Exploring the heart health knowledge among newly diagnosed cardiac patients in Aotearoa New Zealand: A convergent mixed methods inquiry

A thesis submitted in fulfilment of the requirements for the degree:

Doctor of Philosophy (PhD)

by

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for the University of Canterbury, New Zealand.

2023
Abstract

**Background:** Cardiovascular diseases (CVDs) remain the leading cause of mortality worldwide, accounting for 32% of global deaths (World Health Organization [WHO], 2021). In Aotearoa New Zealand, ischaemic heart disease stands as the primary cause of death among various demographic groups, with 175,000 people living with heart disease (Heart Foundation, 2023a). Secondary prevention, specifically cardiac rehabilitation, has been proven to reduce mortality rates and further cardiac events. However, the effectiveness of such programmes relies on patients’ comprehension.

**Aim:** This research sought to investigate the current levels of understanding among individuals diagnosed with cardiovascular disease in Aotearoa New Zealand following their first engagement with acute cardiac hospital services. A tailored model for cardiac health education in acute care settings is proposed.

**Method:** Employing a fixed convergent mixed methods research design, by nationally administering a previously validated questionnaire, across five prominent cardiac centres throughout the country, while also conducting focus groups and individual interviews in Canterbury.

**Results:** The Aotearoa New Zealand knowledge scores obtained from the survey were parallel with international studies, indicating an overall ‘acceptable’ level of knowledge (63.04±13.38), with disparities associated with demographic characteristics such as prior educational levels, employment, smoking habits, age, and gender. Patients exhibited varying levels of knowledge across different aspects of cardiac health.

Qualitative findings revealed that patients perceived good knowledge of risk factors but struggled with medication instructions and exercise guidelines. Both
patients and healthcare professionals highlighted a lack of formal assessment of understanding during the inpatient period and a need for standardised approaches. Information overload emerged as a potential barrier to knowledge retention. Moreover, the study highlighted the interplay between cardiovascular disease and mental health.

Mixed analysis revealed disparities and alignments between knowledge scores and acute cardiac patient and health care professionals’ insights, emphasising the impact of information overload on knowledge retention and the importance of mental health screening.

**Conclusion:** Despite progress in reducing CVD rates, there is a need for acute hospital cardiac rehabilitation, as it remains a crucial connection to specialised cardiac healthcare. The study recommends a future model of acute education practice, including rapid knowledge assessment and mental health screening. Addressing these aspects can improve patient outcomes and contribute to the ongoing efforts to combat cardiovascular diseases.
Acknowledgments

I would like to express my deepest gratitude to the individuals and institutions who have played pivotal roles in my journey throughout this research endeavour. First and foremost, I extend my sincere appreciation to my dedicated supervisors—Dr Alison Dixon (primary supervisor) and Dr Isabel Jamieson (secondary supervisor). Their unwavering support and expert guidance have been invaluable in shaping me into the researcher I am today. Their approach allowed me the autonomy to explore various paths, empowering me to chart my course to the culmination of this research. I am deeply appreciative of their patience and perseverance in assisting me with refining my writing skills. Throughout this process, I have never felt anything less than wholehearted support.

In addition to the exceptional support from Alison and Isabel, I offer special recognition to Associate Professor Cathy Andrews. As my former head of department, it was her unwavering belief in my potential that set me on this scholarly journey 15 years ago, transitioning me into the field of nursing education in New Zealand. I extend my heartfelt gratitude to Cathy for her faith in me and her encouragement to embark on this path. Cathy’s profound contributions to nursing education in New Zealand are immeasurable, and I consider myself immensely privileged to have had the opportunity to collaborate with such a visionary leader.

I extend my heartfelt acknowledgment to the various cardiology departments across Aotearoa New Zealand; specifically, the former Canterbury District Health Board (DHB), Southern DHB, Capital and Coast DHB, Waikato DHB, Waitemata DHB, and Counties Manukau DHB. Their unwavering support and cooperation were pivotal in the successful execution of this research. I wish to offer a special thank you to Ruth Davison, Wendy Maginness, and Sheryl Gregson at Canterbury DHB for
their invaluable support throughout both the quantitative and qualitative phases of this study. Furthermore, my deepest gratitude goes to all the study participants, whose generosity in sharing their time, knowledge, and experiences was indispensable in shaping the insights and findings of this research. Their contributions have been immeasurable, and I am truly thankful for their involvement in this study.

I wish to acknowledge the invaluable assistance provided by Margaret Paterson, subject librarian for Health Science. Margaret’s expert guidance and support in literature reviews and EndNote management have been instrumental in times when I felt overwhelmed by the magnitude of the task at hand. Additionally, I extend my gratitude to Professor Chris Frampton from the University of Otago, as well as Dr Matt Hobbs and Dr Elena Moltchanova from the University of Canterbury, for their invaluable assistance with statistics. Furthermore, I am deeply appreciative of the exceptional support offered by Dr Lyn Lavery at Academic Consulting, particularly with qualitative data analysis and NVIVO.

I would like to acknowledge the supportive environment of the University of Canterbury, where I have completed my PhD. The institution’s abundant resources, dedicated staff, and vibrant culture have greatly facilitated this journey. Working within its state-of-the-art facilities has been an absolute pleasure, and being a student in the city of Christchurch has been truly inspiring.

I extend my heartfelt appreciation to my colleagues at both the former Ara Institute of Canterbury (now Te Pūkunga) and the University of Canterbury. Their unwavering support, insightful advice, and camaraderie have been a source of strength throughout this journey. I offer special thanks to Dianne Hudson, Kirsten
Gunn, Kay Milligan, Karen Edgecombe, and Margaret Hughes for their exceptional support, guidance, and coffees.

I owe a debt of gratitude to my parents, who, despite not having had the opportunity to complete their own formal education, instilled in me the profound value of learning. I thank them for their sacrifices during my formative years; ensuring that my siblings and I had access to a world-class education and laying the foundation for us to pursue our dreams and aspirations.

Lastly, my deepest and most significant acknowledgment goes to my beloved husband, John, and my cherished children, Edwin and Elia. You are my world, and I am profoundly thankful for all that you are to me. John, your support, friendship, and steadfast presence have been my rock throughout this journey. To Edwin and Elia, you are my proudest accomplishments, two remarkable young individuals whom I am profoundly privileged to call my children. If there is one lesson I wish to impart to you, it is that achievements are not solely measured by financial gain; rather, by the sense of purpose and pride derived from the journey itself. To John, Edwin, and Elia, I acknowledge and appreciate the sacrifices and unwavering support you have provided, especially in the past 12 months, as I worked tirelessly to complete this thesis.
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Glossary

**Acute Coronary Syndrome (ACS):** A spectrum of conditions, including unstable angina and heart attacks (myocardial infarction/MI), caused by reduced blood flow to the heart.

**Angina Pectoris:** Chest pain or discomfort resulting from reduced blood flow to the heart muscle, often due to narrowed or blocked coronary arteries.

**Atherosclerosis:** The accumulation of fatty deposits (plaques) in the arteries, a major cause of heart disease.

**Cardiac Resynchronisation Therapy (CRT):** A treatment for heart failure that involves pacing both ventricles of the heart to improve its pumping ability.

**Cardiovascular Diseases (CVDs):** Conditions that affect the heart or blood vessels, including heart diseases, heart attacks (MI), strokes (cerebral vascular accidents/CVA), and many other heart and blood vessel conditions.

**Cerebrovascular Disease:** A group of medical conditions that affect the blood vessels in the brain. It includes conditions such as stroke, transient ischemic attack (TIA or ‘mini-stroke’), and other disorders.

**Cholesterol:** A type of fat in the blood; high levels of which can contribute to CVD.

**Circulatory System:** The complex network of organs, vessels, and tissues responsible for transporting blood, oxygen, nutrients, and waste products throughout the body. Includes the heart and blood vessels.

**Congenital Heart Disease (CHD):** Refers to structural abnormalities in the heart present at birth that can affect the heart’s chambers, valves, or blood vessels.
Coronary Artery Bypass Grafting Surgery (CABG): A surgical procedure to improve blood flow to the heart by creating new pathways for blood to bypass blocked or narrowed coronary arteries.

Coronary Artery Disease (CAD): A common and serious cardiovascular condition characterised by the accumulation of fatty deposits (plaques) in the coronary arteries, leading to reduced blood flow to the heart muscle and an increased risk of MI, angina, and other heart-related problems.

Diabetes Mellitus (DM): A chronic metabolic disorder characterised by high blood sugar levels, which can increase the risk of CVD. Can be classed as Type 1 Diabetes Mellitus (T1DM) or Type 2 Diabetes Mellitus (T2DM).

Exertional Angina: Chest pain or discomfort that occurs during physical activity due to reduced blood flow to the heart.

Heart Failure (HF): A chronic condition where the heart is unable to pump blood effectively.

Heart Valve Replacements: Surgical procedures to replace damaged or diseased heart valves with artificial valves.

Hypertension: High blood pressure, a chronic medical condition that can lead to heart disease, CVA, and other health problems.

Hyperlipidaemia: High levels of lipids (fats) in the blood, a risk factor for CVDs.

Inpatients: Patients who are admitted to a hospital and receive medical care while staying there.

Intra-Cardiac Defibrillator (ICD): Placement of a device in the heart to monitor and correct life-threatening irregular heart rhythms.
**Ischemic Heart Disease (IHD):** A condition characterised by reduced blood flow to the heart muscle, commonly known as CAD.

**Iwi:** A Māori term that refers to a tribe or group within the indigenous Māori people of Aotearoa New Zealand.

**Māori:** Indigenous people of Aotearoa New Zealand, comprising various iwi groups.

**Morbidity:** The state of being diseased or unhealthy, often used to refer to the prevalence of a specific disease in a population.

**Mortality:** The rate of deaths within a population, often used to assess the impact of diseases or health interventions.

**Non-ST Elevation MI:** A type of heart attack MI without ST-segment elevation on an ECG.

**Outpatients:** Patients who receive medical care at a hospital or clinic without being admitted for an overnight stay.

**Pasifika:** Refers to the peoples of the Pacific Islands, including those from countries such as Fiji, Samoa, Tonga, and others.

**Peripheral Vascular Disease (PVD):** A circulatory disorder that affects blood vessels outside the heart and brain, primarily those in the limbs (usually the legs).

**Pulmonary Vessel Disease:** Encompasses various conditions affecting the pulmonary veins, which are responsible for carrying oxygenated blood from the lungs back to the heart.

**Primary Percutaneous Coronary Intervention (PCI):** A procedure to open blocked coronary arteries during a heart attack/MI.
**Rheumatic Heart Disease (RHD):** A condition that results from untreated or inadequately treated streptococcal infections, such as strep throat. These infections can lead to inflammation in the heart, which can cause scarring of heart valve.

**Social Determinants of Health:** The conditions and factors in the social and economic environment that influence an individual’s health and well-being.

**ST Elevation MI:** A type of heart attack characterised by ST-segment elevation on an electrocardiogram (ECG).

**Stenting:** A medical procedure that involves inserting a small tube (stent) into a blocked or narrowed blood vessel to keep it open.

**Strokes (Cerebrovascular Accidents/CVA):** Sudden disruptions of blood flow to the brain, leading to brain damage and neurological symptoms.

**Thrombolysis:** Medical treatment involving the dissolution of blood clots, often used in the context of heart attacks/MI and strokes/CVA.

**Unstable Angina:** A condition where the heart does not receive enough blood flow and oxygen, often a precursor to a heart attack.

**Whānau:** A Māori term for extended family or community, emphasising collective well-being and support.
Publications and Awards Arising

Presentations

Short, K., Jamieson, I., & Dixon, A. (2022, October). *A national study exploring New Zealand patients understanding about their ‘heart health’: a convergent mixed methods research design*. Oral presentation at the HRSC Emerging Researcher Awards 2022, Christchurch, New Zealand.


**Short, K.** (2019, July). *Do patients understand cardiac education?* A New Zealand study. Presented to the 3MT (Thesis in 3 minutes) competition, School of Health Science, University of Canterbury, Christchurch, New Zealand.


**Short, K.** (2019, March). *Do patients really understand us?* Oral presentation at the Medico Legal Congress, Sydney, Australia.

**Awards, Scholarships, Grants Arising**

2020 The New Zealand Nursing Education and Research Foundation Grant – awarded $1,000.

2020 School of Health Science, University of Canterbury. Scholarship awarded for course fees 2020 – awarded $3500.

Chapter 1: Introduction

This chapter serves as an overview of cardiovascular disease (CVD), both at a global and national level. It presents the risk factors associated with CVD and offers insight into the current treatment options. Within this discussion, the gaps in the current literature are identified and provide a basis for establishing the rationale for conducting this research. This chapter also highlights the likely contributions the study may have for practice. Lastly, this chapter provides an overview of the subsequent chapters, outlining the structure and content of the remaining thesis.

1.1 Background and Context

The motivation behind this Doctor of Philosophy (PhD) topic stems from my passion for education and clinical work with patients with CVD. I often witnessed colleagues expressing frustration when patients experienced adverse or repeated events due to non-compliance with advice and education. These experiences led me to question the effectiveness of current educational approaches and whether patients’ understanding of the information provided to them is adequately assessed.

Furthermore, being personally aware of the impact of chronic illness through my family’s health history, I felt compelled to contribute to the profession by seeking ways to improve the quality of care and services we offer. My hope is that this research will contribute towards enhancing patient outcomes and improve the overall care provided to individuals living with CVD.

1.1.1 An Overview of CVD

With an estimated 17.9 million deaths (32%) each year attributed to CVDs, they collectively remain the leading cause of mortality worldwide (World Health Organization [WHO], 2021). While CVD is commonly associated with heart attacks
(ischemic heart disease [IHD]) and strokes (cerebrovascular accidents [CVAs]), it actually encompasses a diverse range of disorders affecting the heart and blood vessels. These conditions include heart disease, cerebrovascular diseases, peripheral and pulmonary vessel diseases, congenital heart diseases (CHDs), rheumatic heart disease (RHD), and numerous other conditions affecting the circulatory system (WHO, 2021). According to the WHO (2021), approximately 85% of disease related deaths are attributed to heart attacks or strokes.

These conditions represent significant burden on populations, especially from low- and middle-income countries (WHO, 2021). According to the American Heart Association (2022), the global regions with the highest mortality rates attributable to CVD, are in Eastern Europe and Central Asia. Furthermore, high levels of CVD were also seen in Oceania, North Africa, the Middle East, Central Europe, sub Saharan Africa, and Southeast Asia. The geographical regions with the lowest prevalence of CVD were locations of higher-income countries and included Asia Pacific, Australasia, Western Europe, North America, and Latin America (American Heart Association, 2022; Vaduganathan. et al., 2022). CVD has been on the rise in low-income countries for decades, and these differences may be reflective of limited access to primary treatment and secondary prevention strategies (Husain et al., 2020).

Roth et al. (2020) acknowledged the prevalence of CVD has nearly doubled between 1990 and 2019, as more people are now living with the sequela of CVD morbidity. These authors reported that cases have risen from 271 million in 1990 to over 523 million cases in 2019. They also recognised that the burden associated to CVD, such as years living with disability and years of life lost to premature death, have significantly increased (Roth et al., 2020). Several contributing factors to CVD
are driving this statistical increase. These factors are often related to preventable conditions that contribute to cardiometabolic disease; heart attack, stroke, diabetes, insulin resistance, obesity, and non-alcoholic fatty liver disease. Furthermore, adverse behavioural, environmental, and social factors compound the situation leading to escalating rates of people living with CVD (Roth et al., 2020). To effectively mitigate the rising incidences of CVD, it will be imperative for healthcare providers and communities to address environmental and social determinants of health, thereby optimising health outcomes (Roth et al., 2020).

1.1.2 CVD in Aotearoa New Zealand

In 2020, the primary cause of mortality in Aotearoa New Zealand was cancers; all types combined (109.9 per 100,000), ischaemic heart disease (IHD; 41.9 per 100,000), and cerebrovascular diseases (18.9 per 100,000) (Te Whatu Ora - Health New Zealand, 2022b). CVDs accounts for one-third of all deaths in Aotearoa New Zealand, being the cause of death for one New Zealander every 90 minutes (Heart Foundation, 2023a). As a standalone condition, IHD is the leading cause of death in Aotearoa New Zealand for Māori men, non-Māori men, and non-Māori women. However, for Māori women it is ranked second, with lung cancer being the leading cause of death for this group (Manatū Hauora-Ministry of Health, 2018b). Further, 175,000 people in Aotearoa New Zealand are living with heart disease (Heart Foundation, 2023a). Despite the notable decline in CVD mortality rates since the peaks observed in the 1960s and early 1970s, at which time rates were approximately five times higher than current rates, declines have plateaued over the past decade (Te Whatu Ora - Health New Zealand, 2022a).

It is important to recognise that in Aotearoa New Zealand, twice as many women die from a heart disease related aetiology compared to any other single
condition (Te Whatu Ora - Health New Zealand, 2022a); which is in contrast to the prevailing notion that IHD predominantly afflicts men. The Global Burden of Disease (2020) study, reported that in recent years certain countries with a high-socioeconomic index have witnessed a decline in the age-standardised CVD mortality rates for women. Nevertheless, it has been observed that these rates have plateaued and some countries, like Canada, the United States, and Aotearoa New Zealand, have even reported annual increases over specific years during the last decade (Roth et al., 2020; Te Whatu Ora - Health New Zealand, 2022b). Conversely, in some low-socioeconomic countries there is a concerning trend of worsening CVD rates for women. In some cases, the highest rates of CVD mortality have now shifted from men to women (Roth et al., 2020).

The burden of the disease lies with Māori and Pacific Island ethnic groups in the Aotearoa New Zealand populations (Te Whatu Ora - Health New Zealand, 2022a). CVD is a leading cause of life expectancy disparities between Māori and non-Māori in the country (Disney et al., 2017). The disparities are notably amplified among Māori residing in a rural community, where no discernible progress has been reported over the past decade (Cameron et al., 2012). Indigenous populations worldwide have a history of CVD inequity and in countries with a common history of colonisation like Aotearoa New Zealand, Australia, and Canada, there are significant differences in CVD health outcomes for their Indigenous populations (Crengle et al., 2018). Mortality rates associated with CVD for Māori males (197.9 per 100,000) are 1.9 times higher than non-Māori males (103.5 per 100,000) and 2 times for Māori females (133.2 per 100,000) compared to non-Māori females (68.1 per 100,000) (Te Whatu Ora - Health New Zealand, 2022a).
Reassuringly, there has been a decline in mortality rates for all ethnic groups in Aotearoa New Zealand over a significant number of years (Grey et al., 2016; Manatū Hauora-Ministry of Health, 2023); a trend seen in a number of developed countries worldwide (Amini et al., 2021; Jagannathan et al., 2019; Jennings et al., 2012; Mensah et al., 2017; Nedkoff et al., 2012; Schmidt et al., 2012; Yeh et al., 2010). This decline in CVD mortality is attributed to developments in both prevention and treatment strategies (Mensah et al., 2017). These advancements include improved screening, increased sensitivity of cardiac markers, a refined approach to classifying and treating heart events (most commonly myocardial infarctions [MIs] and unstable angina) to acute coronary syndrome (ACS), declining rates of cigarette smoking, improvement in the treatment and control of hypertension and cholesterol, and timely thrombolysis and stenting (Grey et al., 2017; Kontos et al., 2003; Mensah et al., 2017). As a result of these improved treatment and management strategies, alongside advancements in pharmacotherapy, individuals now diagnosed with IHD are living longer with improved outcomes; there are reduced hospital admissions and decreasing mortality rates (Boisclair et al., 2018; Mensah et al., 2017).

The considerable decline in CVD rates in Aotearoa New Zealand could suggest that primary and secondary prevention programmes are having a positive impact alongside advanced treatment modalities. However, health care professionals cannot afford to become complacent as CVD is still the leading cause of death worldwide, despite declining mortality rates in recent decades (Dalal et al., 2015). In fact, as already noted, there is recent evidence to suggest that the declining rates have abated and, in some populations, may be showing evidence of an early reversal (Mensah et al., 2017).
1.1.3 CVD Risk Factors

In the context of health, risk factors are characteristics that increase an individual’s likelihood of developing a particular disease or experiencing negative health outcomes (Australian Institute of Health and Welfare, 2022). CVD is influenced by a number of modifiable risk factors that can potentially be changed, and non-modifiable factors that cannot be altered (Assessing cardiovascular risk: What the experts think, 2010).

In 1948, the United States public health service initiated a population based, observational cohort study to prospectively explore the epidemiology and risk factors of CVD (Boston Medical Center, n.d.). This work became known as the Framingham Study and is accredited for much of the foundational information known about cardiovascular risk factors. The original cohort (N=5209; 2873 females, 2336 males) comprised two-thirds of the adult population of Framingham, Massachusetts (Boston Medical Center, n.d.). The research has since developed into a longitudinal study and expanded to include participants across diverse age categories, become multi-generational, and now gathers data regarding a wide range of health conditions (Boston Medical Center, n.d.).

Brown et al. (2023) reported the non-modifiable factors include advancing age, gender, ethnicity, and family history. Whereas, modifiable factors include having a history of hypertension, hyperlipidaemia, diabetes mellitus, obesity, smoking, poor diet, and a sedentary lifestyle. Additionally, Brown et al. highlighted several emerging factors that have also been found to have an increased risk of developing CVD. These include non-alcoholic fatty liver disease (NAFLD), chronic kidney disease (CKD), systemic lupus erythematosus (SLE), rheumatoid arthritis (RA), inflammatory bowel disease (IBD), human immunodeficiency virus (HIV),
thyroid disease, low testosterone levels, and Vitamin D insufficiency (Brown et al., 2023).

Further to these reported characteristics, there are well established psychosocial factors associated with increased risk of CVD. Mulle and Vaccarino (2013) reported these factors include low socioeconomic status, limited access to social support, increased workplace and familial stress, and/or a history of anxiety or depressive disorders. Psychosocial factors have a complex relationship with cardiovascular health and are likely to be a major cause of morbidity and mortality disparities between population groups (Peterson, 2020). Peterson (2020) suggested that adverse psychosocial experiences predispose an individual to negative behavioural risks such as smoking, substance misuse, poor diet and a more sedentary lifestyle. In association with the inflammatory and neurohormonal physiological response to stress, these psychosocial factors have a major influence on cardiovascular health outcomes and well-being.

1.1.4 CVD Treatments

There are several effective strategies employed in the treatment and prevention of CVD. According to Leong et al. (2017), effective strategies for CVD management and prevention in high-income countries have seen a significant reduction in mortality rates. The authors attribute these results to strategies that promote the modification of risk factors and implementation of improved therapeutic interventions (Leong et al., 2017).

Treatment options for CVD will depend on the underlying pathophysiology of the disease process. As identified above, CVDs are varied and have diverse aetiology. The primary objective of treatment is focused on symptom control and to reduce the risk of subsequent heart attacks and worsening morbidity. Medications
play a significant role in the management of CVD. Beta blockers, nitrates, calcium channel blockers/calcium antagonists, angiotensin-converting enzyme (ACE) inhibitors/angiotensin II receptor blockers (ARBs), antiplatelet agents and statins are all used to help prevent the risk of having a heart attack or stroke (Saraste & Knuuti, 2020). Furthermore, nonsurgical techniques such as coronary angioplasty and percutaneous coronary interventions (stenting) are used to widen narrowed coronary arteries and have been shown to significantly reduce the rate of coronary artery re-narrowing (Chew et al., 2016).

Coronary Artery Bypass Grafting (CABG) is a surgical procedure performed to restore flow to the heart beyond the site of blockage (Alexander & Smith, 2016). This procedure typically involves grafting a new blood vessel to two specific locations, below the narrowing and often emerges from the aorta, effectively creating a bypass around the narrowed coronary artery. As a result of these treatment advancements, and with the implementation of primary and secondary prevention programmes, patients are experiencing significantly reduced mortality from CVD and living longer.

In addition to treatment options, primary and secondary prevention programmes play a critical role in effectively managing CVD. There are several lifestyle management prevention strategies that can be implemented to reduce the risk of CVD. These prevention strategies yield best results if implemented as part of a primary prevention programme. However, they also serve as the foundation for many secondary prevention programmes. Primary prevention is concerned with mitigating the risk for an individual who is already susceptible for developing CVD; therefore, minimising the chance of experiencing a heart event, stroke, requiring treatment interventions, or developing additional forms of CVD (Harvard T.H. Chan School of Public Health, 2022).
Secondary prevention is implemented following an individual’s diagnosis of heart disease or after experiencing a heart event that requires medication management, stenting, or cardiac surgery (Harvard T.H. Chan School of Public Health, 2022). The principal objective of a secondary prevention programme is to palliate the risk of further heart attacks, strokes, disease progression, and premature death (Harvard T.H. Chan School of Public Health, 2022). These programmes offer education and support pertaining to various aspects of heart health including dietary and alcohol habits; smoking cessation; participation in exercise; weight management; and disease related management such as cholesterol control, medical conditions management, medication and symptoms management, as well as risk factor awareness (Liew et al., 2021). The discussion within this thesis will focus on secondary prevention programmes for patients with CVD, with a specific emphasis on those diagnosed with IHD.

1.2 Research Gaps and Rationale

The current research demonstrates several gaps; and, to the best of my knowledge, there is a lack of published national data on the baseline heart health knowledge for individuals diagnosed with CVD. Additionally, although some countries have reported on population knowledge levels (see Chapter 2), there is limited global comparative research examining the differences between patients’ and health professionals’ perceptions of the patient’s understanding of heart health. Such information would highlight potential gaps between the patient and health care professionals’ perceptions, and the quantifiable assessment of knowledge. Obtaining this information will provide valuable insights for the development of cardiac rehabilitation programmes that prioritise a patient-centred approach by enhancing self-management and overall well-being.
Gaining an understanding of a population’s baseline health literacy and knowledge is vital when developing education and health promotion strategies. The information allows for the identification of existing gaps enabling effective improvement of education strategies. By assessing what individuals already know about their heart disease, healthcare providers can focus on areas of misunderstanding or misinformation and, in turn, facilitate patient-centred and more impactful cardiac rehabilitation programmes. Furthermore, by incorporating a practice that regularly assesses patient’s understanding, ongoing evaluation of education and the effectiveness of programmes is completed. In summary, understanding the baseline knowledge of a population will provide a critical foundation for developing evidence-based programmes, and will help customise cardiac rehabilitation education to meet the needs of the Aotearoa New Zealand population.

1.3 Research Purpose

In consideration of the identified gaps, the overarching aim of this research is twofold. First, it aims to investigate and evaluate the current comprehension levels of individuals diagnosed with CVD in Aotearoa New Zealand regarding their heart health. This inquiry is dedicated to revealing the prevailing understanding among this demographic concerning various aspects of cardiac health and well-being.

Second, this research is dedicated to conceptualising a future model for cardiac health education in acute care settings. It is a deliberate effort to scrutinise and, where necessary, enhance the existing nationwide approaches to cardiac rehabilitation education within the Aotearoa New Zealand healthcare landscape. In doing so, this research aspires to address the specific knowledge needs of the
population related to heart health, ultimately proposing a more tailored framework for cardiac healthcare delivery within the acute cardiac context in Aotearoa New Zealand.

1.4 Research Questions and Objectives

To fulfil the above stated purposes, the research will answer the following mixed methods research (MMR) questions and objectives.

1.4.1 Research Questions

1. What do newly diagnosed patients understand about heart health following their first engagement with acute cardiac hospital services?

2. What are cardiac patients and health care professionals’ understandings of patients’ levels of heart health knowledge.

1.4.2 Research Objectives

1. To assess what newly diagnosed patients understand about their cardiac health, following engagement with acute cardiac hospital services, utilising a previously validated and verified Coronary Artery Disease Education Questionnaire II (CADE-QII).

2. To describe the patient demographics that may influence heart health knowledge scores.

3. To investigate what patients and cardiac health care professionals understand patients know after engagement with acute cardiac hospital services.

4. To explore how patients and cardiac health care professionals assume patients’ knowledge is assessed
5. To analyse and identify, through the integration of data, variations between knowledge scores and participants’ assumptions of patients’ understandings.

6. To use the research outcomes as guidance to inform acute cardiac rehabilitation education for acute hospital services.

1.5 Significance and Contributions

The current research will investigate patients’ understandings of their heart health after a first-time diagnosis of CVD, along with the cardiac patients’ and health care professionals’ understandings of the patient’s levels of knowledge. The findings are anticipated to have significant implications across a number of areas including nursing practice and education, the patient’s overall well-being, healthcare service delivery, and research in the context of mixed methodology. These contributions are expected to bring benefits by fostering improve health services, promoting improved patient outcomes, and adding to the body of literature that is already exploring MMR.

Understanding patients’ knowledge gaps and perceptions of their heart health can help health care professionals design patients centred education and may enhance effective communication strategies. The findings from the research can help inform the development of educational interventions. This research will consider patient CVD education in the specific context of Aotearoa New Zealand and New Zealanders, with the aim to improve patient comprehension, self-management, and promote culturally reflective care.

Currently, in Aotearoa New Zealand there is no formalised process for routinely assessing patients’ baseline understanding of their CVD; nor is understanding regularly assessed in a formal capacity at the exit point of a cardiac
rehabilitation programme. This research may contribute to the further development and refinement of a tool that could be used to assess patient understanding for the purpose of creating individualised cardiac rehabilitation programmes, and to help ensure that patients do not have essential gaps or misconceptions in their knowledge.

This work has the potential to make a valuable contribution to the field of MMR by providing an example of how quantitative and qualitative data can be integrated and analysed to gain a more comprehensive understanding of cardiac patients’ levels of knowledge and perceptions. Furthermore, it may offer awareness of how the adoption of a mixed methods ontological and epistemological stance can help establish a robust foundation for developing rigorous, reliable, and valid research that promotes comprehensive insights.

This research is likely to identify further gaps in knowledge and highlight areas that require further investigation. These gaps can inform future research inquiry and are likely to provide a foundation for my future body of work with a specific focus on patient understanding, effective educational delivery, and enhanced communication for the objective of improving patients’ outcomes, along with their experiences navigating the health system.

In summary, this research has significant potential to inform educational delivery, improve patient outcomes, help shape cardiac rehabilitation policy and guidelines, and contribute to the methodological advancement of the MMR paradigm. By identifying gaps in this area of research, further research opportunities will be identified. There will be potential benefits for nursing practice, healthcare delivery, and research, all with the aim of achieving best patient outcomes in the context of cardiovascular health.
1.6 Contextual Factors Influencing the Research

This section provides an overview of the contextual factors that exerted a significant impact on the course and execution of this study. The relationship of these factors contributed to a dynamic research environment, shaping the design, data collection process, and outcomes.

The emergence of the COVID-19 pandemic (WHO, 2020) exerted profound effects on various aspects of the study. The initiation of the scheduled data collection was hampered as the pandemic swiftly prompted widespread concerns regarding the vulnerability of patients with CVD. This necessitated a temporary pause to data collection efforts, reflecting the need to prioritise patient safety and adhere to evolving public health guidelines.

The necessitation of multiple national lockdowns (Te Whatu Ora–Health New Zealand, 2022), driven by the progression of the COVID-19 pandemic, resulted in considerable disruptions to both the national consultation process and the planned data collection timeline. These lockdowns caused delays in data collection and provoked challenges related to maintaining participants’ engagement in the study.

An unforeseen cyber-attack (InPhySec., 2022) targeted one of the participating district health boards (DHBs), which had initially committed to serve as a data collection site for the study. The repercussions of the incident resulted in disruptions to the clinical setting creating an increase demand on the workload of the clinical staff. This ultimately resulted in the unfortunate withdrawal of the hospital’s participation due to the substantial operating constraints imposed by the cyber-attack.

Notably, Aotearoa New Zealand’s health system underwent a significant restructuring during the course of this study. The transition from 20 independent DHBs to a unified entity, Te Whatu Ora – Health New Zealand, brings a shift in
healthcare governance and service delivery. Simultaneously, the establishment of Te Aka Whai Ora – Māori Health Authority, in partnership with Manatū Huora and Te Whatu Ora, aims to ensure equitable health outcomes for Māori communities. These structural changes, effective from 1 July 2022, will have implications for future service provision and Māori health considerations.

These contextual factors collectively underscore the intricacies and challenges that melded the trajectory for this study. The following chapters will discuss how these influences were navigated, managed, integrated and how they ultimately shaped the study’s findings; highlighting the complicated interplay between health research and the broader contextual landscape.

1.7. Overview of the Thesis

This section provides an overview of the following chapters of this thesis.

1.7.1 Chapter 2 – Literature Review

This chapter provides a comprehensive and critical overview of cardiac rehabilitation and the relevance of health literacy in the context of CVD. It explores the importance of patient education and the assessment of disease related health knowledge, with a focus on cardiac education. Furthermore, this chapter presents the methodology employed and the key findings from a comprehensive systematic review of 32 publications. This systematic review evaluates the knowledge of patients diagnosed with CVD and the contextual factors that influence understanding. Through the synthesis of current literature, the chapter provides an understanding of the current context of patient knowledge in the area of CVD.
1.7.2 Chapter 3 – Research Methodology

Chapter 3 introduces the philosophical position adopted by the researcher when addressing the research question. It provides an overview of the MMR methodology and encompasses a discussion about common philosophical stances associated with the mixed methods paradigm, within the context of nursing science.

This chapter discusses how the research is situated within the ontological position of dialectical pluralism and an epistemological standpoint of pragmatism. It explores the rationale for these positions and their relevance for the study. By presenting the philosophical framework of the research, this chapter establishes the foundation and provides understanding towards the approach taken for data collection and analysis.

1.7.3 Chapter 4 – Theoretical Frameworks and Conceptual Model

Chapter 4 provides a concise overview of the theoretical framework and conceptual model underpinning this research exploring patient cardiac knowledge. It examines the Health Belief Model (HBM) and the Chronic Care Model (CCM), highlighting their significance in understanding patient perceptions, behaviours, and management of chronic conditions.

1.7.4 Chapter 5 – Research Design

This chapter presents the research design employed to address the research questions and meet the study’s aims. It provides a comprehensive outline and discussion of the approach, methods, and procedures in this convergent mixed methods study. The chapter begins by detailing the processes used to conduct the two-phase nature of the mixed methods design. Phase one is the qualitative arm of this study. This chapter includes information about how the semi-structured focus
groups and interviews were conducted, the criteria for evaluating data quality, and the methods of analysis.

Furthermore, the chapter outlines phase two. It will present the processes used for collecting quantitative data, specifically through a national questionnaire. The discussion will provide an overview of the administration and implementation of the questionnaire. This chapter will consider how the mixed methods design integrates the quantitative and qualitative data to provide more in-depth and meaningful understandings.

Finally, this chapter considers any potential bias and ethical implications for the study. By detailing the research design, data collection methods, and outlining the analytical procedures, the chapter provides a clear outline of the research study to ensure transparency and promote rigour in the research process; ultimately, contributing to the reliability and validity of the findings.

1.7.5 Chapter 6 – Quantitative Data Analysis and Reporting of Results

Chapter 6 will present the quantitative data analysis conducted to address the quantitative component of the MMR question. Analysis aligns with the first objective of this research to assess what patients understand about their cardiac health, utilising the previously validated and verified Coronary Artery Disease Education Questionnaire II (CADE-QII). In addition, this chapter will describe the demographic characteristics that influence knowledge scores.

This chapter outlines the procedures used to analyse the quantitative data collected from the national questionnaire. It details the statistical methods used to assess and interpret the data, including descriptive statistics, inferential analysis, and
consideration of any correlations. The chapter provides a rationale for the chosen analytical processes to ensure reliability of the findings.

This chapter presents data that contributes to developing a comprehensive understanding of the heart health knowledge of patients in Aotearoa New Zealand, who have been diagnosed with CVD. The data from this chapter supports the integration of the findings within the broader mixed methods study, which works towards the overall validity and reliability of the thesis.

1.7.6 Chapter 7 – Qualitative Data Analysis and Reporting of Results

Chapter 7 focuses on the qualitative data analysis conducted to address the qualitative component of the MMR question, specifically investigating what were the cardiac patients’ and health care professionals’ insights towards patients’ levels of understanding. This analysis is crucial for achieving aims three and four of the research, which endeavour to explore what health care professionals and patients believe is understood by patients after engaging with the acute hospital services, and how health care professionals and patients believe understanding is assessed.

This chapter provides an in-depth discussion of the processes employed during the qualitative data analysis. It outlines the chosen methods used to organise, code, and interpret the data gathered during the focus groups and interviews. The analytical processes use to identify the themes and recurring concepts within the data will be presented and justified.

The discussion presented in this chapter offers insight into the perceptions and beliefs of both the patients and health care professionals regarding disease understanding in the context of the acute hospital setting, and supports the integration of the qualitative data within the broader mixed methods study.
1.7.7 Chapter 8 – Mixed Methods Analysis and Reporting of Results

Chapter 8 focuses on the integration and analysis of the quantitative and qualitative data within a mixed methods framework and is presented as a six-stage framework employed for the integration of the quantitative and qualitative datasets within a convergent mixed methods design. The framework provides a systematic approach for merging and analysing the two types of data, ensuring a comprehensive and coherent process of analysis.

To support the integration process, joint-displays are utilised at two levels in this chapter. First, they are being employed as a tool to mitigate the integration of the datasets, aiding in the identification of connections, patterns and relationships between the quantitative and qualitative data. Second, joint-displays are used to report the findings of the integrated analysis. They offer a visual representation that synthesises the results, enabling clear interpretation of the mixed methods findings.

The use of the six-stage framework and utilisation of the joint-displays in this chapter ensures a rigorous and systematic integration and analysis of the quantitative and qualitative data. The chapter contributes to the overall validity and reliability of the study by demonstrating robust processes towards integration and analysis. It highlights the strength of using mixed methods to generate a more comprehensive insight than may be seen via a single method alone.

1.7.8 Chapter 9 – Discussion

Chapter 9 offers an extensive interpretation and critical analysis of the research findings in relation to the research questions and aims. Within this chapter a discussion of the findings will be presented to reflect the convergent mixed methods design employed in the study. The discussion of the results will begin with the quantitative analysis of the national questionnaire, followed by a comprehensive
discussion of the key findings from the qualitative analysis. These components will then be assimilated to present a detailed account of the findings within the context of mixed integration.

1.7.9 Chapter 10 – Interpretations in Context with Theoretical Frameworks and Philosophies.

Chapter 10 presents a thorough examination of the research findings in the context of established theoretical frameworks and philosophical perspectives. The discussion begins by aligning the research outcomes with two theoretical models: HBM and the CCM. This approach reveals the insights derived from the study through the perspectives of these models, establishing a robust theoretical foundation for the interpretations.

Following, the chapter adopts a broader philosophical stance when considering the research outcomes, drawing from the philosophies of dialectical pluralism and pragmatism. Within these philosophical contexts the research findings undergo reassessment and reflection. Through this multifaceted exploration, Chapter 10 is structured to enhance the discourse and deepen comprehension of the significance of the research within the theoretical and philosophical landscape.

1.7.10 Chapter 11 – Implications for Practice

In Chapter 11, the practical ramifications of the research findings within the clinical domain with be explored. This comprehensive exploration assesses their pertinence to real-world applications and introduces a future ‘Model for RAPID knowledge and psychosocial risk assessment - for newly diagnosed in patients with cardiovascular disease’. This chapter represents a bridge between theory and practice, shedding light on the tangible benefits of the research.
1.7.11 Chapter 12 – Conclusion

The concluding chapter circles back to the core research objectives that have guided this study and how they have been answered. It offers a condensed synthesis of the insights acquired through the convergent mixed methods design, followed by a comprehensive discussion into the implications of the findings for future research application.

Furthermore, Chapter 12 provides a balanced evaluation of the study strengths and limitations, and suggests recommendations for both future practice and research. Ultimately, it creates a vital link between the research outcomes and the original research aims, unifying the study’s contributions with its initial purpose.

1.8 Conclusion

Chapter 1 has provided a comprehensive overview of the landscape of CVD at a global and national level. It provided insight into the risk factors and the current treatment options for the disease. This discussion concluded by identifying gaps in the research and established the need for further investigation in this area. Moving forward, Chapter 2 presents a systematic review of the literature that has specifically focused on assessing patients understanding of their cardiovascular health.
Chapter 2: Literature Review

2.1 Introduction

This chapter is presented with three focuses. The first section commences with a comprehensive discussion of cardiac rehabilitation, examining the global and national perspectives. Additionally, section two will explore health literacy in the context of CVD, encompassing patient education and the assessment of disease related knowledge. Subsequently, the third section offers an in-depth presentation of the findings derived from a comprehensive literature review of 32 studies that employed questionnaires to evaluate the knowledge of patients with CVD. Cardiac rehabilitation programmes play a significant role in reducing the burden of CVD. According to Lima et al. (2022), patient comprehension empowers individuals to gain a deeper understanding of their disease progression and fosters the adoption of self-management practices essential for enhancing their long-term health prospects.

2.2 Cardiac Rehabilitation

Secondary prevention (commonly referred to as cardiac rehabilitation) is a multi-faceted comprehensive programme designed to prevent and minimise further physical and psychological impact of CVD (British Association for Cardiovascular Prevention and Rehabilitation, 2023; de Melo Ghisi, Britto, et al., 2015; Santos et al., 2019). The aim is to reduce the incidence of sudden death and re-infarction; to help patients self-manage, promote self-recognition, and control of cardiac disease symptoms; stabilise or reverse atherosclerosis; and promote psychosocial well-being (Dalal et al., 2015; de Melo Ghisi et al., 2013a). Cardiac rehabilitation is a cost-effective strategy that assists patients in integrating and effectively managing the necessary lifestyle and psychological changes required after a diagnosis of CVD.
This multidisciplinary approach is comprehensive in nature and can be individualised to meet the well-being requirements of each person (Benatar et al., 2016). Cardiac rehabilitation is defined by the World Health Organization (1993) as:

the coordinated sum of activities required to influence favourably the underlying cause of cardiovascular disease, as well as to provide the best possible physical, mental and social conditions, so that the patients may, by their own efforts, preserve or resume optimal functioning in their community and through improved health behaviour, slow or reverse progression of disease. (p. 1)

### 2.2.1 Historical Evolution of Cardiac Rehabilitation

Early treatment for a heart attack, known as a MI, emphasised the importance of bedrests and involved confining patients to bed for extended periods of 6 weeks and, in some cases, up to 1 year, to rest the heart (Braunwald, 1998; Certo, 1985). The rationale behind this practice was based on the premise that bedrest could effectively diminish the myocardial workload, subsequently lowering the risk of additional perfusion impairment and minimise the potential for remodelling of the heart muscle (Wenger, 1978). Despite early evidence dating back to the late 1700s suggesting the benefits of exercise as a treatment of angina pectoris, the notion of bedrest remained the prevailing treatment. Bedrest, as a treatment, had serious consequences, such as physical deconditioning, functional decline, prolonged hospital stays, and increased mortality and morbidity (Mampuya, 2012). The concept of cardiac rehabilitation emerged in the 1950s when health care professionals recognised a need to reduce the morbidity sequelae that resulted from prolonged bedrest. A structured programme to support recovery, prevent further cardiac events, and improve outcomes was advised (Redfern et al., 2022).
By the mid-20th century, thinking was starting to evolve and, against strong opposition, two American physicians, Levine and Lown (1951), introduced chair therapy, a treatment where patients were allowed to sit in a chair for 1-2 hours per day. Over time, this treatment approach progressed to include short 3-4 minute walks, which was introduced a month into the patient’s recovery. The scientific community gradually recognised the importance of early mobilisation and acknowledged the detrimental effects of prolonged bedrest (Mampuya, 2012; Saltin et al., 1968). The work undertaken by the likes of Braunwald, Hellerstein, Naughton, Sarnoff, and Sonnenblick helped legitimise the physical and psychological benefits of exercise, and these works became the foundations of what is now recognised as the multidiscipline approach to cardiac rehabilitation (Bethell, 2000; Braunwald, 1998; Naughton et al., 1966).

The 1970s saw a global progression in the management of CVD, accompanied by advancements in treatment approaches. It was during this time that a structured model for cardiac rehabilitation emerged (Redfern et al., 2022). Supervised exercise programmes provided a new approach toward post discharge care and eventually evolved to become what is now recognised as the traditional cardiac rehabilitation programmes. Over the last 40 years, cardiac rehabilitation has undergone a transformation from a simple programme designed to monitor an individual’s safe return to physical activity, to a complex multidisciplinary programme with the primary objective to empower patients to self-manage their condition and optimise their well-being (Mampuya, 2012). This transformation reflects the importance of holistic care to support patients in their journey towards improved health and quality of life.
2.2.2 Evidence Regarding Cardiac Rehabilitation

There is an elevated risk of adverse outcomes after experiencing a MI, including high incidences of re-infarction and a 6-fold higher mortality rate than for individuals without a diagnosis of IHD (Benatar et al., 2016). In a recent systematic review and meta-analysis (Dibben et al., 2023), the benefits of CR were evaluated by synthesising the results of 85 randomised controlled trials involving 23,430 participants. The results confirmed participation in an exercise-based cardiac rehabilitation programme leads to a reduction in mortality rates and reduces the risk of further cardiac events. Additionally, findings indicated a decreased need for subsequent hospitalisations; cardiac rehabilitation supported improved health-related quality of life and was demonstrated to be a cost-effective intervention (Dibben et al., 2023; Kabboul et al., 2018; Shields et al., 2018).

In addition to the well reported physical health benefits attributed to cardiac rehabilitation, there is also increasing recognition of the positive impact on psychological well-being (Dalal et al., 2015). Research by Chauvet-Gelinier and Bonin (2017) highlighted that depression, stress, and anxiety are risk factors for developing CVD. Furthermore, results by Bethell (2000) and Wurst et al. (2019) have demonstrated positive outcomes associated with cardiac rehabilitation engagement.

In a randomised control trial, Wurst et al. (2019) examined the long-term effectiveness of a group-based psychological intervention on promoting physical activity for 202 participants with coronary heart disease. The results indicated that a psychological intervention had a positive effect on exercise capacity with the intervention group maintaining higher levels of function compared to the control group. The intervention participants also showed higher levels of resilience at the end of the cardiac rehabilitation programme. Furthermore, Albus et al. (2019) conducted
a systematic review and meta-analysis involving 4450 participants across 20 studies, to investigate the effects of including a psychological intervention in cardiac rehabilitation compared to exercise-based programmes alone. The findings suggest a trend towards reduced levels of anxiety and depression associated with the inclusion of psychosocial content in a cardiac rehabilitation programme. However, the authors also recognised the need for further research to substantiate these findings (Albus et al., 2019). The available evidence supports cardiac rehabilitation as an effective adjunct treatment, reducing subsequent risk and promoting the psychological well-being of individuals with CVD.

2.2.3 Cardiac Rehabilitation Settings and Different Modes

Formal cardiac rehabilitation has traditionally followed a three-phase approach (Mampuya, 2012; Redfern et al., 2022). This comprehensive process begins with an appropriate patient being referred to the cardiac rehabilitation team. It involves several key components including an individual assessment to develop a personalised care plan, the delivery of an extensive secondary cardiac rehabilitation prevention programme, the subsequent assessment of the individual on completion of the programme, and, where appropriate, a referral is made for long-term cardiac rehabilitation. Finally, the patient will be discharged from all services (British Association for Cardiovascular Prevention and Rehabilitation, 2023; Mampuya, 2012; New Zealand Guidelines Group, 2002).

Traditionally, the first phase of cardiac rehabilitation is clinical inpatient, which often includes education about early mobilisation. This phase aims to assess the patient’s individual situation and address their immediate needs. Education provided during this phase focuses on the patient developing a basic understanding of their heart disease, treatment plan, medication management, activities of daily
living, psychosocial risk, and, ultimately, prepares the patients for a safe discharge so they can manage their condition at home (Liew et al., 2021; Tessler & Bordoni, 2023). Phase one is typically delivered by ward staff, cardiologists, or specialised inpatient cardiac rehabilitation teams. This phase is preferably initiated during the hospital stay or within the first week of discharge through phone communication.

Phase two typically refers to the secondary prevention programme that occurs after the patient is discharged from hospital (Redfern et al., 2022). Ideally the patient and the healthcare team collaborate to identify the individual’s needs, set goals, and design a programme that incorporates the patient’s cultural and health beliefs (Liew et al., 2021). Phase two builds upon the progress made during phase one, and supports the individual’s ability to self-manage.

Phase two is a comprehensive multifaceted guideline-based programme that uses a multidisciplinary approach (Amsterdam Ezra et al., 2014; Bäck & Hansen, 2021; Liew et al., 2021; National Heart Foundation of Australia, 2019; National Institute for Health and Care Excellence, 2020; Scottish Intercollegiate Guidelines Network, 2017; Stone et al., 2021; Woodruffe et al., 2015). It includes regular supervised exercise sessions, education that emphasises lifestyle and risk factor management, condition management, and the provision of psychosocial support. The fundamental goal of the secondary prevention phase, is to enhance the patient’s physical and emotional well-being, improve their cardiac health, and reduce the risk of further events, while empowering them to effectively manage their own condition.

Phase two usually commences 6-8 weeks post discharge from hospital and can be delivered in a variety of diverse settings utilising a number of educational approaches. The specific mode of delivery can be varied and should be tailored to meet the needs of the patient, while maximising the participation and support of
whānau/family/carers/social support network (Liew et al., 2021). The duration of an outpatient programme varies between, and even within, countries but typically these programmes are from 3-6 months duration, and consist of a number of classes/sessions (Mampuya, 2012). Delivery settings can include, but are not limited to, telephone based consultations, electronic or online consultations, home visits, community centre based individual appointments, or community centre based group classes/sessions (Liew et al., 2021).

The final phase of cardiac rehabilitation is commonly referred to as the maintenance phase (Mampuya, 2012) and is usually delivered as an outpatient or, more commonly, via a community-based programme (del Pozo-Cruz et al., 2018). It is traditionally less structured than phases one and two and often provides a link between the transition individuals make from attending supervised sessions to becoming self-directed with their physical activity. While this phase mainly focuses on encouraging continued physical activity post a heart event, it may also address additional risk factors and can often provide an element of behavioural change counselling (del Pozo-Cruz et al., 2018).

This three-phase approach to cardiac rehabilitation offers a structured and comprehensive framework to support individuals as they recover from a cardiovascular event or new diagnosis. The benefits offered by these approaches may contribute to improving overall well-being, capacity, and health-related quality of life (del Pozo-Cruz et al., 2018).

2.2.4 International Guidelines

The international landscape of cardiac rehabilitation guidelines reflects a concerted effort to address the needs of patients with ischemic heart disease (IHD). Aotearoa New Zealand's cardiac support and secondary prevention guidelines
prioritise inclusivity, covering a spectrum of cardiac conditions from stable angina to acute coronary syndrome (ACS) and post-revascularisation scenarios (Liew et al., 2021). Core components emphasise personalised assessment, tailored support, and ongoing program improvement. Educational content spans disease pathophysiology, medication rationale, risk factor management, and lifestyle modifications.

Similarly, Australia's standardised program extends its scope to various cardiac conditions, emphasising initial assessment, risk factor management, and comprehensive patient education on lifestyle changes, medication, and psychosocial well-being (National Heart Foundation of Australia, 2019; Woodruffe et al., 2015). Canadian guidelines (Stone et al., 2021) emphasise systematic referral processes, individualised assessment, and multifaceted risk factor modification, complemented by extensive education on nutritional counselling, physical activity, and psychosocial support. The British standards advocate for a multidisciplinary approach, focusing on health behaviour change, lifestyle management, and long-term strategies for cardiovascular health (British Association for Cardiovascular Prevention and Rehabilitation, 2023; Scottish Intercollegiate Guidelines Network, 2017) European guidelines (National Institute for Health and Care Excellence, 2020; Bäck & Hansen, 2021), including those from the National Institute for Health and Care Excellence (NICE), prioritise inclusivity, health education, and psychological support alongside physical rehabilitation.

Guidelines from the United States of America are integrated within condition-specific guidelines for managing heart failure, ST-elevation myocardial infarction, and coronary artery revascularisation (Amsterdam Ezra et al., 2014; Heidenreich et al., 2022; O'Gara et al., 2013). They emphasise comprehensive patient assessment, medical surveillance, nutritional and psychosocial support,
cardiovascular risk management, smoking cessation, physical activity guidance, exercise training, and pharmacological interventions. This holistic approach aims to optimise patient outcomes across diverse clinical contexts. Globally, these guidelines collectively underscore a comprehensive approach to patient assessment, risk management, and education, emphasising holistic care for patients with IHD and offering valuable insights relevant to the Aotearoa New Zealand context.

In summary the international guidelines for cardiac rehabilitation illuminates the commonalities in recommendations for appropriate attendees, essential core components of the cardiac rehabilitation programmes, and the educational topics that should be addressed. A subsequent discussion will follow, notably revealing similarities among guidelines from countries with comparable health systems and populations, all of which are relevant to the Aotearoa New Zealand context.

2.2.4.1 Target Participants for Cardiac Rehabilitation

Across the guidelines there are a number of recommendations which identify the patients who would benefit most from attending a cardiac rehabilitation programme. Firstly, individuals with a diagnosis of IHD, acute coronary syndrome, and those undergoing revascularisation procedures, such as CABG and PCI, should be encouraged to participate. Furthermore, patients with a history of heart failure, stable angina, and various other cardiac related conditions should also be urged to attend a programme. There is consensus across a number of the guidelines that other cardiovascular conditions, including patients with atrial fibrillation and those at high risk of CAD, should be extended an opportunity to attend cardiac rehabilitation. These guidelines emphasise inclusivity, and cardiac rehabilitation should avoid excluding people from participation.
2.2.4.2 Recommended Core Components of Cardiac Rehabilitation

The international guidelines emphasise that cardiac rehabilitation needs to be comprehensive; yet individualised to meet positive secondary prevention outcomes for people with CVD. They highlight the need for an initial comprehensive assessment of the individual’s needs, development of personalised care plans, and the importance of multidisciplinary team involvement. In addition to a comprehensive educational programme, CR should incorporate exercise/activity support, psychosocial provision, discharge assessment, and next stage referral/recommendations. It is now recognised that ongoing programme review, audit, and assessment is essential for optimising best practice. This results in the evaluation of effectiveness and consideration towards improvements, ensuring a high quality of care is provided to the service users.

2.2.4.3 Recommended Educational Content

A range of recommendations about what educational content should be included to optimise an individual’s ability to effectively manage their cardiovascular health are evident in the guidelines. While there are variations in the specific topics to be covered, there is a general consensus. The key themes include education about the disease and subsequent management, addressing both modifiable and non-modifiable lifestyle and risk factors, emphasising the importance of medication management and adherence, recognising and addressing psychosocial risk, educating individuals to recognise disease symptoms, and providing guidance towards resuming exercise/activities of daily living.

By integrating these elements into an educational programme, cardiac rehabilitation fosters an environment that supports long term optimisation of both lifestyle and behavioural modifications, promotes effective and safe self-
management, and reduces the risk of future cardiac events. This comprehensive approach aims to facilitate an environment which promotes optimal recovery, with the overall aim of improved well-being.

It could be questioned if incorporating a formalised practice of assessing the patient’s knowledge at the commencement of cardiac rehabilitation should be considered a fundamental component of cardiac rehabilitation guidelines. The Aotearoa New Zealand cardiac rehabilitation guidelines serve as a model, highlighting the importance of individualised rehabilitation plans based on the patient’s gaps in knowledge. By adopting this approach, service providers can ensure that cardiac rehabilitation is optimised and may foster better long-term outcomes.

2.2.5 Barriers to Cardiac Rehabilitation and Attendance Numbers

Despite the reported benefits from cardiac rehabilitation (Dibben et al., 2023; Kabboul et al., 2018; Shields et al., 2018), the programmes remain notably underutilised, particularly beyond the ‘initial in-hospital’ phase (Kwan & Balady, 2012). Inadequate engagement with secondary prevention strategies may be a significant contributor to the mortality and morbidity burden of this disease (Kwan & Balady, 2012). According to Redfern et al. (2022), there is a significant gap between persons eligible to attend cardiac rehabilitation and the actual participation rates. Their report highlighted that only 30-50% of eligible individuals are referred to a programme (Redfern et al., 2022). Furthermore, only a percentage of those who are referred go on to attend the programme with rates reported to be between 20-50% (Clark et al., 2012; Dalal et al., 2015). Low attendance results in as few as 5% of the initial eligible individuals completing a full cardiac rehabilitation programme (Redfern et al., 2022). Among the patients eligible to attend, less than 40% of those who have experienced a MI, and approximately only 30% of patients who have had
CABG surgery attend the programmes beyond their initial hospitalisation (Centers for Disease Control and Prevention, 2008; Suaya et al., 2007). The uptake rates in Aotearoa New Zealand also reflect the international studies, with rates as low as 30% seen nationally (Liew et al., 2021). These findings underscore the need to address the barriers towards participation in cardiac rehabilitation programmes.

Several publications (Clark et al., 2012; Dalal et al., 2015; Taylor et al., 2022) have identified barriers that hinder participation in cardiac rehabilitation programmes. A systematic literature review by Clark et al. (2012) found both personal and contextual barriers contribute to poor attendance in cardiac rehabilitation. Personal factors included a lack of knowledge around the availability of programmes, a person’s belief that heart disease is unavoidable, negative experiences of the health system/services, people saw themselves as different to other people who would likely be attending, work and financial constraints, and the demands on females (Clark et al., 2012). Contextual factors that contributed to poor attendance included travel requirements, geographical distance, and limited support from family. Additionally, Clark et al. highlighted the factors that supported attendance were associated with a belief that heart disease was controllable, positive attitudes towards services, having supportive family and social networks, and increased follow-up opportunities with health professionals who provided encouragement to attend.

Building upon Clark et al.’s (2012) work, Taylor et al. (2022) conducted a comprehensive review of systematic reviews and meta-analyses of randomised control trials revealing a number of multi-layered barriers to cardiac rehabilitation at various levels: patient, clinician, and the health service. In addition to the challenges highlighted by Clark et al., Taylor et al. identified that a lack of cardiac
rehabilitation training for the health care professionals and suboptimal endorsement/referral practices contributed to low attendance rates. Patient related factors such as awareness, motivation, time, transport, and the financial cost also contributed to nonattendance. Furthermore, inadequately resourced healthcare systems and services have a cascading effect on attendance (Taylor et al., 2022). For improved participation to occur, more resources should be shifted to cardiac rehabilitation to overcome the aforenoted barriers to optimise the benefits of cardiac rehabilitation and improve outcomes for individuals with CVD.

2.2.6 Equity and Diversity Issues

Equity and diversity issues in cardiac rehabilitation act as potential barriers which can create unfair or non-inclusive access to services. Redfern et al. (2022) emphasised that there are many challenges when managing CVD and providing cardiac rehabilitation services. They highlighted the importance of a resolution that prioritises overcoming the equity and diversity issues (Redfern et al., 2022). Certain population groups, such as individuals from ethnic minorities, individuals lacking proficiency in the country’s language, women, the elderly, people with low socioeconomic status, and those residing remotely or rurally, are under-represented in cardiac rehabilitation (Dalal et al., 2015; Kwan & Balady, 2012; Redfern et al., 2022). Additionally, this disparity transmits beyond national borders. Low- and middle-income countries, which often have large populations, carry 90% of the global burden of CVD (Abubakar et al., 2015). Furthermore, these countries often lack adequate resources to manage the disease effectively.

As identified earlier, healthcare providers can have their own biases and perceptions towards cardiac rehabilitation. These can inadvertently contribute to disparities in the service delivery. Training programmes that include cultural
competence may help to mitigate this implicit and often unintentional bias.

Furthermore, an individual’s health literacy level is likely to influence their ability to access services, navigate the health system, and influence their understanding of the cardiac rehabilitation education provided. Therefore, in collaboration with providing an individualised cardiac rehabilitation intervention, the inclusion of an assessment of health literacy and an assessment of understanding prior and following the delivery of education may work to reduce equity gaps. Addressing equity and diversity issues in cardiac rehabilitation requires a comprehensive and multidimensional approach. This is best served at the levels of policy, education, professional training, community engagement, and through regular programme assessment and auditing (Liew et al., 2021).

2.3 Cardiac Rehabilitation in Aotearoa New Zealand

The origins of cardiac rehabilitation and secondary prevention in Aotearoa New Zealand can be traced back to the 1960s (Thompson, 2014). There has always been a strong association between the Australian and Aotearoa New Zealand deliveries of healthcare services, and during the 1960s both countries established their National Heart Foundations. In the 1980s, the Australian Cardiovascular Health and Rehabilitation Association was formed. This organisation, in collaboration with the Cardiac Society of Australia and New Zealand (which was established in 1951), have played pivotal roles in driving the development and implementation of cardiac rehabilitation programmes (Thompson, 2014). However, unlike other countries that underwent similar historical evolutions of cardiac rehabilitation, such as those in Europe, Aoteaora New Zealand and Australia face unique challenges. They are serving significant rural populations with limited access to health services, and need
to meet the health needs of their Indigenous populations, who bear the burden of CVD (Thompson, 2014).

In Aotearoa New Zealand, there are more than 40 centres providing cardiac rehabilitation education to patients, and these programmes typically work within the three-phase model of cardiac rehabilitation (Kira et al., 2016). Cardiac rehabilitation guidelines in Aotearoa New Zealand were established and formalised in the early 2000s, and served as the foundation for practice for an extended period of time (New Zealand Guidelines Group, 2002). In recent years, the Cardiac Society of Australia and New Zealand’s Secondary Prevention Working Group published their recommendations, outlining the core components that should be included in cardiac rehabilitation and secondary prevention programmes (Liew et al., 2021). These new guidelines emphasise an evolution in Aotearoa New Zealand cardiac rehabilitation, which has shifted its focus towards patient-centred and holistic care, and includes six core components: referral and engagement, individualised assessment of patient needs (including understanding assessment), individualised needs-based support and secondary prevention, exercise program, completion of the program and transfer of care, and continuous improvement through program audit and review. The Aotearoa New Zealand guidelines demonstrate alignment with guidelines from other high-income countries (see Section 2.2.4) and reflect the consensus of global standards between experts and international organisations.

The lack of consistency and standardisation in the delivery of cardiac rehabilitation services across Aotearoa New Zealand has presented challenges in assessing their effectiveness. A national survey conducted by Kira et al. (2016), before the recent merge of all the district health organisations, described significant variations in the provision of cardiac rehabilitation services. Stewart (2016) and
Benatar et al. (2016) also reported that the absence of standard criteria for delivering and reporting on performance hinders effective evaluation. All three papers concluded that the introduction of a set of national key performance indicators would enhance service delivery by facilitating meaningful data collection for the purpose of auditing and review (Benatar et al., 2016; Kira et al., 2016; Stewart, 2016). Through the implementation of performance indicators, service providers would be able to systematically assess and monitor the outcomes of cardiac rehabilitation programmes, which could lead to improvements in service delivery, ultimately benefiting the patients.

The survey conducted by Kira et al. (2016) reported on the provision of cardiac rehabilitation services across 42 participating departments. These findings revealed that the majority of providers delivered phase two cardiac rehabilitation (N=34). Among these providers, 50% offered a community-based programme, while 38% exclusively offered a hospital-only education programme. In addition, 12% provided an option for community and/or hospital settings. Regarding the frequency of sessions, cardiac rehabilitation services were typically offered once or twice a week, with 53% of providers offering one session. The average duration of a programme was 6 weeks, with some services extending their programmes up to 12 weeks.

In addition to the aforementioned survey, Roxburgh (2019) conducted a cross-sectional study encompassing 62.7% of the cardiac rehabilitation programmes in Aotearoa New Zealand. This study revealed that Aotearoa New Zealand had a lower number of sessions and fewer components within their programmes compared to other high-income countries, indicating a potential disparity of resources offered in the country. Roxburgh concluded that more funding for cardiac rehabilitation was
necessary, particularly considering, at the time of this research, services were managed at an individual health board level. However, the impact of the recent merge of the individual health boards into one health authority on funding and resource availability remains uncertain. It is also important to note that since the publication of Roxburgh study, comprehensive guidelines incorporating a set of national core components for cardiac rehabilitation have been published (Liew et al., 2021). These guidelines will support the standardisation of practice and benchmark Aotearoa New Zealand services against other international standards.

Cardiac rehabilitation is delivered via a number of models in Aotearoa New Zealand: traditional group cardiac rehabilitation, home-based, case management, nurse coordinated prevention programmes, telephone-based cardiac rehabilitation and the Heart Guide Aotearoa (HGA) (Kira et al., 2016). Work presented at the 67th Cardiac Society of Australia and New Zealand Annual Scientific Meeting in 2019, reported that Aotearoa New Zealand was now a global leader in community based cardiac rehabilitation (Roxburgh et al., 2019). The community model aims to enhance accessibility to cardiac rehabilitation for individuals, while proving to be more cost effective.

Community cardiac rehabilitation programmes were significantly more likely to be offered in Aotearoa New Zealand, compared to in other high-income countries. These programmes, predominately supervised by nurses and exercise physiologists, operate for an average of 8 weeks, and offer an average of 10 patient sessions per programme (Roxburgh et al., 2019). Community based cardiac rehabilitation now accounts for about 40% of all provided cardiac rehabilitation in Aotearoa New Zealand, and enrollees in the programmes are predominately from middle- to low-income populations (Roxburgh et al., 2019). This model has the potential to address
the barriers to attending rehabilitation and reduce the disparities previously identified in Section 1.2.6 among specific demographic groups.

The HGA programme, based on the United Kingdom Heart Manual, is a homebased cardiac rehabilitation initiative in Aotearoa New Zealand (Eadie & Tane, 2010). The reason behind adapting and implementing this programme in the Aoteaora New Zealand context was to mitigate the disparities between Māori and non-Māori populations by addressing the low cardiac rehabilitation up-take rates. A retrospective audit comparing results between HGA and hospital-based cardiac rehabilitation demonstrated significant improvements, with an increase from 23% to 89% of Māori completing the HGA programme. These completion rates were 1% higher than non-Māori New Zealand Europeans (Eadie & Tane, 2010). Furthermore, qualitative findings indicated that HGA works towards removing the barriers posed by travel, cost, and illness; as well as promoting a positive change by empowering individuals to effectively self-manage their illness (Eadie & Tane, 2010). Moving forward, the challenge for Aotearoa New Zealand cardiac rehabilitation is to address the health disparities faced by the Indigenous population. Traditional cardiac rehabilitation has failed to engage Māori and by implementing targeted programmes to address these concerns cardiac rehabilitation becomes more accessible, culturally appropriate, and will be more beneficial for all New Zealanders.

2.4 Health Literacy and CVD

For individuals who are concerned with improving and protecting the health of populations, a critical focus incorporates the promotion of optimal health literacy (Nielsen-Bohlman & Institute of Medicine Committee on Health Literacy Staff, 2004). Health literacy is defined as “the degree to which individuals have the
capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions” (Ratzan et al., 2000, p. vi). Poor levels of health literacy have been associated with lower levels of unsatisfactory health outcomes such as higher readmission rates, decreased quality of life, impact on mental health, and decreased access to social supports (Berkman et al., 2011; de Melo Ghisi, Chaves, Britto et al., 2018; Nielsen-Bohlman & Institute of Medicine Committee on Health Literacy Staff, 2004). The attainment of acceptable levels of health literacy is an essential component of patient understanding and self-management (Crengle et al., 2018). Essentially, adequate health literacy enables an individual’s capacity to navigate the health system, comprehend their condition, and understand self-management requirements so that they are in a more advantageous position to communicate with health professionals and critically evaluate information.

A seminal international study reported on the population prevalence of health literacy as part of the European Health Literacy Survey (HLS-EU) (Sorensen et al., 2015). An outcome of this study established levels to determine health literacy and categories were reported as insufficient, problematic, sufficient, and excellent. Findings showed that 47% of participants demonstrated insufficient or problematic levels of health literacy. Further to this study, a number of other reviews also reported on the social determinants that demonstrate a relationship with poor health literacy; these include lower educational attainment, financial deprivation, low social status, occupation, race/ethnicity, and advancing age (Mantwill et al., 2015; Nutbeam & Lloyd, 2021; Paasche-Orlow et al., 2005; Sorensen et al., 2015; Stormaq et al., 2019). Limited health literacy represents a significant challenge for health policies.
and practices because there is a reciprocal influence between social and economic determinants and health literacy outcomes (Nutbeam & Lloyd, 2021).

In the context of CVD, the impact of health literacy has been well reported in the literature (Crengle et al., 2018; da Costa et al., 2023; G L. de Melo Ghisi, Chaves, Loures, et al., 2018; Kanejima et al., 2022; Magnani et al., 2018; Mattson et al., 2014). CVD is a multifaceted chronic health process, and individuals with this condition face the challenge of managing intricate medication schedules, dietary and exercise plans, as well as the need to understand how to best respond to on-going disease related symptoms.

Inadequate levels of health literacy are a barrier to health maintenance, and low levels of health literacy have been reported among patients with a history of CVD (de Melo Ghisi, Chaves, Britto et al., 2018). de Melo Ghisi, Chaves, Britto et al.’s (2018) systematic literature review of 10 articles (of which two were randomised control trials) reported that 30.5% of patients with CAD demonstrated low health literacy levels. Supporting these findings are the results from an observational study conducted by Chehuen Neto et al. (2019) who sought to evaluate the functional health literacy levels of patients with chronic CVD. Findings indicated that less than 50% of participants (N=345) demonstrated adequate health literacy. A report commissioned by the American Heart Association acknowledged that people with CAD and limited health literacy continue to face challenges when trying to manage their health needs. Furthermore, the report noted that there are limited studies addressing the impact that low health literacy has on the complex requirements for self-management of CVD (Magnani et al., 2018).

While disease knowledge and health literacy are not synonymous notions, these concepts are intricately connected. As outlined above, health literacy refers to
an individual’s ability to access, understand, evaluate, and apply health related knowledge, to make informed decisions and take actions towards health outcomes (Ratzan et al., 2000). Patient knowledge and understanding specifically refers to the comprehension an individual has about a particular disease situation. This concept would likely include knowledge of their medical condition, treatment options, and other health related areas. It could be suggested that a patient’s level of knowledge influences health literacy. This is because the application of understanding facilitates an individual to effectively navigate through health information and the healthcare system.

The amount of medical information is vast, often containing multifaceted written and spoken concepts. There is a growing assumption that patients have a certain level of knowledge, and have probably researched medical information to support their understanding (Graham & Brookey, 2008). However, if they do not comprehend this information, they may not take appropriate action to manage their disease; therefore, adversely affecting their overall health and well-being. To promote informed decision making and effective self-management, patient education programmes become crucial in the attainment of disease related knowledge and understanding.

2.5 Patient Education

Patient education is a complex process that surpasses the mere simple acquisition of knowledge. It is “the process of enabling individuals to make informed decisions about their personal health-related behaviour” (Bellamy, 2004, p. 1). Its overarching goal is to enhance health outcomes by fostering adherence to medical treatment regimens and promoting the adoption of healthy lifestyle practices. Cardiac
rehabilitation programmes have been widely and historically used as an educational strategy to promote the self-management of CVD (Buckley et al., 2020; New Zealand Guidelines Group, 2002; Scottish Intercollegiate Guidelines Network, 2017; Woodruffe et al., 2015). According to Santos et al. (2018), patients who participate in education programmes are more successful at self-managing their condition; a stance supported by a number of large-scale meta and systematic analyses that have evaluated the impact of cardiac rehabilitation programmes (Brown et al., 2011; de Melo Ghisi et al., 2014; Dusseldorp et al., 1999; Mullen et al., 1992). The provision of education for patients with cardiac disease could promote enhanced understanding, subsequently empowering patients to take a more active role in managing their condition. Consequently, enhanced knowledge has the potential to promote adherence to treatment plans, improved quality of life, better health outcomes, and reduce health related costs (Brown et al., 2011; Melamed et al., 2014; Santos et al., 2019).

2.6 Assessing Disease Related Knowledge

After a cardiac event, during the hospital admission there is a major opportunity and requirement for the delivery of patient education (Nurit et al., 2009). During this time patients are confronted with acute health demands coupled with immediate education requirements that cannot be postponed. Amid the urgency, a number of potential barriers converge, with the clinical environment itself likely serving as a significant factor, contributing to potential misunderstanding among patients. The phase of admission introduces both physical and environmental hurdles for patients that encompass challenges related to physical and psychological well-being; for instance pain, fear, and anxiety (Beagley, 2011). Moreover, environmental
complexities, such as elevated noise levels, unregulated ambient temperatures, inadequate lighting, hindrances to sleep, and the absence of privacy, collectively impede the learning process (Beagley, 2011). These challengers experienced by inpatients serve to underscore the notion that the immediate admission phase may not be the optimal time to provide education. However, the issue is further compounded by the challenge of relying solely on the time during outpatient cardiac rehabilitation for educational delivery. This challenge is particularly evident from the suboptimal uptake of such programmes post discharge, as explained in section 2.2.5.

A further issue compounding the problem is the failure to routinely assess the patient’s comprehension. Assessing understanding promotes an environment where all stakeholders have an opportunity to clarify what has been said and, more importantly, what has been heard (White et al., 2013). It provides all parties involved an opportunity to continue the dialogue until a satisfactory level of understanding is reached (Samuels-Kalow et al., 2016). Lukoschek et al. (2003) recognised that there is limited formal training on assessing understanding and, coupled with the absence of routine comprehension assessment tools in practice, there is the risk health care professionals may make incorrect assumptions about their patient’s level of understanding (Goff et al., 2014).

Griffey et al. (2015) suggested that a reason for formally assessing a patient’s level of understanding is to limit any discrepancies which often exist between what the patient and the health care professional believed to have been understood, and the actual level of comprehension. Patients frequently lack awareness of their gaps in understanding. Even though patients may state they have understood the information, studies have indicated that further testing has shown inconsistencies with the calculated knowledge scores (Behrendt et al., 2011; Kušec et al., 2006). Furthermore,
Engel et al. (2009) suggested that patients simply do not ask for clarification or further information.

A qualitative study of 37 patients with heart failure used open-ended narrative interviews to examine whether knowledge of medications equipped the participants with the skills to make informed decisions about their health (Field et al., 2006). Participants were all referred to the study by a health care professional and would have been exposed to some level of patient education. Results indicated that all participants had an understanding that medications were important. However, the level of comprehension varied. Some knew they had to take medications but had little understanding around the indications for taking them or the side effects. Other participants understood their diagnosis and were keen to continue to immerse in further learning opportunities (Field et al., 2006). The concern is that patients with limited comprehension may lack the knowledge to make informed decisions about their health needs, resulting in a shift of power wherein disparity in knowledge has the potential to disempower patients, rendering them reliant on health care professionals to make decisions about their health care. By assessing patients’ understanding, health professionals can work in partnership with patients to provide individualised education.

A cross-sectional, interview-based study of 140 English-speaking patients across two emergency departments in Michigan, United States by Engel et al. (2009) also recognised inconsistencies between patients’ perceptions of their understanding and their actual comprehension. The study aimed to explore patients understanding of the emergency department care and instructions. Findings highlighted that miscomprehensions of discharge instructions were common, indicating that patients were unaware of their own understandings. The study revealed that 78% of
participants had less than complete understanding of the information provided; and of these patients, less than 20% identified that they had gaps in their comprehension (Engel et al., 2009). This finding highlights the significant discrepancy between perceived and actual knowledge. If patients are unaware of their knowledge deficits, they are unlikely to seek further clarification or information. Thus, the need for routine knowledge assessments to be incorporated into clinical practice so targeted education can address comprehension deficits.

It is not only patients who are at risk of miscalculating their level of understanding following the delivery of health education. Health professionals often misjudge, make assumptions, or simply fail to assess if patients have understood what has been said (Chan, 2014; Farrell et al., 2009; Goff et al., 2014; Nurit et al., 2009). There is evidence to suggest a formal understanding assessment is seldom completed by health professionals (Kemp et al., 2008). On the occasions when an assessment of comprehension is performed, the process of the assessment can be superficial which results in incorrect assumptions towards accurate understanding. Farrell et al. (2009) analysed 86 conversations between patients and medical residents and found that the process of assessing understanding was limited. Seventy-nine percent of the consultations contained some form of understanding assessment. However, in 75% of these cases, comprehension was evaluated using close-ended or “is that ok” questions (Farrell et al., 2009) which inevitably leaves doubt over what the patient has truly understood, and may result in consequences for the patient’s health outcomes, community impact, and/or the cost to the health service.

Assessing the patient’s levels of knowledge provides health professionals with the opportunity to gauge a baseline of understanding of the medical condition, identifies areas of misinformation and where there are gaps in understanding. By
identifying specific areas of limited comprehension, the health provider can individualise education to focus on areas of greatest need. When patients demonstrate higher levels of understanding and health literacy, they can take a more active role in their self-management and health decision making with the ultimate aim of achieving improved health outcomes. Assessing patients’ understanding also provides health care professionals an opportunity to evaluate their educational strategies and make quality improvements to programmes to enhance the patient experience.

Cardiac education is fundamental in the management of newly diagnosed cardiac patients, and an essential pillar of cardiac rehabilitation programmes. Including a routine knowledge assessment in cardiac rehabilitation programmes will serve to enhance the patient educational experience. Knowledge assessments play a critical role in identifying gaps in the patient’s knowledge and promotes an active engagement in the health journey, with the aim to improve the health outcomes and overall well-being of CVD patients.

2.7 Systematic Review (Methods)

The literature review aims to address two key questions: Firstly, it explores the factors that influence baseline knowledge outcomes among patients with CVD, as evaluated through the use of cardiac knowledge assessment tools. Secondly, it investigates the variation in patients’ levels of understanding across different subject areas pertaining to cardiac health. By examining these questions, the review seeks to provide insights into the factors influencing patients’ baseline knowledge levels and the specific areas within cardiac health where patients demonstrate varying levels of comprehension.
The primary focus was not to report on the effectiveness of cardiac education or rehabilitation programmes; rather, to detail the baseline knowledge of participants and the associated factors.

### 2.7.1 Search Strategy

The search strategy employed in this systematic review was carefully designed to ensure comprehensive coverage of relevant literature and resources related to patients' health knowledge, attitudes, and practices regarding CVD. The rationale behind the chosen search terms is twofold. Firstly, by including terms related to patients' health knowledge, attitudes, and practices, the review aimed to capture a wide range of studies examining various aspects of patient behaviour and understanding related to CVD. This approach ensures a holistic exploration of the topic, encompassing diverse perspectives and dimensions of patient engagement with their cardiovascular health.

Secondly, the inclusion of terms such as "assessment tools" or "assessment method" alongside keywords specific to CVD allows for the identification of studies focusing on the evaluation and measurement of patients' knowledge in this context. This ensures the retrieval of studies that not only investigate patient knowledge but also assess the methodologies and instruments used for such assessments.

Furthermore, the search strategy was implemented across multiple reputable databases, including ScienceDirect, PubMed, CINAHL, ProQuest, ProQuest dissertations, Medline, and Google Scholar, to maximise the breadth of literature coverage. Additionally, forward and backward citation reviews were conducted to identify any additional relevant articles, ensuring a thorough examination of the existing literature. Finally, the use of ResearchRabbit and Keenious platforms further augmented the search process, although no additional publications meeting the
inclusion criteria were identified through these means. Overall, the chosen search strategy was robust and comprehensive, aimed at capturing a diverse range of studies relevant to the research objectives of this systematic review.

2.7.2 Study Selection

The search was limited by date of publication within the last 20 years (between January 2003 and May 2023). This timeframe was chosen to reflect the evolution of ‘knowledge assessment tools’ which are used in the area of cardiovascular health. The publication also needed to reference either the demographic characteristics that were reported to influence knowledge scores, or report on the categories of cardiovascular knowledge. The inclusion and exclusion criteria are detailed in Table 2.1. As recommended by Peters (2017), Endnote was used to manage and code extracted data, and the analysis was supported through Microsoft Excel.
### Inclusion and Exclusion Criteria

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<th>Inclusion criteria</th>
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<tr>
<td>Any studies reporting the baseline demographic factors and corresponding heart health knowledge for patients with CVD.</td>
<td>Studies that did not report the specifics of cardiac knowledge (in relation to either demographic influences or areas of cardiac health knowledge) – only reported pre and post intervention scores.</td>
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<tr>
<td>Any studies reporting specific topic areas of cardiac health knowledge as baseline for patients with CVD.</td>
<td>CAD cohorts with a specific focus on a disease outside of CVD (such as: conditions like rheumatoid arthritis, diabetes and erectile dysfunction).</td>
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<tr>
<td>Patients with all types of CAD.</td>
<td>Focused on health literacy rather than CVD knowledge.</td>
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<td>Focus on evaluation of cardiac rehabilitation programme, the validation and validity of a new assessment tool, or disease management rather than reporting the details pertaining to the patients’ levels of knowledge.</td>
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<td></td>
<td>Studies that included non-cardiac participants from the general population.</td>
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<td>Outside the publication dates of 2003-current.</td>
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<td>Non-English language literature.</td>
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<td>Literature that were not accessible after an extensive database search, or unavailable through library inter-loan.</td>
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A number of articles were later removed from the review because they solely focused on assessing the effectiveness of education programmes (focusing on measurable clinical health outcomes) rather than patient knowledge. Studies that
simply reported knowledge scores at baseline and following an educational intervention, without further discussion towards factors influencing cardiac health knowledge, were also excluded. Publications were not included if they primarily focused on the topic of ‘health literacy’ rather than cardiac knowledge, or if they focused on the impact on self-management and/or behaviour change. The research reported in this thesis is focused on assessing understanding following the hospital admission and before the completion of a comprehensive cardiac rehabilitation programme, so the inclusion and exclusion criteria have reflected this intention.

2.7.3 Types of Studies Included

An open selection criterion allowed for the inclusion of all methodological research designs. It resulted in the inclusion of cohort studies, randomised control trials, cross sectional studies, and a number of other studies that used quasi-experimental, observational, quantitative, descriptive, prospective and longitudinal approaches to research design.

2.7.4 Data Extraction

Once the search terms were finalised, discussed with the supervisory team and the University of Canterbury’s subject librarian, they were used to identify potential literature. At that point, the ‘titles’ of the resulting articles were reviewed. Next, abstracts were screened for all articles that were identified as possibly meeting the inclusion criteria. Eligibility for inclusion was determined after the full-text of relevant publications was examined. If there was uncertainty about the suitability of including any of the publications, a discussion with the supervisory team would have been organised to arrive at a mutually agreed decision. To provide consistency throughout the review process, an excel template was developed for recording
extracted data and included the following information: name of author and article, database, journal, design methods, Joanna Briggs Institute (JBI) critical appraisal tool, outcome of quality assessment, country, participant demographics, study aims, and outcomes/key findings.

2.7.5 Mitigation to Manage Risk of Bias

For each publication deemed to meet the review inclusion criteria, a quality assessment was completed. JBI Critical Appraisal Tools (JBI, 2020) were used to evaluate quality. As JBI does not have a suitable tool for assessing mixed-methods research, the Mixed Methods Appraisal Tool (MMAT) Version 2018 (Hong et al., 2018) would have been used for MMR studies. However, the review did not result in any publications using this research design. Studies that were not assessed as demonstrating quality, or did not meet the inclusion criteria, were excluded from the review. The results of the quality assessments were included in the final synthesis of the literature.

2.7.6 Strategy for Data Synthesis

A synthesis of the data in the form of thematic analysis was completed as part of the literature review. This process considered the contextual factors associated with the patient’s levels of knowledge in relation to their heart health and resulted in the themes: calculated knowledge scores, patients’ demographics influencing knowledge, and patients’ knowledge of cardiac health topics. Excel and the NVIVO data management systems were used to support data synthesis. The conceptualisation of final themes was reviewed by me and the supervisory team.
2.8 Results

The data extraction process is represented as a flow chart (see Figure 2.1) using the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) (Page et al., 2021). A database exploration using the previously reported search terms, resulted in 2,236 records for further screening after duplicates were removed. Subsequently, the titles of all records were screened and resulted in 308 potential articles for further appraisal. All abstracts were examined and then the full publications of a further 114 articles were scrutinised to assess the eligibility for inclusion. Thirty-two studies were assessed as meeting the inclusion criteria and were later included in the literature review.
Figure 2.1

Illustration of the Systematic Review–Data Extraction Process

<table>
<thead>
<tr>
<th>Database</th>
<th>Search Criteria</th>
<th>Records Reviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science Direct</td>
<td>Patient’s health knowledge, attitudes, practice AND (assessment tools or assessment method or assessing) AND (cardiovascular disease or cardiovascular or coronary heart disease)</td>
<td>N = 278 titles reviewed</td>
</tr>
<tr>
<td>Pubmed</td>
<td>Health Knowledge, Attitudes, Practice AND assessment AND “Coronary Artery Disease”</td>
<td>N = 268 titles reviewed</td>
</tr>
<tr>
<td>CINAHL</td>
<td>Patient’s health knowledge, attitudes, practice AND (assessment tools or assessment method or assessing) AND (cardiovascular disease or cardiovascular or coronary heart disease)</td>
<td>N = 268 titles reviewed</td>
</tr>
<tr>
<td>ProQuest</td>
<td>Patient’s health knowledge, attitudes, practice AND (assessment tools or assessment method or assessing) AND (cardiovascular disease or cardiovascular or coronary heart disease)</td>
<td>N = 499 titles reviewed</td>
</tr>
<tr>
<td>Medline</td>
<td>Patient’s health knowledge, attitudes, practice AND (assessment tools or assessment method or assessing) AND (cardiovascular disease or cardiovascular or coronary heart disease)</td>
<td>N = 322 titles reviewed</td>
</tr>
</tbody>
</table>

Total records identified through database searching (N = 2283)

Records excluded after screening (N = 1928)

Records excluded after review (N = 276)
- Studies that did not report the specifics of cardiac knowledge (N=46)
- CAD cohorts with a specific focus on a disease outside of CVD (N=35)
- Focused on health literacy rather than CVD knowledge (N=5)
- Focus on evaluation of cardiac rehabilitation programme (N=34)
- Studies that included non-cardiac participants from the general population (N=38)
- Focus on disease management rather than knowledge (N=91)
- Focusing on reporting tool validation and validity (N=5)
- Publication unavailable (N=2)

Abstracts reviewed (Total N = 308)
(N = 214, full-text articles assessed for eligibility)
- 28 (Science Direct) Full-text (N = 24) reviewed
- 164 (PubMed) Full-text (N = 25) reviewed
- 35 (CINAHL) Full-text (N = 17) reviewed
- 10 (ProQuest Dissertations and Theses) Full-text (N = 15) reviewed
- 25 (ProQuest) Full-text (N = 15) reviewed
- 42 (Medline) Full-text (N = 15) reviewed

Articles included in synthesis N = 32
The 32 studies included in this literature review are summarised in Appendix A. The information includes; the author/s details, year of publication, geographical location, and the appraisal tools used to assess the research. Information also includes the sample size and the ‘knowledge assessment tools’ used to collect data within the studies. Finally, the table reports the findings relating to knowledge outcomes for each of the studies. These conclusions are presented at three levels: 1) knowledge scores, 2) demographics that have a relationship with knowledge scores, and 3) individual areas of knowledge content pertaining to CVD. Further information about the databases from which the publications were sourced; the journals; the study’s designs, settings, and aims, can be found in Appendix B. There are inconsistencies between publications regarding how authors present their findings. Therefore, not all publications report on all three of the above-mentioned areas within their results.

The results presented from 32 studies include the analysis of data from 11,056 participants with CVD. The publications include studies across 10 different global geographic locations: Canada (N=8); South America (N=8); Asia (China N=5, Singapore N=1, Vietnam N=1); the Middle East (N=3); the United States (N=2); Europe (N=1); Australia (N=1); and international collaborations (N=2). The majority of studies were completed using a cross-sectional research design (N=21). The remaining publications that report their research methodology used either a prospective observational design (N=4), a randomised control trial (N=3), a quasi-experimental design N=1) or a prospective pre and post-test design (N=3).
2.8.1 Assessment Tools Used to Evaluate Knowledge

All publications reported the use of an assessment tool to evaluate the heart health knowledge of patients with CVD. The Coronary Artery Disease Education Questionnaire (CADE-Q) and the revised variations (CADE-Q II and CADE-Q SV) were the most reported tools, used across a total of 24 studies. The CADE-Q was initially developed and psychometrically validated in Brazil, with the purpose to assess the knowledge levels of patients attending cardiac rehabilitation. It was subsequently translated, cross-culturally adapted, and validated to English. The translation and adaptation process gave the original authors an opportunity to make comparisons between findings from different countries. The authors went on to develop a second version, CADE-Q II, which provides a more comprehensive assessment of the core components of cardiac rehabilitation. However, both assessment tools proved to be time intensive in the research environment. In 2015 the authors created and validated a shortened version of the questionnaire CADE-Q SV.

2.8.1.1 An Overview of the Evolution and Use of the CADE-Q

The CADE-Q has 19 items covering four areas of heart health knowledge. Area one includes questions about pathophysiology and the signs and symptoms of CAD. Area two covers disease related risk factors and lifestyle habits. Area three evaluates the patient’s knowledge in relation to their diagnosis, treatment, and medicines; and, the final area (four) considers exercise understanding.

The revised CADE-Q II expands on these key concepts and developed five areas of comprehension, referred to as cardiac domains of knowledge. This questionnaire composes 31 questions covering the domains of: 1) medical condition,
2) risk factors, 3) exercise, 4) nutrition, and 5) psychosocial risk. The CADE-Q SV retained the premise of the five cardiac domains of knowledge but rather than having questions with multiple answer options from which participants can choose the correct response, the short version evolved to be a true/false/I don’t know questionnaire, with 20 items.

The CADE-Q was first published in 2010 (de Melo Ghisi et al., 2010) and subsequently used in four other studies presented in this review (de Melo Ghisi, R. Britto, et al., 2015; de Melo Ghisi et al., 2013a; de Melo Ghisi et al., 2013b; Freitas Pinheiro et al., 2014). As noted above, de Melo Ghisi, Grace, Thomas, Evans et al. (2015) went on to develop the revised version CADE-Q II and the published data from that study are included in this literature review. A further five studies in this review have utilised the CADE-Q II knowledge assessment tool to evaluate patients’ levels of knowledge towards CVD (Anderson-Dooley, 2020; Chen et al., 2018; de Melo Ghisi, Grace, Thomas, & Oh, 2015; Santos et al., 2019; Williamson et al., 2021). The shortened version of the CADE-Q developed in 2016 (de Melo Ghisi et al., 2016), was the most frequently used knowledge assessment tool within this synthesis. In addition to de Melo Ghisi et al, a further 12 studies presented data that were collected through the administration of the CADE-Q SV (Akten et al., 2021; Arrieta-Bartolomé et al., 2022; de Melo Ghisi, Chaves, Loures et al., 2018; de Melo Ghisi et al., 2016, Fernandez, et al., 2021; de Melo Ghisi, Grace, et al., 2021; de Melo Ghisi & Oh, 2022; de Melo Ghisi et al., 2020; Huynh et al., 2020; Liu et al., 2022; Omovvat et al., 2022; Shi et al., 2022; Yang et al., 2021).

2.8.1.2 Other Reported Knowledge Assessment Tools

A further six studies in the review developed new assessment tools for data collection. In 2003, Assiri developed a 25-item questionnaire to evaluate the CAD
knowledge of patients with acute coronary syndrome in Saudi Arabia; and Eckman et al. (2012) developed an assessment tool to assess patients’ levels of knowledge regarding CAD for use in the United States. Shen et al. (2017) and Zhou et al. (2017) both developed questionnaires designed to assess knowledge of CAD and other aspects of heart health management such as behaviours and attitudes. Another new knowledge assessment tool—HIPER-Q—was developed and reported in the study by Santos et al. (2018) and used to evaluate the cardiac rehabilitation attendees’ knowledge of hypertension. Finally, Salzwedel et al. (2019), developed a 34-item questionnaire for the purposes of assessing the cognitive performance of patients after participation in a cardiac rehabilitation programme in the German context.

The final two studies in this literature review presented findings from data collected using previously designed and verified knowledge assessment tools. McKinley et al. (2009) used an adapted version of the instrument originally used in the Rapid Early Action for Coronary Treatment (REACT) study (Luepker et al., 2000). The tools collected information pertaining to knowledge, attitude, and beliefs, with the knowledge component containing 21-items evaluating the participants’ comprehension of acute coronary syndrome symptoms. Zhang et al. (2017) used the Perceived Knowledge Scale for Coronary Heart Disease (PKS-CHD), which was originally designed by Meilian and Tao (2008). The 52-item PKS-CHD considers knowledge of coronary heart disease across eight subscales: definition, risk factors, predisposing factors, manifestation, examination, treatment, medication, and rehabilitation knowledge. Each subscale was given a score out of 100.
2.8.2 Knowledge Levels and Factors Affecting Baseline Understanding

The literature review identified that there is a lack of standardised reporting of findings pertaining to the knowledge levels of patients with CVD. To address this limitation, the findings have been presented across three categories.

2.8.2.1 Heart Health Related Knowledge Scores for Patients with CVD

The majority of studies (N=30) evaluated knowledge and reported it as an overall score connected to the knowledge assessment tool utilised. The knowledge assessment tool, the number of items in a questionnaire, and the scoring rubric all influenced the overall total knowledge scores. Variations in reporting style were evident between studies, even when the same assessment tool was used, but adaptations were made for contextual reasons. An example was when adaptations to the original tools were required due to cultural and language differences. Therefore, to promote more meaningful cross-comparison between studies, Appendix A presents both the mean knowledge scores as reported in the studies and a total mean knowledge percentage for each cohort.

Knowledge scores were clustered into percentage categories: 89-80, 79-70, 69-60, 59-50 and 49-40, for analysis. Twelve of the 32 studies reported knowledge scores between 69 and 60%. The second highest ‘mean percentage knowledge scores’ were calculated between 79 and 70%, and were described in 11 of the studies. A small number of total mean percentage knowledge scores were recorded in the other percentage categories: 89-80% (N=2), 59-50% (N=3), and 49-40% (N=1).

From the four studies that presented findings pertaining to a mean percentage knowledge score between 40-59%, three are with cohorts geographically located in China and one from across South America. The two studies that identified a mean percentage knowledge score between 80 and 89% included cohorts from Canada and
Singapore. Not all studies report a classification of knowledge and what pertains to an acceptable level of understanding which makes it difficult to judge whether a cohort has poor, acceptable, or above average knowledge. However, de Melo Ghisi et al. (2010) did define groups for CADE-Q and are classified as: 90-100% representing ‘great’ knowledge, 70-89% ‘good’ knowledge, 50-69% ‘acceptable’ knowledge, 30-49% ‘poor’ knowledge, and below 30% as ‘insufficient’ knowledge. Distinguishing classifications for knowledge scores in the future will allow for more meaningful cross study analysis.

2.8.2.2 Demographics Associated with Knowledge Acquisition

The majority of studies (N=26) at some level presented information with consideration to the relationship between the participants’ demographic factors and CVD knowledge. The most significant sociodemographic factor was the impact of prior educational attainment, as reported across 21 studies. In general, there was a positive association between high levels of CVD knowledge and participants who had attended more years of schooling or further education (Akten et al., 2021; de Melo Ghisi et al., 2010; de Melo Ghisi & Oh, 2022; de Melo Ghisi et al., 2013a; de Melo Ghisi et al., 2013b; de Melo Ghisi et al., 2016; Freitas Pinheiro et al., 2014; Huynh et al., 2020; Omovvat et al., 2022; Santos et al., 2019; Shen et al., 2017; Williamson et al., 2021; Yang et al., 2021). Other studies also demonstrated that low knowledge scores were often associated with participants who had spent less time in the education sector (Assiri, 2003; Chen et al., 2018; de Melo Ghisi, Chaves, Loures et al., 2018; de Melo Ghisi, Grace, Thomas, Evans et al., 2015; de Melo Ghisi et al., 2016; Santos et al., 2018). Overall, studies reviewed consistently demonstrated a strong relationship with prior educational attainment and CVD knowledge.
The second highest characteristic which presented a relationship with CVD understanding was seen in participants with past medical histories/conditions. Ten studies reported that patients who had comorbidities or medical histories, had higher knowledge scores (Akten et al., 2021; Chen et al., 2018; de Melo Ghisi, Britto, et al., 2015; de Melo Ghisi, Chaves, Loures et al., 2018; de Melo Ghisi, Grace, et al., 2021; de Melo Ghisi, Grace, Thomas, Evans et al., de Melo Ghisi et al., 2013b; Santos et al., 2018; Shen et al., 2017; Yang et al., 2021). Only three studies found that a pre-existing medical condition was linked to low scores (de Melo Ghisi, Grace, Thomas, Evans et al., 2015; de Melo Ghisi et al., 2016; McKinley et al., 2009). However, it is worth noting that while one of the three studies did identify a relationship between low knowledge scores and certain coexisting medical conditions, the same study also showed a relationship between high knowledge scores and other comorbidities (de Melo Ghisi, Grace, Thomas, Evans et al., 2015). An additional study showed a statistically significant relationship between history of type one diabetes and low knowledge scores. The same study also identified that having only one participant with type one diabetes was a limitation and consequently the results may not be truly representative (de Melo Ghisi et al., 2016). These findings suggest different comorbidities are likely to have varying relationships with comprehension levels.

Several other demographic characteristics were found to be associated with higher knowledge outcomes in the studies reviewed. Factors included not living in a rural location, having previously attended cardiac rehabilitation classes, and not having reported high levels of anxiety. Participants who also reported having higher incomes were associated with higher levels of understanding (de Melo Ghisi et al., 2010; de Melo Ghisi & Oh, 2022; de Melo Ghisi et al., 2013a; Freitas Pinheiro et al., 2014; McKinley et al., 2009; Santos et al., 2019); whereas lower knowledge scores
consistently correlated with participants stating they had lower income levels or were unemployed (Akten et al., 2021; de Melo Ghisi, Chaves, Loures et al., 2018; de Melo Ghisi et al., 2013b; Santos et al., 2018). In addition to income, being under the age of 65 years was linked to higher CVD knowledge (Assiri, 2003; de Melo Ghisi, Chaves, Loures et al., 2018; de Melo Ghisi et al., 2016; Shen et al., 2017). The category of gender presented diverse results across the studies reviewed. A number of studies (Akten et al., 2021; Anderson-Dooley, 2020; de Melo Ghisi et al., 2013b; Huynh et al., 2020) found knowledge scores were higher amongst male participants, while other studies reported females had higher levels of understanding (McKinley et al., 2009; Santos et al., 2018; Shen et al., 2017). Many studies discussed a diverse range of demographics that may have a relationship with patients’ levels of CVD understanding. However, the only factors reported consistently across a number of publications were prior educational attainment, comorbidities, and household income.

2.8.2.3 Patients’ Knowledge Across Subject Topics; Areas of Highest and Lowest Knowledge

The final synthesis of the review aimed to explore the varying levels of comprehension amongst participants regarding cardiovascular health related subjects. The subjects essentially aligned with one of the following categories: knowledge towards medical conditions, risk factors and lifestyle awareness, exercise knowledge, dietary awareness, psychosocial knowledge, condition management, and awareness of the availability of cardiac rehabilitation programmes. Although there are some diverging findings, there are also some patterns emerging around CVD health and management, and what is most and least understood.
Risk factor awareness and dietary knowledge were subjects most commonly associated with the highest levels of knowledge. Eleven publications reported high levels of risk factor knowledge (Anderson-Doyley, 2020; Arrieta-Bartolomé et al., 2022; de Melo Ghisi, Chaves, Loures et al., 2018; de Melo Ghisi et al., 2010; de Melo Ghisi & Oh, 2022; de Melo Ghisi et al., 2013a; de Melo Ghisi et al., 2020; Freitas Pinheiro et al., 2014; Liu et al., 2022; Salzwedel et al., 2019; Zhou et al., 2017), while an equal number reported high levels of dietary awareness (Akten et al., 2021; de Melo Ghisi, Fernandez, et al., 2021; de Melo Ghisi, Grace, et al., 2021; de Melo Ghisi & Oh, 2022; de Melo Ghisi et al., 2020; de Melo Ghisi et al., 2016; Omovvat et al., 2022; Santos et al., 2019; Shi et al., 2022; Yang et al., 2021; Zhou et al., 2017). However, it is worth noting that while the majority of publications did report high levels of risk factor awareness and dietary knowledge, five studies found risk factor knowledge was poor (Anderson-Doyley, 2020; Chen et al., 2018; de Melo Ghisi, Britto, et al., 2015; de Melo Ghisi, Grace, Thomas, Evans et al., 2015; Williamson et al., 2021). Additionally, two publications reported limited dietary understanding amongst participants (de Melo Ghisi et al., 2013a; Williamson et al., 2021).

Another area that consistently demonstrated high levels of knowledge, pertained to the awareness of exercise resumption post CAD. Within 10 studies exercise knowledge was reported as being one of the highest subjects (Anderson-Doyley, 2020; Chen et al., 2018; de Melo. Ghisi, Britto, et al., 2015; de Melo Ghisi, Grace et al., 2015; de Melo Ghisi, Grace, Thomas, Evans et al., 2015; de Melo Ghisi et al., 2013b; de Melo Ghisi et al., 2016; Santos et al., 2019; Williamson et al., 2021; Yang et al., 2021), while only three publications reported this as an area of concern (Akten et al., 2021; de Melo Ghisi et al., 2013a; Freitas Pinheiro et al., 2014).
Understanding pertaining to the medical condition (which includes understanding of the disease process/pathophysiology and the medications) resulted in mixed outcomes across the articles reviewed. Eight articles reported that participants had high levels of knowledge regarding their medical conditions (Akten et al., 2021; Anderson-Doyley, 2020; Chen et al., 2018; de Melo Ghisi, Grace, Thomas, Evans et al., 2015; de Melo Ghisi, Grace, Thomas & Oh., 2015; de Melo Ghisi, Grace, Thomas, & Oh., 2015; Santos et al., 2018; Zhang et al., 2017), while a further 12 identified this as a topic of concern (de Melo Ghisi, Britto, et al., 2015; de Melo Ghisi et al., 2010; de Melo Ghisi, Fernandez, et al., 2021; de Melo Ghisi, Grace, et al., 2021; de Melo Ghisi, Grace, et al., 2021; de Melo Ghisi, & Oh., 2021; de Melo Ghisi et al., 2013a; de Melo Ghisi et al., 2013b; de Melo Ghisi et al., 2020; de Melo Ghisi et al., 2016; Freitas Pinheiro et al., 2014; Salzwedel et al., 2019; Yang et al., 2021). None of the studies reported that patient medication knowledge was satisfactory or even adequate. Considering the crucial role medications play in the management of CVD, the absence of reporting on medication knowledge raises concerns and highlights the need for further research into the subject.

Consistently, across a number of studies, the subjects of psychosocial risk and self-management were identified as areas associated with lower knowledge. Five articles reported knowledge deficits towards management of disease related symptoms, self-management of medications, and knowing when to seek further treatment (Akten et al., 2021; de Melo Ghisi, Britto, et al., 2015; Santos et al., 2018; Zhang et al., 2017; Zhou et al., 2017). However, the understanding of the psychosocial impact of CVD emerged as the most frequent area where patients had least knowledge (Akten et al., 2021; Anderson-Doyley, 2020; Arrieta-Bartolomé et al., 2022; de Melo Ghisi, Chaves, Loures et al., 2018; de Melo Ghisi, Grace, et al., 2021).
2015; de Melo Ghisi & Oh, 2021; Liu et al., 2022; Omovvat et al., 2022; Santos et al., 2019; Shi et al., 2022). Overall, the results demonstrate varying levels of knowledge across a number of subjects which enable optimal self-management and health outcomes. While high levels of knowledge are generally associated with risk factor awareness and dietary knowledge, other areas demonstrate significant gaps. Further research across all areas could be beneficial.

2.9 Discussion

This systematic literature review investigated what factors influence knowledge outcomes for patients with CVD. The research findings explored knowledge at three levels: 1) the assessment outcomes of knowledge as represented via ‘knowledge scores’, 2) what demographics influence knowledge outcomes, and 3) participants’ knowledge pertaining to diverse topics of cardiac health and management. As already reported, while cardiovascular mortality rates have decreased in recent years, the corresponding morbidity rates have increased and patients are now living longer with the disease (da Rocha, et al. 2021; Dibben, et al. 2023). In response to the extended life expectancy of patients, it is essential to embrace a chronic disease management approach that prioritises collaboration with patients to promote effective self-management. Now, more than ever, there is a need for a comprehensive and patient-centred approach to healthcare management, which places patient empowerment at the centre. To best meet this objective, it is essential for health care professionals to be aware of the baseline knowledge of patients, so that gaps can be identified and education can be tailored to meet the consumers’ needs.
2.9.1 Knowledge

Whilst the results of the overall knowledge assessments scores were largely positive, with most participants demonstrating a total knowledge greater than 60%, there is ambiguity across many of the studies regarding the criteria for determining what is an acceptable level of knowledge. Defining what are acceptable levels of knowledge is complex, and is best considered in partnership between the healthcare team and the patient (Halloy et al., 2023). In evaluating the participants’ levels of understanding, all studies investigated knowledge by employing some form of questionnaire as a knowledge assessment tool for data collection. Although questionnaire testing offers an efficient way to gather data, helps standardise findings, and enables the quantification of results for statistical analysis between groups, questionnaires may lack contextual meaning (Kviz, 2020).

2.9.2 Social Determinants and Comprehension

Social determinants of health (SDOH) are non-medical conditions that have an influence on the health outcomes for an individual (WHO, 2023). These include factors that can be present at birth and throughout lifespan development (WHO, 2023). They are subject to other factors such as where someone lives and works, and are shaped by social, political, and economic policies and agendas (WHO, 2023). The majority of studies in this literature review reported on demographic factors and their relationship to knowledge scores, providing an opportunity to consider a number of SDOH and the influence these factors may have on the acquisition of cardiac knowledge and subsequent health literacy. The review highlights that prior educational attainment and income are dominant factors associated with levels of knowledge. When designing and evaluating patient education programmes, an educator should consider SDOH as they promote broader attention to factors that
influence health outcomes. In considering these factors, healthcare providers empower patients, promote equality towards health outcomes, individualise interventions, and foster an environment where collaboration is at the centre of the provision of care (Gottlieb et al., 2019).

2.9.3 Programme Content

Traditionally, the development of cardiac rehabilitation programmes have been a collaboration between the healthcare team and clinical experts and are often guided by evidence-based guidelines from professional bodies (British Association for Cardiovascular Prevention and Rehabilitation, 2023; Jones et al., 2020; Liew et al., 2021; Manatū Hauora-Ministry of Health, 2018a; Woodruffe et al., 2015). The fundamental components often include an education programme covering; exercise and sexual activity resumption, the heart disease process, how to recognise and manage symptoms, risk factors, medicines, nutrition, psychosocial risk, and often include a programme to support smoking cessation when required (Liew et al., 2021). The majority of studies included in this review explored participants’ knowledge across these different areas, with the purpose of identifying where understanding is greatest and most limited. While there was some agreement across some studies that knowledge of risk factors and nutrition are generally high and that psychosocial risk awareness is low, there was a level of conflict between the studies’ findings. These differences underscore the importance of completing individualised knowledge assessments for specific clinical areas and population groups. As much as this literature review provides some general insights, it has highlighted that population findings can be variable.
2.9.4 Assessing Patients’ Understandings

When evaluating the baseline knowledge of a previously un-assessed group, a verbal assessment and/or interview may provide an opportunity for the researcher and the participant to clarify meaning. A verbal interview offers an opportunity to gather rich qualitative data which can help construct meaning and explore the participants’ beliefs (Rubin & Rubin, 2005). When data collected are solely within the confinement of a questionnaire, researchers minimise the ability to explore the participants’ thought processes, may not understand their reasoning, and have limited opportunity to consider the participants’ own assessment of their heart health knowledge. Creswell and Plano Clark (2018) suggested that by incorporating both quantitative and qualitative methods to data collection, researchers have the opportunity to explore topics of inquiry more comprehensively. A more inclusive approach to evaluating patient knowledge will ultimately encourage informed decision making and promote better self-management, which will lead to improved health outcomes for patients.

Incorporating knowledge and understanding assessments into practice is not without its issues. Much of this is synonymous with the challenge of patient education as a whole. Beagley (2011) acknowledged that the provision of quality patient education faces many barriers, including diverse literacy levels, language and cultural differences, as well as the impact psychological well-being may have on comprehension. Furthermore, the physical clinical environment can also act as an obstacle to the provision of education (Beagley, 2011). As a consequence of busy clinical workloads, dedicated time for patient education is seldomly prioritised and often delayed until shortly before discharge. Discharge is a busy time and patients may be overwhelmed and less receptive to information. Staff may feel that incorporating a comprehension assessment at this time may contribute to the
patient’s emotional and physical burden; yet, research completed by Peter et al. (2015), demonstrated that the time required to assess comprehension is actually minimal. The benefits that come from fostering an environment that facilitates self-management may actually reduce the burden on the clinical services.

There needs to be a mindful approach when incorporating comprehension assessments into practice, as it is essential that patients do not feel like they are being tested or made to feel inadequate (Peter et al., 2015). The purpose of the comprehension assessment is to evaluate the effectiveness of education delivery rather than evaluating the patient’s knowledge of health theory. Peter et al. (2015) emphasised that the primary objective is to reveal gaps in understanding so further information can be provided. At all times, the process should maintain a judgement free atmosphere. Phrasing questions like ‘there has been a lot of information today. So that I know that I have clearly explained what you need to do when you get home, can you please tell me your understanding of what I have said?’ would be more appropriate than ‘it is really important that you understand the information we have talked about today, so can you tell me your understanding of what I have told you?’

There was some evidence to suggest people found assessment of understanding can be condescending. However, far more patients supported the inclusion of assessments and felt that it allowed for clarification and information reinforcement (Peter et al., 2015; Samuels-Kalow et al., 2016).

2.9.5 Assessment Tools

When health care professionals appraise how much a patient comprehends about their condition, they promote shared decision-making and treatment adherence (Thompson, 2017). By assessing the patient’s baseline knowledge, educators can adapt a programme to meet an individual’s learning needs (de Melo Ghisi,
Fernandez, et al., 2021). A patient-centred approach can facilitate improved health outcomes for people with CVD (de Melo Ghisi et al., 2014). The review highlighted a number of knowledge assessment tools utilised for facilitating the collection of this data. Across the studies, the CADE-Q questionnaire and subsequent versions have been consistently demonstrated to be reliable and effective tools for assessing understanding of CVD. When used in collaboration with a questionnaire to collect demographic data to highlight SDOH, the CADE-Q questionnaire assesses the participant’s knowledge of their medical condition, risk factors, exercise resumption, nutrition, and psychosocial risk. Used as a baseline assessment, the results generated from this tool could be used in partnership with patients to develop an individualised plan to optimise educational needs and delivery.

2.10 Conclusion

This systematic literature review analysed 32 articles that reported on the factors that influence comprehension amongst patients with CVD. It draws attention to a number of knowledge assessment tools employed to evaluate patients’ understanding. The most frequent tool used across the studies was the CADE-Q and subsequent versions (CADE-Q II and CADE-Q SV). Although the findings may suggest that patients have acceptable levels of knowledge, any generalisations cannot be made because the quantification of knowledge is not standardised throughout the reporting process. Results indicated that prior educational attainment and having a past medical history are the most significant demographics associated with high levels of comprehension; whereas lower income levels, unemployment, and advancing age are associated with lower understanding. Furthermore, the findings indicated patients had good understanding toward exercise and dietary management.
but often struggled to comprehend the psychosocial risk associated with CVD. This review has highlighted the diversity of results between populations and emphasised the need to complete assessments for different groups. The recommendation is to exercise caution when generalising these results to other cohorts. The review also draws attention to the need to conduct cohort assessments for each population.

It is imperative to acknowledge the significant limitations inherent in data collection solely confined within the boundaries of questionnaires. By only adopting this approach, researchers inadvertently limit their abilities to explore the intricate thought processes that underpin the responses. The absence of qualitative data might hinder a comprehensive understanding of the participants’ experiences and may not fully capture their subjective assessment of heart health knowledge. To address these limitations, and provide a more holistic understanding, the current study employs a mixed methods approach, combining quantitative insight with qualitative narratives. The next chapter considers the methodological position employed in the conceptualisation of the study.
Chapter 3: Research Methodology and Philosophical Position

The focus of this chapter is to provide a location for the research methodology and philosophical position. It will provide a comprehensive exploration of the paradigm of MMR, including its philosophical underpinnings, methodological intricacies, and the claim that MMR could potentially emerge as a distinct third research paradigm. The historical evolution of MMR will be presented, along with the pivotal typologies that have significantly shaped the landscape of this investigation. Furthermore, a nuance discussion of the challenges stemming from the perceived data dominance will be considered, coupled with an evaluation of the inherent strengths and limitations intrinsic to the MMR approach.

The latter part of this chapter is dedicated to an insightful discussion on research philosophies, explicitly their interrelationship within MMR. This discussion seeks to establish a firm foundation for comprehending the philosophical underpinnings that guide the methodological choices made in this study. Concluding this chapter, the philosophical orientation adopted in this research is explained, along with a comprehensive discussion encompassing my ontological stance, epistemological beliefs, and axiological perspectives. Through this explanation, a clear and coherent understanding of my position within the philosophical framework will be established.

3.1 Overview of MMR Methodology

The MMR movement has received growing attention in the scholarly discourse in recent years, as evidenced by the escalating body of literature on the subject (Creswell & Plano Clark, 2018) and substantiated by the increasing number of journal articles, books, organisations/affiliations, and websites published by
researchers and academics focusing on the MMR approach (Fetters & Freshwater, 2015; Fetters & Molina-Azorin, 2019; Timans et al., 2019). Timans et al. (2019) highlighted a considerable increase in publications related to MMR post 1994, reflecting the exponential growth in the adoption of this methodology.

Johnson and Onwuegbuzie (2004) attributed the ascendancy of the MMR movement to a confluence of factors. Primarily, MMR offers researchers a unique vantage point, positioning them between the quantitative and qualitative dichotomies. This stance allows the research question to assume importance, disentangling it from the researcher’s individual philosophical leanings (Tashakkori & Teddlie, 2010). Secondly, mixed research designs emerge as a potential remedy to the limitations inherent in solitary research approaches, navigating a truce in the long-standing, unproductive debates that have marked the history of paradigmatic discourse (Johnson & Onwuegbuzie, 2004). Lastly, MMR emerges as a more adaptable medium for capturing the intricate fabric of social reality within the multifaceted and interdisciplinary scope of contemporary research (Johnson & Onwuegbuzie, 2004).

MMR is frequently labelled the third research path/paradigm/methodological movement; MMR is considered an alternative to the traditional approaches to research inquiry (Teddlie & Tashakkori, 2009). Biesta (2010) augmented this discourse by challenging the legitimacy of labelling quantitative and qualitative as paradigms, as these terms inherently connote data types rather than fundamental theoretical orientations. In contrast, the terminology of MMR extends beyond the mere delineation of data categories; it encapsulates a comprehensive methodological framework that guides the entirety of the research process (Anguera et al., 2018).

Traditionally, social science research and its researchers have conventionally been categorised into those with a tendency for quantitative approaches or an affinity
for qualitative methodologies. MMR has effectively disrupted this binary categorisation and opened an opportunity to transcend from the traditional view that confines a researcher to a singular orientation. The approach advocates that research can use multiple methodological styles, with the choice of approach established upon careful alignment with the optimal strategy for addressing the research question. This proposition, entrenched in the philosophy of MMR, signifies a pivotal departure from the former notion that research endeavours must be unequivocally tethered to a singular methodological style.

3.1.1 Terminology in Mixed Methods
Mixing research methods has appeared in the literature by several names throughout the years. In recent years, MMR has evolved as the preferred terminological choice (Johnson et al., 2007). Nevertheless, alternative descriptions have appeared in the discourse surrounding this research paradigm, encompassing terms such as multimethod research, multiple methods research, triangulation, mixed research, integrative research, blended research, fully integrated mixed design, or fully integrated mixed methods (Creamer, 2018; Johnson & Christensen, 2012; Johnson & Onwuegbuzie, 2004; Morse, 2003; Sandelowski, 2003; Smith, 2006; Thomas, 2003). Across this array of terms, a common thread emerges that acknowledges a research process that harmonises the integration of quantitative and qualitative data collection within a single research study (Bowers et al., 2013). This synergy of traditional research methodologies is conducive to being interwoven at distinct junctures within the research continuum: at the philosophical underpinnings, during the phase of data collection, in the process of data analysis, and culminating in the nuanced interpretation of research findings (Creamer, 2018).
3.1.2 Defining MMR

There has been much discussion in the literature around a definition of mixed method design (Creswell & Plano Clark, 2018; Fetters, 2018; Greene, 2008; Greene et al., 2001; Johnson et al., 2007; Maxwell, 2016; Mesel, 2013; Tashakkori & Teddlie, 2010). The literature has referred to the term ‘mixed methods’ as being synonymous with ‘mixing’ data types, but has also advocated that ‘mixing’ should occur across all facets of the research process. This has been a discussion throughout the mixed methods movement and continues to inform the evolution of a definitive definition (Creswell & Plano Clark, 2018). An article authored by Johnson et al. (2007), dedicated to establishing consensus among esteemed mixed method researchers regarding a definition, yielded the following:

Mixed methods research is the type of research in which a researcher or team of researchers combines elements of quantitative and qualitative research approaches (e.g., use of quantitative and qualitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration. (p. 123)

The nuances that underpin the challenge in coalescing around a definition comes from the divergent perspectives concerning what is the essence of ‘mixing’ within the research process and the precise situation of this ‘mixing’ (Creswell & Plano Clark, 2018; Creswell & Tashakkori, 2007). In early literature, many scholars contended that the act of mixing was predominantly confined to the method facet of the research process (Greene et al., 1989; Hesse-Biber, 2015). However, over time, and even amongst proponents of the original stance, the conceptual landscape has evolved, culminating in a consensus that the infusion of methodologies should pervade across all levels of the research journey (Creamer, 2018; Creswell, 2014;
Creswell & Plano Clark, 2007; Greene, 2008; Johnson et al., 2007; Tashakkori & Creswell, 2007, p. 4; Tashakkori & Teddlie, 2010).

3.1.3. Historical Evolution of MMR

The historical trajectory of the MMR movement has been extensively documented by scholars (Creswell & Plano Clark, 2018). The amalgamation of observational and descriptive approaches is not novel within the natural sciences, traces of combining these methods date back to the distant past. Notably, the use of both quantitative and qualitative approaches in scientific inquiry can be traced as far back as the 1600s, with Galileo’s study of the moon serving as an illustrative example (Creswell & Plano Clark, 2018). Furthermore, Maxwell (2015) detailed the work of Charles Lynell from the mid-1850s which utilised quantitative and qualitative methods when reporting on European rock strata. The intersection of quantitative and qualitative inquiry in medicine and epidemiology, as observed by Freedman (2008), also has a historical footing reaching back to the 19\textsuperscript{th} and 20\textsuperscript{th} centuries. Additionally, Irwin (2009) highlighted how qualitative evidence and quantitative reasoning jointly contributed to John Snow’s seminal discovery of the causes of cholera in the 1850s. Maxwell acknowledge that contemporary narratives tend to gloss over the rich history of combined research, thus perpetuating the misconception that MMR represents a novel and revolutionary third paradigm, despite evidence of its historical usage.

In the contemporary narrative of MMR, Campbell and Fiske (1959) introduced during the mid-20\textsuperscript{th} century the concept of triangulation of multiple sets of data within the same paradigmatic framework. Sieber (1973) advocated for combining case studies with surveys, thereby integrating quantitative and qualitative data to gain deeper insight into research questions. As evidenced by a plethora of
research, the emergence of the mixed methods movement gained momentum in the 1980s (Brewer et al., 2006; Bryman, 1988; Creswell, 1994; Greene et al., 1989; Morse, 1991). The early 2000s witnessed the publication of seminal textbooks and the emergence of the Journal of Mixed Method Research, an international journal dedicated to MMR. This period was characterised by robust scholarly discourse aimed at harmonising the diverse perspectives encapsulated within the MMR literature (Roberts, 2020; Subedi, 2016; Teddlie & Tashakkori, 2006).

3.1.4 Evolution of MMR Typologies

Within the contemporary resurgence of MMR, several scholars have endeavoured to construct a series of ‘typologies’ aimed at providing inexperienced mixed methods researchers with a structured framework (Doyle et al., 2009). In the field of MMR, the term typology has gained synonymous status (Caracelli & Greene, 1993; Greene, 2008), suggesting a structured framework adaptable to the research design that describes how incongruent data types will be synthesised for analysis (Bryman, 2006). Across diverse academic domains, an array of mixed methods research typologies have been presented, each focusing on distinct facets of the research process (Creswell & Plano Clark, 2018). Originating from fields as varied as education, public health, nursing, health research, primary health care, social and behavioural sciences, social sciences, educational evaluation, and health sciences, these typologies provide an invaluable toolkit for researchers. The selection of an appropriate typology should be guided by the research question (Creswell & Plano Clark, 2018).

The current study, and the ensuing evolution of the research design, have been substantially influenced by three seminal works authored by distinguished scholars: Creswell and Plano Clark (2018), Green (2008), and Tashakkori and
T Teddlies (2010). These typologies have significantly contributed to the conceptual refinement of philosophical assumptions, the formation of the research design, the planning of data analysis, and the seamless integration of findings. A succinct encapsulation of the typologies proposed by these authors is presented in Table 3.1.

Table 1.1

Key Influential Typologies

<table>
<thead>
<tr>
<th>Creswell and Plano Clark (2018)</th>
<th>Convergent</th>
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<tr>
<td></td>
<td>Two ‘check’ each other/are considered of equal priority combines the best of both approaches/a challenge is merging the two datasets and drawing conclusive analysis.</td>
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**Explanatory sequential design**
A two-phase model where, firstly, quantitative data is collected and analysed; and then the qualitative data set is collected to explain or expand on the quantitative results.

**Exploratory sequential design**
Prioritises the collection and analysis of qualitative data first, building on the results the researcher conducts and designs a quantitative phase. Finally, the quantitative component is tested.

**Experimental design**
The researcher conducts one type of research (usually quantitative) and uses an additional data method (usually qualitative) to address additional questions within the data. Can be at the beginning, middle, or end of the original study and aims to address emerging questions. Can be sequential or concurrent.

**Social justice design**
Seeks to create change and address social injustice/transformative design. Uses convergent, explanatory, or exploratory design to address area of concern. During this design, promotes social justice and ends with a call for action. A newer design within the MMR community.

**Multistage evaluation design**
Used when a researcher wants to evaluate the impact of a programme or project. Builds on the previous designs in stages 1) needs assessment, 2) development of a theory or concept, 3) design of an instrument, and 4) test a programme. Common in large-scale health research and in programme evaluation.

| Tashakkori and Teddlie (2010) | MMR with either a monostand or multistand process guiding the design. |
Methods and Sequencing of the data collection
Parallel mixed design
Sequential mixed design
Conversion mixed design
Multilevel mixed design
Fully integrated mixed designs

**Complex designs**
Extended beyond the basic design typologies – integrated/interactive and systemic designs.

These authors also give focus on the stages in the research process where mixing occurs
Research philosophy
Research question
Sampling
Data collection
Data analysis
Inference drawing

**Green** (2007)

**Convergence**
A design where the quantitative and qualitative data sets are collected, analysed, and then integration of findings occurs.

**Extension**
Research where one approach to data collection methods (i.e., qualitative/quantitative) extends the findings of the other in a sequential process.

**Integrated designs:**
Following the collection of mixed-data, the integration of the multiple sets of different forms occurs (numbers/words).

Iteration
Blending
Nesting or embedding
Mixed for other reasons due to substance or values

3.1.5 Data Dominance in MMR

The discourse surrounding data dominance has become a pivotal focal point in MMR, a dialogue stemming from its profound resonance with concepts such as importance, priority, emphasis, and value of a given dataset (Creswell, 2014; Maxwell, 2016; Walker & Baxter, 2019). Some authors highlight that it is an inevitability that dominance will occur in MMR, and this results in either qualitative-driven or quantitative-driven inquiry (Udosen, 2022). In more recent years, the idea
of inevitable data dominance has evolved, particularly within frameworks like convergent typologies, wherein scholars abstain from unequivocally establishing primacy or dominance within the research journey (Creswell & Plano Clark, 2018). Creswell (2014) posited that the design of MMR can indeed reflect an equal stance between quantitative and qualitative philosophies, a sentiment concurred by Greene (2006) who underlined this as a principal distinction between MMR and multi-method research.

Whilst methodological balance is not essential in MMR, the crux lies in the achievement of meaningful integration and representation (Creamer, 2018). Consideration needs to be given to the apparent importance of the qualitative, quantitative, or the mixed strands of the design. Determining the most crucial dataset remains a matter of ongoing debate, as does the question of whether a dominant dataset is even necessary. Determinations in this regard should be intricately woven with the research question and its corresponding philosophical underpinnings. Advocates of mixed methods would argue that the fundamental premise is not the value of ‘dominance’ but is the symbiotic integration of quantitative and qualitative data; thereby, concretely addressing the principles of reliability and validity within the findings (Bazeley, 2010; Mertens, 2014). Essentially, the quality of the research is not contingent upon the hierarchical prominence of datasets; rather, on the process of integrating the findings.

3.1.6 Strengths and Challenges of Utilising a MMR Design

Employing a mixed methods design offers an array of notable advantages. Foremost it allows the researcher an opportunity to explore a topic through multiple sets of data, engendering a more comprehensive understanding of a subject by leveraging multiple datasets; thereby, facilitating a deeper understanding (National
In mixed methods, a researcher can confront more challenging and diverse questions because the confinement of having to work within the tenets of traditional methodological boundaries are unshackled. This flexibility enables the exploitation of the strengths of one methodology to offset the limitations of another, affording a synergistic enhancement of the research design. Incorporating two methodological approaches can be complementary and strengthen a research design. Through a mixed methods design, the researcher considers the topic using both quantitative and qualitative methods, and then completes an integrative analysis that yields an enriched understanding and more profound insights (Fetters, 2018). Through the process of integration and synthesis, the understanding that comes from a mixed approach is a more detailed conceptualisation of the research findings (Subedi, 2016). This synthesis results in an intricate and nuanced conceptualisation, substantiating that a mixed methods design maximises outcomes compared to a single-method approach (Tashakkori & Teddlie, 2010).

Additionally, the deployment of mixed methods research contributes to strengthening the validity and reliability of the study outcomes. Roberts (2020) underscored the capacity of MMR to strengthen research findings by triangulating data; thereby, augmenting depth and rigor during synthesis. The simultaneous examination of quantitative and qualitative datasets produces a heightened comprehension of the examined phenomenon and provides a platform for addressing disparities between datasets. This process is pivotal in avoiding unconscious biases and mitigating the risks inherent in single-method studies (Roberts, 2020). The rigorous amalgamation of quantitative and qualitative data culminates in a
confirmatory process that enriches inferences and amplifies the spectrum of insights (Teddlie & Tashakkori, 2009).

Another strength of mixed methods design is that it may work toward answering concerns about the perceived importance of emic versus etic insights (Onwuegbuzie, Johnson, et al., 2009). Emic and etic are anthropological terms used by social and behavioural researchers and refer to viewpoints obtained from participants during the research process (Teddlie & Tashakkori, 2009). Emic refers to the ‘perceptions’ from the subject and etic refers to the ‘perceptions’ of the observer. This debate aligns with the long-standing discussions of ‘what is reality’ and will be explored further in the ‘philosophical assumptions’ section in this chapter. The questions for the research community are whose perceptions of the phenomena being studied are of greater importance and what holds the greater value? By reporting and examining both emic and etic perceptions, the research process can report the findings of both and work toward valuing equal levels of insight.

Furthermore, the utilisation of mixed methods design is analogous to data collection approaches in healthcare practice. When working with patients/clients, health care professionals gather both subjective information (accounts from the patient) and objective information through physical examinations, tests, and investigations. This process provides a more holistic view of what may be happening for the patient and, ideally, will result in a more comprehensive delivery of care (Jarvis, 2020). This combined approach, as with MMR, is an advantage; and as a research methodology it gives an element of certainty to the findings (Gidding & Grant, 2006; Greene, 2008).

The adoption of a mixed methods design is not devoid of challenges. Its inherently intricate nature might dissuade researchers from embracing it, as it departs
from the straightforwardness of traditional methods (Subedi, 2016). Within the mixed methods research community, divergent stances persist regarding underlying philosophical assumptions, yielding ongoing challenges for new researchers (Dawadi et al., 2021; Onwuegbuzie et al., 2007, Johnson, et al., 2009). Philosophical and epistemological frameworks inherently guide all research (Mesel, 2013; Meymandi & Deaver, 1999) and some critics argue that the fusion of worldviews within MMR is inherently incongruent. While pragmatism is often advanced as a suitable philosophical position for mixed methods (Biesta, 2010), there is still much debate over which paradigm, if any, truly aligns with mixed methods methodology. An adept understanding of research philosophy is imperative for researchers to navigate this complex landscape.

Yu (2012) acknowledged that for meaningful integration, quantitative and qualitative measures need to be comparable; a challenging skill for a new researcher to master. Creswell and Plano Clark (2018) pointed out that many researchers have conflicting results when using MMR, which they attributed to a MMR design that is actually drawing conclusions from different types of information. Therefore, it is essential that the research process is designed to support and not compromise the integration or integrity of the data (Dawadi et al., 2021). There are a number of resources now available to support the practicality of integration (Bazeley, 2018; Creamer, 2018; Creswell & Plano Clark, 2018). Nevertheless, Casey et al. (2016) reported that this process is still complex and can be overwhelming for the novice mixed methods researcher.

Although there are a number of typologies available for guidance their suitability remains relatively unclear and can be overwhelming for a researcher when making design decisions. The logistics of conducting both quantitative and
qualitative arms of a research project can also present several challenges. A number of researchers have reported that it can be expensive, time-consuming, and requires more researchers with diverse understandings of different research paradigms (David et al., 2018; Fauser, 2018). Convincing stakeholders of the merits of the intricate data collection and analytical process inherent in mixed methods design can also prove challenging (Sadat Safavi, 2016).

In summary, MMR offers several advantages such as providing a comprehensive view of a topic, enhancing the validity and reliability of findings, and addressing the emic and etic perspectives. It draws parallels with healthcare’s holistic data collection approach. However, it comes with challenges like complex philosophical considerations, the need for comparable measures, and resource constraints. Striking a balance between strengths and challenges is essential for meaningful integration of quantitative and qualitative data in research.

3.2 Research Philosophy

To this point, this discussion has considered that MMR is a methodological design that is complementary to the traditional views of quantitative and qualitative research. MMR is often reported as a new methodology and is labelled as the third paradigm; but collecting, analysing, and synthesising multiple sets of data in the context of one study has been around for centuries. However, what is new is the labelling of MMR as a paradigm in itself and in its integration within the landscape of both conventional and burgeoning philosophical frameworks. The forthcoming discussion, offers the conventional worldviews pertaining to reality and knowledge, while concurrently embarking on an expedition to ascertain the potential positioning of MMR within the contours of the current study.
3.2.1 The Traditional Worldview

Embedded within the research landscape are the fundamental underpinnings of research paradigms, a conceptual set of beliefs and methodologies that have long served as examples guiding the journey of inquiry (Morgan, 2007). These theoretical perceptions shape the very essence of inquiry, deciphering what is deemed ‘known’ and unravelling the intricate fabric of reality itself (Denzin & Lincoln, 2018). At their core, research paradigms includes assumptions about encapsulating the nature of truth and reality; epistemology, framing the essence and architecture of knowledge; and axiology, reflecting the ethical foundations (Gerrish & Lathlean, 2015). In the discipline of research, the choice of paradigm should emanate from the research question; thereby, imprinting its essence onto the chosen methodologies that follow suit (Bryman, 2016).

Within the expanse of scholarly discourse, a prolonged discussion has emerged, giving rise to considerable deliberation and perplexity surrounding the interpretation and application of the term ‘paradigm’ (Bergman, 2010; Biddle & Schafft, 2015; Cronenberg, 2020; Kuhn et al., 2000; Mertens, 2012; Patton, 1982; Schwandt, 1989). The term first appeared in the academic literature through the seminal work of Thomas Kuhn’s (1962) book, “The Structure of Scientific Revolutions”. Within the context of research, Kuhn characterised paradigms as possessing a dual meaning. Firstly, they are shared exemplars from a scientific community that provide an intellectual framework from which inquiry can be grounded. Secondly, Kuhnian perspective maintains that paradigms transform into worldviews, encapsulating perceptions of reality, complete with ontological and epistemological conjectures that support these convictions. In this view, Kuhn proposed that scientist who held divergent worldviews would inherently find themselves opposed (Anand et al., 2020; Kuhn, 1970; Morgan, 2007).
Kuhn (1970) proposed an alternative terminology to encapsulate the very essence of this theoretical construct. Rather than the conventional term ‘research paradigms’, he suggested the more fitting term ‘disciplinary matrices’. His stance was grounded in the concept that scientific achievements see paradigmatic shifts when historical perspectives no longer suffice to explain emerging phenomena. Instead, novel theoretical frameworks emerge, marking the dynamic nature of paradigms; and new theoretical understandings arise (Kuhn, 1970), underscoring that paradigms are a forever changing landscape.

Preeminent academics, Guba and Lincoln (1989, 2005), continued the dialogue exploring the notion of paradigms in social science, and ascertained that paradigms encapsulate comprehensive worldviews. They agreed that paradigms establish the base for a researcher’s perceptions of reality. Aligning with Kuhn’s viewpoint, they suggested that paradigms meld both methodological stances and extend to encompass ethical and epistemological orientations of the researcher (Guba, 2005; Guba & Lincoln, 1989). Guba and Lincoln referred to these not as paradigms but the researcher’s assumptions towards reality (ontology), epistemology, and ethics, and opened the discussion towards the possibility of having paradigm choices. This shift offered a broader perspective, fostering contemplation about paradigmatic choices and their potential coexistence (Mertens, 2012) and opens the doors to an expansive realm of possibilities where diverse perspectives and coexisting paradigms can enrich the landscape of inquiry.

The academic discourse around terminologies continues to evolve, with Tashakkori and Teddlie (2010) presenting ‘conceptual stances’ as an alternative replacement for the term paradigm. This replacement emanates from the desire to transcend the rigidity of philosophical dogma and aligns with MMR, recognising it is
a dynamic process where the interaction of components surpasses the individual sum. Whether the term paradigm is used or replaced by any number of other nuances, Shannon-Baker (2016) underscored that the core essence remains unaltered, it is a scaffolding that guides researchers through the intricate web of decisions imperative to any research project.

Within the context of MMR, Morgan (2007) introduced a multi-faceted understanding of paradigms as encompassing 1) paradigms as worldviews (ontology), 2) paradigms as epistemological stances that give rise to understanding the nature of knowledge, 3) paradigms as shared beliefs, and 4) paradigms as practical models guiding the very process of research. In this respect, both Morgan (2007) and Kuhn (1977) converge, placing paramount significance on paradigms as communal practices. The core of their perspective asserts that all these facets converge upon paradigms as collective perceptions, a repository of shared understanding that invariably shapes and navigates the collection and interpretation of evidence. In essence, the journey from ‘paradigm’ to ‘conceptual stances’ encapsulates the ongoing evolution of language within the scholarly discourse, illuminating the ever-shifting understanding that underpins the pursuit of knowledge.

3.2.2 Common Philosophical Stances Associated with MMR

Traditionally there have been two predominant methodological approaches within research: the quantitative approach, often nestled within postpositivist paradigms; and the qualitative approach, frequently situated within the constructivist or interpretivist paradigms (Baškarada & Koronios, 2018). Green and Hall (2010) suggested that the dichotomous categorisation of placing academic inquiry into a ‘box’ of being either a qualitative or quantitative investigation, reinforced by a single philosophical assumption, discounts the diverse history and nature of the social
world. To establish the legitimacy of MMR, the challenge lies in overcoming the perceived incongruity between quantitative and qualitative domains, advocating instead for a harmonious fusion of philosophical stances; thus, justifying the use of both approaches (Shan, 2022). The published literature dedicated to MMR now reveals an array of paradigms that offer scaffolding for the research process (Cronenberg, 2020; Mertens, 2012; Molina-Azorin & Fetters, 2020). Among these paradigms, several philosophical positions have emerged as prominent foundations, including pragmatism, the dialectical position, dialectical pluralism, transformation, and critical realism (Shan, 2022).

Foremost is pragmatism, closely aligned with American pragmatism and stemming from the works of luminaries like John Dewey, Charles Saunders Peirce, and Richard Rorty (Biesta, 2010; Creswell & Plano Clark, 2018) (for detailed discussion, see Section 3.3.5). Another position associated with MMR is the dialectical position, predominately from the works of Greene (Greene, 2006, 2007; Greene et al., 1989). The dialectical stance acknowledges the capacity to offer distinct avenues for approaching questions. It encourages the use of more than one philosophical position in the same research study because it stimulates a deeper understanding of the phenomena under investigation. Emphasising dialogue, the dialectical position advocates the harmonious interplay of stances throughout the inquiry process (Greene & Hall, 2010).

In a move away from both pragmatism and the dialectical position, Johnson (2012, 2017) introduced the compelling philosophical stance of dialectical pluralism, designed to bolster the underpinnings of MMR. Comparable to the dialectical position, Johnson asserted the intricate and multi-faceted nature of reality. Within the paradigm of dialectical pluralism, the intricate character of reality is embraced and
acknowledged. At the heart of this perspective is Johnson’s contention that delving into the realm of reality demands navigating a diverse landscape, each path contributing to the broadening topography of comprehension and knowledge. In essence, this approach honours the various avenues through which reality can be explored, fostering a diverse and nuanced understanding. (For a comprehensive exploration of this paradigm, refer to Section 3.3.3.1).

Another philosophical position that has influenced MMR is the transformative paradigm. This has predominately been a result of the work of Donna Mertens (2003, 2009, 2012; Mertens et al., 2010) The premise of this work acknowledges that multiple realities exist, and are influenced by factors such as society, politics, culture, economy, ethnicity, race, gender, age, and disability. Mertens acknowledged that the relationship between the researcher and participant/s will be complex and influenced by communication and power relationships. Mertens (2003) ascertained that research must be fundamentally concern with “creating a more just and democratic society” (p. 159). Through the use of both quantitative and qualitative methods, a more varied and representative perspective is gained. Therefore, to ensure social justice, Mertens (2003, 2007) suggested social science researchers should favour a mixed methods inquiry.

Critical realism is an additional philosophical position commonly associated with MMR (Maxwell & Mittapalli, 2010; Mukumbang, 2021; Shan, 2022; Zachariadis et al., 2013). Critical realism considers reality as objective and relative to who is viewing it, and how they acquired their perception of what is real (Archer et al., 2016). Critical realism is concerned with the composition of reality; what has caused a given point of view, how this view has been formed, and what relationships have been influential (Milligan, 2016). Critical realism attempts to find a midpoint between the
perceptions of reality and the observable empirical data. Bhaskar (1975) suggested that through critical realism the notion of ‘reality’ could be examined through a stratified lens. This multi-level approach looks at reality from the perspective of 1) empirical science, which is acquired through experiments, observations and data; 2) perceived experiences, and 3) the ‘real’ structures that underpin those events (McEvoy & Richards, 2006). By separating these concepts, a researcher is more likely to gather a richer picture of true reality. Critical realism is a philosophical position that resonates with qualitative, quantitative, and MMR methodologies. It is an approach that looks at all perspectives and offers a deeper level of understanding and explanation of the phenomena. At its core principle is the notion that the research question should dictate the methodological pathway and, in turn, will prescribe the use of methods for a research project (McEvoy & Richards, 2006; Roberts, 2020; Tashakkori & Teddlie, 2010).

3.2.3 Debates About the Philosophical Positioning of MMR

Within the MMR literature there are a plethora of discussions about the justification and positioning of philosophical assumptions in the mixed methods process. Much of the early literature about MMR’s positioning on the research continuum, and whether or not MMR really is a third paradigm, centred around the discussions as to whether paradigms, as worldviews about how truth is measured, could truly be mixed (Guba, 1987; Guba & Lincoln, 1989; Smith & Heshusius, 1986; Tashakkori & Teddlie, 1998; Tashakkori & Teddlie, 2003; Tashakkori & Teddlie, 2010).

In this era of fervent discourse, often coined as the ‘paradigm wars’ (further discussed in Section 3.2.4), staunch purists held steadfast in their conviction that the foundational ontological and epistemological tenets of quantitative and qualitative
research were inherently at odds, rendering their combination inconceivable (Guba & Lincoln, 1989). The lack of consensus was further exacerbated by the ambiguity encircling the term ‘paradigm’, and its alignment with MMR (Johnson, 2011). As noted previously, Thomas Kuhn (1970) introduced the notion that paradigms are communal exemplars, and a host of modern scholars have rallied behind the idea that MMR constitutes a novel paradigm when scrutinised through this lens (Mertens, 2003; Morgan, 2007; Tashakkori & Teddlie, 2003; Uprichard & Dawney, 2019). According to these scholars, MMR entails a harmonious convergence or complementary fusion of paradigms at the ontological, epistemological, and the axiological levels, seamlessly interwoven throughout the entire research process. This occurs from design and analysis to integration of results and the dissemination of findings. However, it is essential to acknowledge that the legitimacy of amalgamating divergent philosophical stances remains a matter of ongoing contention.

Baškarada and Koronios (2018) claimed that valid MMR theories, explanations, and models for integration are still abstract; and thus far the literature has failed to conclusively argue that MMR methodologies do convincingly overcome the incommensurability of combining opposing theoretical positions. They conclude that the scientific worlds predominately characterised by the positivistic quantitative and interpretive qualitative paradigms will maintain pre-eminence until the MMR standpoint garners further substantiation and establishment. The path forward necessitates a persistent endeavour to fortify the foundations of MMR against the backdrop of existing paradigms, gradually solidifying its place within the scholarly world.
3.2.4 Navigating the Paradigm Debate: Progressing Towards Scholarly Acknowledgment of Blended Philosophical Stances

It may not be enough to claim that MMR is a new paradigm because there is a community designing, writing, and endorsing the process as per the first Kuhnian assumption. A more comprehensive understanding necessitates grappling with Kuhn’s second assumption, that paradigms are ‘worldviews’ of reality. In this light, the intricacies of blending these worldviews, especially in the context of ontological assumptions, must be carefully considered.

Throughout history, not all MMR researchers have explicitly discussed the ontological and epistemological conventions underpinning their research. Some scholars even contend that these philosophical assumptions need not dictate the methodological process (Johnson & Onwuegbuzie, 2004) given the metaphysical nature of MMR (Giddings 2006). The metaphysical or a metaparadigm refers to a strategy that deals with paradigm differences, with the basic premise being that a researcher gains empathic and thoughtful perspectives through the application of more than one paradigm (Johnson, 2017). However, in the absence of clearly articulated philosophical position, MMR findings risk veering into subjectivity, potentially degenerating into a mere triangulation of data instead of a methodological orientation (Baškarada & Koronios, 2018; Denzin, 2012; Flick, 2017).

One of the most significant developments in the MMR movement and resulting professional legitimation was achieved through the scholarly acceptance of combining paradigmatic positions (Biddle & Schafft, 2015). As the MMR movement has continued its evolution, consensus has moved towards a desire to consider paradigmatic assumptions at a philosophical level and not just mixing of the data (Greene, 2006; Johnson, 2012; Uprichard & Dawney, 2016). Scholars of the era questioned whether divergent paradigms could genuinely conjoin or ‘mix’ at the
foundational philosophical level. The notion of the ‘incompatibility thesis’ is based 
on the notion that quantitative and qualitative epistemologies are fundamentally 
opposed; therefore, rendering them incompatible (Onwuegbuzie & Leech, 2005).

Within the context of paradigms as ‘worldviews’, an assembly of MMR 
projects now stand as testament to the spectrum of philosophical positions that 
coalesce in the field (Ghiara, 2020). An embracing of dissimilarities and insights that 
diverse paradigms bring has emerged, fostering an environment that values the 
richness they contribute to the journey of inquiry. Scholars, like Uprichard and 
Dawney (2016), underscore that this embrace is now welcomed, exemplified in the 
works of pioneers such as Creswell and Plano Clark (2018), Greene and Hall (2010), 
Johnson (2017), Mertens (2007), and Shan (2022). It is in this cordial environment 
that deeper, novel inquiries are born, breathing fresh life into the exploration of 
subjects under investigation (Uprichard & Dawney, 2016).

3.3 The Philosophical Position of This Research Study

When embarking on a journey of employing a MMR approach to promote a 
meaningful inquiry to explore, describe, and explain the intricacies of social science 
phenomena, the practical application of the philosophical position becomes a crucial 
facet. In this endeavour, insights shared by Creswell and Plano Clark (2018) 
concerning the application of worldviews within MMR offer a valuable compass. 
These scholars offer four overarching stances that a researcher might consider when 
shaping the philosophical underpinning of their research: 1) the selection of the 
‘best’ worldview most aligned with the research, 2) the fusion of multiple 
worldviews, capitalising on the collective strength, 3) identification of the ‘best fit’
worldview, tailored to the researcher’s specific contours, or 4) embracing a
worldview that is an exemplar from the research community’s collective wisdom.

Throughout this research journey, each of these stances has resonated; each
possessing its own inherent value at distinct junctures within the MMR process. The
precise philosophical stance adopted within this study, however, emerges as a
harmonious interplay of these paradigms; yet, with distinct nuances at the ontological
and epistemological levels. At the ontological level, this research finds its anchor in a
fusion of worldviews, a convergence of perspectives that spans the spectrum from
realism to relativism. This dialectical pluralism stance acknowledges the intricate and
multifaceted nature of reality. Simultaneously, the epistemological orientation aligns
with pragmatism, encapsulating the conviction that knowledge is honed through
practical engagement and experiential exploration. In essence, this research study
navigates a carefully constructed philosophical path. The ontological position
becomes a product of dynamic blending, while the epistemological aspect is
informed by the pragmatic pursuit of practical wisdom. This synthesis facilitates an
enriched exploration, unveiling the complexities of the social science environment
through a multi-dimensional lens.

3.3.1 Unpacking Ontology: Navigating the Essence of Reality

Aptly put forth by Crotty (1998), the quest to unravel the essence of reality,
existence, and the notion of ‘being’ stands as the central point of research. Ontology
refers to the philosophical assumptions and views of what is ‘real’ and how reality is
ascertained (Creswell & Plano Clark, 2018). The nature of acquiring this
‘knowledge’ of ‘what is real’ can be viewed along a continuum between the
philosophical stances of realism and relativism. Traditionally, this spectrum guides
researchers towards objectivity or subjectivity, etching the foundation for their
investigations (Greene, 2008). At one end stands the objective perspective resonating with the tenets of positivism. Ritchie and Vitali (2009) acknowledged that within this philosophical position, ontology unfurls as an absolute and tangible existence, wherein truths are derived solely through rigorous scientific methods, often involving meticulous observations and controlled experiments. In contrast, the subjective lens of ontology aligns with the philosophy of constructivism. Within this vantage point, reality is seen as individually constructed (Walker, 2009). It is a uniquely woven construct that is inherently relative, and true understanding can only be achieved through intricate interactions with the participants involved in the research process.

Moreover, philosophy emerges as a guiding compass, sculpting the landscape of nursing science, as highlighted by (Theodoridis, 2018). This profound influence extends beyond shaping ontological beliefs to framing what constitutes ‘knowledge’, ‘reasoning’, and ‘purpose’ as articulately underscored by Bruce et al. (2014). In this research study, ontology assumes its rightful place as the foundation upon which the structure of knowledge is erected. It is crucial to note that the works of Crotty and Bruce echo within this context, shaping and informing the trajectory of understanding reality, albeit from distinct angles and with implications specific to the nursing domain. It is a dynamic interplay between diverse perspectives that together illuminate the profound nuances of the fabric of reality.

### 3.3.2 Ontological Position in Nursing Science and This Research

This section explores the concept of ontology within the context of nursing science. It begins by discussing ontology philosophy as they unfold in the domain of nursing science and then considers my position in relation to nursing ontology.
3.3.2.1 The Ontological Discourse Within Nursing Science

In nursing science, a distinct body of disciplinary knowledge intertwines with practice, shaping nursing education and research endeavours (Hirani et al., 2018). This knowledge is fundamentally grounded in philosophical principles, influencing the very essence of knowing and, in turn, leaving an indelible imprint on the model of nursing science practice (Bruce et al., 2014). When exploring the philosophical ontology within the nursing discipline, Bender (2018) highlighted the holistic nature of nursing that promotes a ‘unique’ orientation to the pursuit of knowledge, “what exists for nursing is not independent domains of person, health, and environment, but rather interdependent relations that dynamically constitute people in their health/environment circumstances, which comprises nursing’s unique, fundamental point of access in the world” (p. 2). In nursing science, a crucial question emerges: Should the assessment of ‘knowledge’ and ‘what is known’ solely adhere to objective or subjective parameters, or should it be an amalgamation of these approaches?

Varied schools of thought converge when it comes to discerning the foundational measure of reality within nursing knowledge (Thorne, 2014). These discussions invariably inquire about what should guide and underpin nursing practice (Hirani et al., 2018). The contemporary debates towards where paradigms fit in nursing began in the 1970s with Margaret Hardy (1978, 1983). Hardy’s reflections on nursing knowledge, at that time, unveiled a perceived chaos that necessitated a more systematic contemplation. Drawing from the insights of Thomas Kuhn (1977) regarding paradigms, Hardy concluded that his different ways of interpreting the notion of paradigms, could indeed be conceptualised as one ‘metaparadigm’. This metaparadigm would amalgamate Kuhnian assumptions into a framework encompassing worldviews, social habits, and concrete methodologies, offering
guidance throughout the research journey. Hardy (1983) and another eminent scholar, Masterman (1970),underscored that at this level paradigms served as orienting mechanisms for nursing, rather than theoretical tools for understanding knowledge. Hardy (1983) accepted there was much discontent between scholars during this transition between the pre- and post-paradigmatic period in nursing. However, she upheld that a metaparadigm could serve as a scaffold for the evolving theoretical foundations of the discipline.

Jacqueline Fawcett (1984, 1996) strongly disagreed with Hardy’s work which suggested that to this point nursing knowledge had been indistinct and unstructured. Fawcett contended that nursing understanding was unified and already contained a metaparadigm that formed the basis of scholarly knowledge. Fawcett highlighted that the discipline’s uniqueness derived from its perspective rather than the object of inquiry or methodology. The rich landscape of nursing theory, spanning influential figures like Peplau, Henderson, Johnson, Rogers, Orem, King, and Roy, echoes through the literature (Alligood, 2022; Arora, 2015; Cronin, 2012; Potter et al., 2021), with a resounding emphasis on the holistic ethos of nursing practice. In this light, nursing research could embrace a stance that mirrors this holistic perspective, embracing both objective and subjective orientations in the pursuit of meaningful inquiry.

3.3.2.2 Nursing Ontology on the Continuum of Realism and Relativism

Nursing has continued to straddle the worlds of the natural and social sciences, which has traditionally been dominated by a philosophical position of realism (Porter, 2001). Realism has traditionally been aligned with the natural sciences where empirical evidence has been sought to understand and explain the physical world (Wainwright, 1997). Through the lens of realism, reality stands
‘objective’, steadfastly independent of individual perceptions, experiences, or theoretical assumptions (Phillips, 1987). From this theoretical stance, reality can be viewed as a singular point established via measurable data collection, or the pursuit of hypotheses’ validation or refutation. These philosophical foundations of realism often position themselves between the contours of positivist and postpositivist epistemologies (Mills et al., 2002).

Realism parallels with quantitative paradigms where researchers use instruments steeped in reliability, verification, and validation to gather data. The pursuit is to quantify, predict outcomes, assess interventions, and gauge effectiveness. Studies grounded in realism cultivate an exploration of empirical knowledge that allows evaluation of many questions about the nursing world such as, the prevalence of disease, associated risk factors, and health outcomes, and provides an opportunity to evaluate the effectiveness of diverse interventional treatments (Hirani et al., 2018). Whether within clinical practice, research endeavours, or the realm of knowledge itself, the art of gathering objective data holds paramount importance. Many skills within the nurse’s repertoire, encompassing comprehensive patient assessments, reside in the worldview of realism (Rycroft-Malone et al., 2010). The gathering of objective measurements contributes to the planning, execution, and assessment of health care delivery.

Further, Cheraghi et al. (2019) argued that nurses need to be concerned with more than developing skills, and there should be a focus on critical, creative, and compassionate thinking. Therefore, a philosophical position grounded in relativism may be more appropriate for nursing science. Through the lens of relativism, knowledge and truth are constructions of a person’s mind and inherently inseparable (Procter, 2019). ‘Reality’ is the certainty viewed by the individual, which is being
influenced by and influencing several outcomes—it is not an absolute construct (Creswell & Plano Clark, 2018). It can be explored through dialogue by considering the lived experience and contextual interpretations which champions a departure from the confines of objective data alone (Baghramian & Coliva, 2020).

Relativists believe that many social interactions and influences play a role in the construction of an individual’s reality, and nursing, therefore, should be grounded in this position (Carper, 1999). Relativism has philosophical links with theoretical positions such as phenomenology, critical theory, interpretivism, and hermeneutic approaches (Denzin & Lincoln, 2018). Its embrace of constructivism and transformative paradigms resonates, opening up a position that celebrates the multiplicity of knowing. Research that is grounded in a relativist perspective is not constricted by the notion that there is only one true reality, but is open to the possibility that there may be multiple ways of knowing. This philosophical position recognises and gives credit to the importance of perceptions, experiences, and personal constructs when assessing reality (Mertens, 2015). Within this paradigm, the nursing researcher considers participants’ perspectives and how multiple factors within the physical, psychological, social, and geographical world may influence their experiences and nature of knowing.

In undertaking health assessments, and the subsequent provision of healthcare services, it is essential for nurses to consider the intricate interplay between the physical aspects and the contextual backdrop of their patients (Rhoads & Petersen, 2018). Subjective data echoes the person’s perceptions of their health status, are a reflection that resonates with their culturally sensitive health needs and priorities (Chambers et al., 2013). Embedding the principles of holistic care in practice can be considered an application of relativism in the nursing discipline. Underpinning
nursing education from a relativist philosophy encourages students and nurses to critically think about their practice, consider alternatives and challenge fixed beliefs, all while fostering inclusivity. A position of philosophical relativism opens the conversation that reality has multiple truths. It embraces the notion that reality is not a monolithic entity but a constellation of multiple truths, each fashioned by the individual’s unique perspective (Rohrbach Viadas, 2015).

3.3.3 My Ontological Position in Nursing Science

In navigating the terrain of reality within nursing science, I hold the belief that reality cannot be solely determined by the analysis of measurable data or by relying solely on people’s subjective perceptions. Each of these worldviews, encapsulating their respective truths, possess inherent value in shaping the answers to the research question at hand. As a result, I have opted for a mixed method approach, recognising that both perspectives have a contribution to make.

This research project is concerned with the intricate concept of ‘understanding’. My objective is to unravel the depths of what patients truly comprehend about their cardiac health after their engagement with hospital services. I am of the belief that the essence of ‘understanding’ transcends the boundaries of merely objectivity or subjectivity. While it is true that an examination can gauge comprehension, it may fall short in conveying the complete spectrum of participants’ knowledge. Knowledge can be considered a personal construct, and without examining the individuals’ perceptions of their understanding, a researcher may not gather an accurate account of the underlying reality.

Embedded within the research paradigm of mixed methods, this research acknowledges the significance of all layers of reality. Such a multidimensional perspective, championed by scholars like Johnson (2008) and Johnson and
Onwuegbuzie (2004), lends itself to a comprehensive grasp of the phenomenon under scrutiny. Across the landscape of research, there now stands a myriad of examples of MMR conducted across the spectrum of paradigms, each rooted in distinct worldviews (Ghiara, 2020). This newfound diversity is embraced, as it fosters an environment of enriched exploration, propelling researchers towards deeper insights and novel revelations within the subject under investigation (Uprichard & Dawney, 2016).

3.3.3.1 Dialectical Pluralism to Support the Ontological Position

Dialectical pluralism positions the researcher at a dynamic crossroads, fostering a continuous flow of communication between diverse philosophical theories that resonate throughout every phase of the research (Johnson, 2017). This approach, although not novel, carries nuances within its terminology and conceptual comprehension. The roots of this philosophy can be traced back to Jennifer Greene’s pioneering work on the dialectical stance in the early MMR literature (Greene, 2007; Greene & Hall, 2010). Nevertheless, the echoes of dialecticism reverberate in the ancient philosophies of luminaries like Socrates, Plato, Aristotle, and extend to modern thinkers such as Dewey (Cronenberg, 2020; Johnson, 2017).

Dialectical pluralism emerges as a potential solution to the ‘incommensurable’ debate surrounding the coexistence of opposing paradigms. This philosophy offers a platform where the tensions arising from conflicting theories can stimulate a profound comprehension of the phenomena under scrutiny (Goertzen, 2010). The alternation between positions actually highlights the convergence and divergence in the scientific process and through discussion there is greater conceptualisation of the findings. Mitchell (1982) described dialectical pluralism as “not liberal toleration of opposing views from a neutral ground but [rather]
transformation, conversation, or, at least, the kind of communication which clarifies exactly what is at stake in any critical conflict” (p. 614). Dialectical pluralism values the concurrent use of paradigms within the research process and puts equal value on the multiple perspectives (Johnson, 2017). Johnson (2017) suggested that the next theoretical evolution in MMR is to consider the research not in terms of a paradigm but a metaparadigm that fully embodies two or more paradigmatic stances. Dialectical pluralism works well as a metaparadigm as the converging and diverging conversations promote deeper reflection of the phenomena under investigation.

Far from an abstract concept, dialectical pluralism constitutes a practical framework applicable to all phases of research. It offers guidance for determining the research’s philosophical stance and continues to underpin the researcher’s approach throughout data analysis and the formation of findings. Furthermore, dialectical pluralism harmonises seamlessly with other paradigmatic positions. The premise is the combining of differing perspectives to create a new workable approach to the research question, and produce ethical findings that are disseminated and utilised to create change (Johnson, 2017). The conversation between quantitative and qualitative components should pervade every stage of the research, spanning ontological and epistemological deliberations, ethical foundations, and methodological implementation. As identified earlier, this research is positioned across the ontological spectrum of realism and relativism because of the inherent nature of objective and subjective inquiry in nursing practise. Dialectical pluralism helps mediate the tension between these ways of knowing as it draws on multiple lenses to develop understanding.

Cronenberg (2020) outlined four key tenets that define dialectical pluralism. First, it emphasises the importance of perpetuating an ongoing dialogue between the
amassed datasets. Secondly, regardless of their methodological underpinnings (be it quantitative, qualitative, or mixed methods encompassing convergent, explanatory sequential, or exploratory sequential designs), all collected data should be accorded an equal significance and status. The third characteristic is to preserve the data integrity, meaning that the researcher should not convert qualitative data into quantitative data or vice versa (Cronenberg, 2020). Such transformations have the potential to alter the ‘power’ dynamic inherent in the datasets, which is at odds with the core principles of dialectical pluralism. Finally, the fourth characteristic underscores the value of harmonising and dissonance among multiple perspectives, with results presented in a manner that respects and integrates these contributions into the research process.

In the current study, the ‘primary data analysis integration procedure’ framework proposed by Creswell and Plano Clark (2018) serves as a guide. This framework aptly aligns with the philosophical stance of dialectical pluralism. Central to this six-stage process is the concept of nurturing an ongoing dialogue between the quantitative and qualitative datasets, akin to the foundational principles of dialectical pluralism.

3.3.4 Epistemological Orientation: Pragmatism’s Influence on Research Design

This section looks at the epistemological theories that have significantly influenced the research design for this study. Consideration is given to the theoretical positions of constructivism, positivism, and postpositivism, examining how these beliefs influenced my stance and, ultimately, led to the adoption of the epistemological perspective of pragmatism. This discussion will culminate in a comprehensive exploration of the philosophy of pragmatism, shedding light on its implication for this study’s methodology.
3.3.4.1 Constructivism

When determining the appropriate epistemological foundation for a study, the research question and objectives play a pivotal role in guiding the researcher’s choice. Within this context, several approaches resonated with the research objectives. Constructivism, for instance, asserts that ‘realities’ are contextually bound, specific, and shaped by social and experiential factors. These realities are contingent upon the perspectives held by individuals or groups (O'Donoghue, 2007).

Constructivism is an epistemological position closely aligned with education. It suggests that knowledge is not passively received; rather, actively constructed through personal experiences and social interactions (Nola & Irzik, 2006; Steffe & Gale, 2012). Viewing the research through the constructivist lens acknowledges that a learner brings their prior knowledge and experience into the learning environment. However, it is important to note that this approach might not offer a complete picture of what the participants fully understand. Participants may not know what they need to know or how to articulate their understanding. Sometimes, participants may possess knowledge regarding a topic but in the context of a focus group or interview, articulating this understanding may not be seen as significant. Consequently, employing methods like surveys or questionnaires, which directly ask straightforward content questions, might yield more successful results. Employing a multifaceted approach to evaluating or gauging ‘understanding’ ensures a more exhaustive response to the research question.

3.3.4.2 Positivism

Evidence-based practice is deeply ingrained in the healthcare landscape, and there exists a prevailing culture that seeks measurable outcomes as a basis for advocating change. There is no doubt that to fully answer the questions and aims of...
this research project, determining ‘what is known’ is essential. Working within a philosophical framework that facilitates the generation of this type of knowledge is essential and aligns well with the theoretical tenets of positivism.

Positivism, at its core, advances that reality is both ‘objective’ and ‘measurable’ (Liamputtong, 2010). Within the positivist paradigm, knowledge is considered independent of the individual acquiring it and is quantified through ‘objective’ and ‘measurable’ data derived from the tangible world, not based on personal opinions, beliefs, and/or experiences (Unrau et al., 2014). However, it is crucial to question can an individual’s understanding of their health education be solely and objectively measured? This could be over simplifying the notion of knowledge and lacking a critical lens.

In education, positivism has become an unpopular ideology and received criticism that it lends itself to didactic teaching, potentially limiting the cultivation of learners as critical thinkers (Matthews, 2004). Nevertheless, there might be a valid role for positivism when employed alongside other ideologies, contributing to a comprehensive understanding of knowledge. Balancing positivism with alternative perspectives could enrich the exploration of the multifaceted nature of knowledge.

3.3.4.3 Postpositivism

There are many factors that will influence ‘understanding’ and a postpositivist lens may be more congruent in answering the research questions. While postpositivism slightly tilts towards assumptions that align well with a quantitative approach, it offers a paradigm that considers the effects and outcomes of the perceived ‘reality’ (Creswell, 2014). Within this theoretical framework, the worth of objective assessments for evaluating knowledge remains acknowledged. However, Phillips and Burbules (2000) introduced a crucial insight, that multiple factors shape
observations, including 1) the underlying philosophies, 2) internal and external assumptions, 3) the researcher and participants’ background knowledge, and 4) inherent values. This is not to say that what the researcher or participant brings to the research process invalidates true meaning, but that it should be acknowledged as part of the analytical process.

Postpositivists contend that knowledge extends beyond being merely an objective construct subject to assessments; it also embodies a subjective element influenced by human perceptions and contextual factors (Young, 2001). It could be argued that adopting a metatheoretical stance offers a pathway toward overcoming the limitations of a singular viewpoint. A holistic approach that synergises both quantitative and qualitative paradigms could potentially yield a more comprehensive level of understanding. As the current research aims consider both the patient’s and health care professionals’ perceptions of what is ‘known’ and aspires to achieve quantifiable outcomes, it seems rational to align this study with a paradigm situated between constructivism and postpositivism. This positioning could harmoniously bridge the dual views of individual construction and measurable outcomes.

3.3.4.4 Pragmatism

A philosophical position often credited with being the theoretical foundations of MMR is pragmatism (Shan, 2022) which assumes that knowledge is a personal construct derived from individual experiences. Pragmatism acknowledges the intricate and multi-layered nature of ‘reality’, recognising that a person’s reality co-exists with the social and psychosocial worlds (Creswell & Plano Clark, 2018; Johnson & Gray, 2010; Johnson & Onwuegbuzie, 2004). Pragmatists contend that reality finds its place both within the natural/physical sphere and the psychological/social domains (Liampittong, 2010). Positioned along a spectrum,
pragmatism emphasises the significance of both subjective and objective facets of reality (Baškarada & Koronios, 2018). In essence, it advocates against drawing rigid boundaries between postpositivism and constructivism, but researchers should be free to move between methodological decisions when designing research (Creswell & Plano Clark, 2018; Johnson & Gray, 2010; Johnson & Onwuegbuzie, 2004). This philosophical position finds resonance with MMR, as it suggests that conflicts inherent between quantitative and qualitative methods can be, to some extent, set aside for practical utility (Biesta, 2010; Creswell & Plano Clark, 2018; Denzin & Lincoln, 2018; Johnson & Gray, 2010; Tashakkori & Teddlie, 2010).

In the published literature, there is much debate as to where pragmatism sits in relation to being used as a paradigm in MMR (Tashakkori & Teddlie, 2010). The discussion centres around the question of whether it is truly a paradigm or actually a practical approach for answering a research problem. Green and Caracelli (2003) proposed it is likely to be in the middle ground between a paradigm and a methodological concept. Pragmatism has been linked to diverse ontological orientations. It has been suggested that pragmatism is fundamentally a relativistic stance, refraining from predetermining a philosophical stance and embracing the emerging reality (Denzin, 2012). Philosophers, such as Rorty (c.f., Brandom, 2000, for a critical analysis of Rorty’s philosophies) and Maxcy (2003), have positioned pragmatism more towards pluralism than realism. Meanwhile, Johnston et al. (2007) advocated an epistemological ‘pragmatism of the middle’, asserting its suitability for MMR by endorsing the coexistence of philosophies through the fusion of quantitative and qualitative research. Pragmatism rejects the notion of the ‘incommensurability thesis’; and claims that while paradigms can remain separate,
they can also be harmonised (Johnson et al., 2007) in the quest to explore ‘the nature of knowledge’.

At a philosophical level, the concept of exploring multiple ways of ‘knowing’ characterises a pragmatic maxim. Pragmatic philosophy views beliefs as having two aspects—operational and inferential—and both guide our actions (Burke, 2013) and delve into the essence of meaning. The operational aspect seeks to explore meaning via tangible data, while the inferential dimension scrutinises the potential consequences of embracing certain beliefs. MMR aligns seamlessly with this philosophical maxim, by embracing a research question from both quantitative and qualitative vantage points. In the context of this research which is exploring heart health knowledge, a comprehensive understanding demands an exploration of both operational and inferential perspectives.

3.3.4.4.1 Historical Evolution of Pragmatism

The roots of the Pragmatist position delve deep into American pragmatism, with its early discussions led by William James (1907). His seminal lectures, initially delivered in 1907 and subsequently abridged in 2018, laid the foundation for this philosophical stance. Johnson and Gray (2010) identified three pivotal philosophers as the architects of the American pragmatic maxim: John Dewey, William James, and Charles Saunders Peirce. Neo-pragmatist ideas have been perpetuated by contemporary thinkers like Richard Rorty, Hilary Putnam, Jurgen Habermas, Susan Haack, Huw Price, Robert Brandon, and Cheryl Misak (Bacon, 2012). Peirce’s insights inspired James’ explorations into pragmatic philosophy. Peirce wrote how philosophers of the day would benefit from examining thoughts and ideas from the perspective of considering what makes a difference to human behaviour (Bacon,
Despite the perception that pragmatism is a relatively young doctrine, its ideals can be traced in the works of traditional philosophers such as Aristotle, Socrates, Locke, and Hume (Bacon, 2012; Johnson & Gray, 2010).

Dewey’s work emphasised that rather than aligning beliefs with a fixed notion of ‘what is true’, consideration should be given to the pragmatic maxim as tools that help us cope with the investigative world (Dewey & McDermott, 1973). Pragmatists contend that insights into life surface when humans are viewed not just as natural entities but also as cultural beings (Bacon, 2012). The researcher needs to consider what is being explored; how the answers belong to the community (the research participants); and how this community will validate, challenge, or scrutinise the findings. Dewey’s proposition underlined that the essence of knowing is validated when the inquirer engages with the scientific culture of the community (Dewey & McDermott, 1973). He questioned the legitimacy of traditional research paradigms stemming from a solitary perspective:

In current philosophy, everything of a practical nature is regarded as ‘merely’ personal and the ‘merely’ has the force of denying legitimate standing in the court of cosmic jurisdiction. This conception seems to me the great and the ignored assumption in contemporary philosophy; many who might shrink from the doctrine if expressly formulated hang desperately to its implications. Yet as an underlying assumption, it is sheer prejudice, a cultural survival. (Dewey, 1977, p. 126)

3.3.4.4.2 Clarifying Misconceptions Associated with a Pragmatic Position

While pragmatism offers a promising approach for research, it is not devoid of challenges. Researchers considering its adoption as a theoretical stance must
carefully address these challenges and establish a rationale for its utilisation (Cameron, 2011). Tufanaru (2015) highlighted several misconceptions surrounding pragmatism. The initial misconception implies that a pragmatist can place practical considerations above all else, including philosophical assumptions, in the decision-making process. This suggests that researchers could manipulate the inquiry process by any means necessary to achieve their goals (Tufanaru, 2015). Such an interpretation may cast doubt on the legitimacy of the research process, as a robust philosophical foundation is crucial for evaluating the research design (Denzin, 2012).

Another misconception is that pragmatism is a validation for utilitarianism and that there is justification to any approach within the research process if there is a perceived benefit of its use. Further confusion arises from the belief that pragmatism advocates neutrality, assuming that all stakeholders will recognise the practicality of the intended outcome. A final misconception relates to the overly optimistic notion that the ends always justify the means (Tufanaru, 2015).

Within the academic discourse, vigorous debates persist and will likely continue regarding the amalgamation of conflicting philosophical stances within a single epistemological framework, as seen in the principles of pragmatism. Purists oppose both pragmatism and the practice of MMR, contending that the ontological and epistemological assumptions underpinning quantitative and qualitative research are irreconcilable, rendering their convergence implausible (Biesta, 2010; Guba & Lincoln, 1989; Petter & Gallivan, 2004). Historically, opposition to mixing paradigms has occurred at the following levels: 1) political debate concerning the appropriateness of such blending within the research community, 2) technical feasibility of methodological integration, and 3) reconciliation of underlying philosophical assumptions (Greene & Caracelli, 2003).
The misconceptions surrounding pragmatism have important implications for a researcher considering using this theoretical position including the need for clarity, ethical integrity, and a balanced approach when using pragmatism in research methodologies. Addressing these implications involves aligning pragmatic approaches with ethical considerations, maintaining robust philosophical foundations, critically evaluating the appropriateness of methods, and fostering open discussions about the challenges and benefits of methodological integration. This ensures the use of a pragmatic stance contributes to credible, well rounded, and meaningful research outcomes.

### 3.3.5 Pragmatism as an Epistemological Position for This Research

The epistemological foundation of this research underscores the essential need to explore the ‘true meaning of reality’ when investigating a patient’s comprehension of their heart health, necessitating a holistic view encompassing both objective and subjective perspectives. While some may argue for a solely ‘assessed’ understanding of knowledge, this study firmly contends that embracing knowledge as a personalised construct is philosophically indispensable. Therefore, considering a paradigm that allows the construction of multiple worldviews, while respecting established scientific theories, becomes pivotal for achieving genuine understanding. Pragmatism emerges as an ideal choice, offering a comfortable middle ground where fusion of theories into a singular metaphysical paradigm is considered both acceptable and advantageous for a comprehensive response to the MMR questions and objectives (Morgan, 2014). Alongside an ontological position of dialectical pluralism, a pragmatic epistemology empowers the researcher to explore knowledge as an evolving and potentially flawed entity, optimally perceived through multiple interpretations. Restricting inquiry to a singular approach aimed at uncovering the
‘true meaning’ risks presenting either a distorted amalgamation of heterogeneous results or an overly homogenised depiction.

There is support that a MMR methodology can be legitimate and this is achieved through a pragmatic epistemology. Central to its validity is the meticulous integration process woven throughout every facet of the MMR design (Creamer, 2018). By fusing diverse data through a range of strategies, findings become linked, yielding a collective impact that surpasses individual components (Bazeley, 2010). This integration process confirms and challenges findings, and ensures completeness and a thorough analysis of the conclusions (Risjord et al., 2002). After a thoughtful examination and analysis of diverse theoretical perspectives, as the researcher I have concluded that an epistemological framework of pragmatism, supported by an ontological basis of dialectical pluralism, most effectively underpins the stance of this research.

3.3.6 Axiology: Ethical Considerations and Value Orientation

Axiology, a branch of philosophy that explores the study of values and ethics (Creamer, 2018), offers a lens through which a researcher can explore the ethical underpinnings and implementation strategies of a study. Reflecting on axiology facilitates a deeper understanding of culturally complex communities and enables anticipatory contemplation of potential ethical dilemmas that may emerge (Mertens, 2007). Guided by three core ethical principles outlined in The Belmont Report (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979) navigates a path that upholds human rights, cultural norms, and fairness (Miracle, 2016). These principles are: 1) beneficence, which aims to promote the human rights and seeks social justice; 2) respect, of cultural norms within and across communities; and 3) justice, by which there is consideration
given to who benefits the most from the research, that it is responsible, nonexploitative, well considered, and administrated in a fair and just way (Mertens, 2015). These principles were entrenched in the aftermath of the Second World War, with subsequent developments such as the Nuremberg Code of 1947, the Helsinki Declaration of 1964, and the Belmont Report of 1979 (Polit & Beck, 2021), shaping their articulation.

While discussions on axiological positions have been relatively less prominent in MMR literature, compared to ontological and epistemological discourse, values and ethics are essential throughout the research journey regardless of the chosen paradigm (Biddle & Schafft, 2015). The incorporation of axiology aligns with the broader research landscape to ensure ethical integrity and cultural sensitivity.

Approaches to an axiological position will vary depending on the paradigm from which frames the research position. There is now a growing body of literature from which axiological positions can be considered in relation to common paradigms in MMR (Biddle & Schafft, 2015; Creamer, 2018; Creswell & Plano Clark, 2018; Mertens, 2007, 2015). Within the postpositivist paradigm the researcher is focused on primarily conducting unbiased and accurately reported data, where findings are as conclusive as possible. Axiology in constructivism considers that the social world is the constructed meaning of the participant; therefore, through interactions, the researcher gains insight. Due to this closeness and the nature of subjectivity, the researcher is exposed to bias which can be mitigated by actively considering the bias, and incorporating a process of thoughtful planning with ongoing researcher reflexivity throughout the project. Constructivists need to promote an environment of
open dialogue between researchers and participants to minimise bias (Creswell & Plano Clark, 2018).

Within a pragmatic paradigm, axiological considerations manifest as actionable steps toward linking research outcomes with practical applications (Mertens, 2015). There is also emphasis towards considering multiple contingencies, so that the researcher gains a true understanding of the phenomena from multiple perspectives. This research has a strong axiological position in the ontology of dialectical pluralism, mindful considerations between theories drive how the research is positioned, and how it judges the nature of what is known (Johnson, 2012). The fundamental ideas that ground this axiological position are the notions of careful thoughtful dialogue and listening (Johnson, 2017). Through a philosophy of dialectical pluralism, consideration is given to the different perspectives gained through multiple datasets and strives for social betterment and justice through respectful discussions (Mertens, 2015).

The forthcoming chapter examines the practical application of this axiological position, providing an in-depth exploration of the research design. By grounding the study in an axiological framework, the research acknowledges its ethical obligations and positions itself for a more comprehensive and impactful exploration of patient understanding of heart health.

3.4 Conclusion

This discussion has highlighted the philosophical position of the research. In relation to the research questions, the conclusion drawn is that a MMR design would best facilitate comprehensive exploration. It has been ascertained that knowledge, a multifaceted construct, can be comprehended through multiple lenses, encompassing
both objective and subjective dimensions. This study situates its evaluation of ‘reality’ along a continuum between the ontological perspectives of realism and relativism, supported by the overarching philosophy of dialectical pluralism, a metaparadigm that harmonises diverse perspectives. Furthermore, this comprehensive approach finds an appropriate epistemological scaffold in pragmatism.

The theoretical position advocates the amalgamation of varied philosophical orientations to unravel the complexities of the research query, foreseeably providing profound insights through rigorous data analysis. Through a mixed methods methodology, this study intends to explore the essence of patients’ comprehension regarding heart health, as well as considering the meaning of this knowledge from the participants’ perspectives. The fusion of datasets fosters a more intricate synthesis of findings and respects both the emic and etic viewpoints nurtured during the research process.

The upcoming chapter will unveil the meticulously designed methods, encompassing both quantitative and qualitative data collection strategies, analytical protocols, quality assurance measures, my position statement, community consultations (including Māori consultation), and ethical considerations.
Chapter 4: Theoretical Framework and Conceptual Model

4.1 Introduction

Two models are congruent with this research study, namely the Health Belief Model (HBM) and the Chronic Care Model (CCM). These models will serve as guiding frameworks throughout the research process, from the generation of new knowledge to the analysis of data and the subsequent discussion. Moreover, they will contribute to informed consideration regarding future interventions and solutions in the area of cardiovascular rehabilitation education.

4.2 The Health Belief Model

One theoretical framework that resonates with research exploring a patient’s disease related knowledge, is the HBM. Developed in the late 1950s, early 1960s, this conceptual framework for health behaviour remains widely utilised by health professionals, health educators, and psychologists (Green et al., 2020; Rosenstock et al., 1988). The HBM originated from investigations into the reasons why individuals did not pursue medical treatment, failed to acknowledge or downplayed their medical symptoms, and emerged as a response to the enhanced need for increased utilisation of preventative services and general health screening (Green et al., 2020). The development of the HBM emerged as a response to the aspirations of health educators who sought to raise the individual’s awareness of health risk and preventable illnesses, while promoting actions to mitigate those risks. Early psychologists theorised that people evaluated and considered both the practical and psychological barriers to behavioural change, and weighed them up against the perceived potential threat that a condition poses to their overall health and well-being (Marks et al., 2005).
The HBM is grounded in four fundamental cognitive constructs. First, it suggests that individuals are more likely to engage with positive health behaviours, such as developing their disease related knowledge, if they perceive themselves to be susceptible to a particular disease. Second, the model proposes that health behaviours are influenced by a person’s perception of the level of threat or significance of the disease including any unwanted outcomes or potential consequences associated with the condition (Green et al., 2020).

Third, behaviour change is influenced by an individual’s belief in the effectiveness and benefit that will be gained from acting to change behaviours. If people believe that engaging in certain behaviours is likely to be valuable to their health, they are more likely to adopt changes. Finally, the HBM recognises the role of self-efficacy which refers to the confidence an individual has in their ability to carry out and overcome barriers to change (Green et al., 2020). The model provides insight for health educators when designing programmes around the factors that influence an individual’s decision to engage in health behaviour change. Improving health related knowledge is one such factor.

The aim of a meta-analysis of 18 studies conducted by Carpenter (2010) was to determine if the aforementioned cognitive constructs of the HBM serve as longitudinal predictors of health behavioural change. The results indicated that perceived ‘benefits’ and ‘barriers’ to behaviour change were the strongest predictors. Furthermore, severity of disease was found to be a weak predictor of behaviour, while perceived susceptibility did not appear as a predictor at all (Carpenter, 2010). However, the author emphasised that a limitation of many of the studies was the variable approach to interpreting and analysing the HBM, which may have impacted on the accurate evaluation of results in the context of this model. Consequently,
caution is needed when attempting to generalise these results in the context of this model.

Several studies have explored the efficacy of using the HBM for educational interventions for chronic conditions, and have consistently demonstrated this model to be an intervention that supports behavioural change (Babaei et al., 2020; Kahnooji et al., 2021; Lo et al., 2015; Shabibi et al., 2017).

In the specific context of the current research, Habibzadeh et al. (2021) conducted a quasi-experimental study including 70 participants who had been discharged from hospital with a primary diagnosis of acute coronary syndrome. The participants were randomised into two groups; the intervention group receiving small group education, with their family members, through face to face sessions every other day for the first 14 days post-discharge (total of seven sessions). Both groups received routine post-operative care, while the control group did not receive any additional interventions. The educational sessions were grounded in the health beliefs educational model. The study found a statistically significant difference in preventative behaviours between the groups, but no significant differences were observed between the readmission rates of the groups (Habibzadeh et al., 2021). However, it is important to note that the findings pertaining to the readmission rates may be influenced by the relatively small sample size, and conducting a larger trial would be beneficial to the literature in this field. Habibzadeh et al. mentioned that the controlled group only received ‘routine’ post-operative care, but the ambiguity of specifics makes it challenging to draw any conclusive interpretations.

The HBM provides valuable perspectives for developing education interventions and strategies. By understanding patients’ misconceptions and identifying barriers, healthcare providers can customise educational material,
communication strategies, and support services to better address the patient’s needs. This tailored approach aims to work towards enhancing the individual’s understanding of how to managed their cardiac condition. The use of the HBM can offer educators valuable insight into the patient’s levels of understanding regarding their heart health following engagement with the hospital services for the first time. By incorporating a mixed method design that combines quantitative data to assess what patients understand about their heart health, and qualitative data that explores the patients and healthcare professionals’ perceptions, this research can comprehensively examine Aotearoa New Zealand patients’ levels of understanding, and consider implications for service delivery.

4.3 The Chronic Care Model

The CCM is as another theoretical framework that strongly resonates with the management of CVD and cardiac education (Stone et al., 2021). This model was developed in the mid-1990s when Wagner et al. (1996) first highlighted what were the common elements of effective primary care programmes that resulted in improved health outcomes for patients with chronic illnesses. The authors reported that these five general areas included: 1) the use of explicit plans and protocols; 2) that to effectively meet the chronic health needs of patients there needs to be a greater allocation of time, resources, and follow-up; 3) the use of a systematic approach with a focus towards recognising the knowledge and behavioural-change needs of the individual; 4) the timely availability and access to experts; and 5) supportive systems for the sharing of information (Wagner et al., 1996). The CCM places the patient at the centre of all care decisions when providing chronic care services. This model emphasises the importance of tailored made treatment plans.
based on the individual needs and preferences of the patient, with a collaborative health team facilitating the process (Ham & Wagner, 2014).

Since the introduction of the original CCM (Wagner et al., 2001), there have been a number of modified versions but all include six core elements (Stone et al., 2021). These core elements are summarised below:

1) **The health system:** Emphasises the creation of a supportive environment within the health system to facilitate effective chronic disease management. It promotes a culture of continual quality improvement by aligning various factors including financial policies, leadership practices, and a patient centred approach to care.

2) **Delivery system design:** Centres around the reorganisation of healthcare delivery to effectively address the needs of patients with chronic health conditions. It advocates the promotion of collaborative care, and emphasises the importance of coordinating services to enhance communication between patients, healthcare providers, and different healthcare teams.

3) **Decision support:** Focuses on providing health care professionals with evidence-based practice guidelines, protocols, and resources to facilitate informed decision-making regarding patient care. Its objective is to ensure that health care professionals have access to the up-to-date guidelines and best practice principles for managing chronic conditions.

4) **Clinical information systems:** Emphasises the importance in using technology and information systems to facilitate effective chronic disease management. It advocates the use of electronic health records, systems for tracking patient data, condition registries, and the monitoring of health indicators. These tools
are aimed at supporting clinical decision making and enhancing the overall quality of services available to individuals with chronic conditions.

5) **Self-management support:** Places emphasis on the importance of empowering individuals with chronic disease to actively manage their conditions. It prioritises processes and interventions that enable individuals to take an active role in the management of their condition. Self-management support involves providing services such as education, resources for skill development, goal setting assistance, and knowledge acquisition. The objective is to equip individuals with the necessary tools and knowledge to make informed decisions about their treatment and to effectively manage their conditions.

6) **The community:** Finally, the CCM recognises the significant role of the community in supporting people with chronic conditions. This element highlights the importance of community engagement and the utilisation of community resources to provide further support to individuals with chronic conditions. It acknowledges the value of community organisations such as, support groups, public health agencies, and other health agencies in offering further resources, education, and assistance to individuals with chronic conditions.

The CCM places the patient at the centre of all care decisions, and prioritises their needs and preferences. For achieving optimal results, it requires a proactive and well prepared team working collaboratively so that information is shared and services leverage off evidence-base practice guidelines and the expertise of the members within the team (Ham & Wagner, 2014). At the centre of this model lies the concept that integrated and coordinated care plays a pivotal role in the delivery of services. The approach relies on a central person coordinating the various services required to address the complex needs of the individual. It emphasises a holistic
approach that encompasses physical health and includes other aspects of well-being (Ham & Wagner, 2014).

4.4 Conclusion

The current research will investigate patients’ understandings about their heart health, aligned with the above two theoretical frameworks. Both models emphasise the significance of effective self-management and patient-centred care. They recognise the importance of active patient engagement in their own care and decision-making processes. By understanding the patients’ levels of knowledge, beliefs, and potential misunderstandings related to their health, health care professionals can personalise education, communication, and resources to cater to their specific needs. This is likely to enhance adherence to treatment plans and promote positive health behaviours. Research that aligns with the principles of the CCM and the core cognitive constructs of the HBM, contributes to the delivery of patient-centred, individualised, and effective healthcare for people with CVD.
Chapter 5: Research Design and Methods

5.1 Introduction

This chapter presents an examination of the research design and methodology employed in the study. It offers a comprehensive overview of the strategies, procedures, and methods meticulously crafted to facilitate data collection and the subsequent analytical processes. Building upon the discussion in the preceding chapter, which explored the nuances of the MMR methodology and the philosophical underpinnings of the study, this chapter serves as an in-depth exploration of the adoption of a ‘fixed convergent MMR design’ to address the research questions.

Within this chapter, a detailed account of both quantitative and qualitative data collection techniques and analytical methods will be presented. This chapter provides in-depth examination of the inclusion criteria, the intricacies of recruitment processes, the precision of data collection procedures, and the methodologies deployed to strengthen the data analysis. Additionally, it explains the quality assessment practices that have fortified the robustness of the research design. Subsequent to the presentation of quantitative and qualitative methods, the chapter expands upon a structured six-stage approach employed to dissect and comprehensively analyse the convergent mixed methods design. This discussion is complemented by a thorough examination of the framework employed to evaluate the MMR process. This chapter sheds light on the position of the researcher within the study, and the ethical considerations that have steadfastly guided the research process.

5.1.1 Introduction to the Design

This research project employed a mixed methodology, encompassing both quantitative and qualitative data collection methods to address the research questions
and objectives. The framework adopted aligns with a fixed mixed method typology centred on a convergent design, as outlined by Creswell and Plano Clark (2018). Within this fixed design, the selection and planning of both quantitative and qualitative data collection methods were predetermined at the commencement of the research and systematically implemented. In tandem with the convergent design, I gathered distinct quantitative and qualitative datasets, subjecting them to separate analyses before integrating and synthesising the results (Creswell & Plano Clark, 2018). A detailed overview of the research design is available in Appendix C.

Convergent designs offer several advantages, notably the concurrent capture of emic and etic perspectives. The subsequent meta-analysis stage enables the validation of findings from both quantitative and qualitative streams, and facilitates the development of overarching conceptual theories (Teddlie & Tashakkori, 2006). It is important to acknowledge that working within a convergent typology can pose challenges, particularly for novice researchers. It necessitates a high level of skill to independently analyse datasets and, subsequently, navigate the integration process. Detecting discrepancies within datasets can also prove challenging when the researcher is deeply immersed in both facets of the design.

The phases of the project encompassed the following:

**Phase One:** Focus groups and individual interviews conducted in Canterbury, Aotearoa New Zealand.

**Phase Two:** CADE QII questionnaire

- **Part A:** Pilot questionnaire – executed in Canterbury, Aotearoa New Zealand.
- **Part B:** National questionnaire – involved data collection from several major cardiac centres across Aotearoa New Zealand.
5.1.2 Ethics Approval

The research received ethical approval from the Health and Ethics Committee at the University of Canterbury (Appendix D). Further, a consultation process with Kaiarāhi Māori Research at the University of Canterbury (Appendix E) and a scoping review with the Health and Disability Ethics Committees (HDEC) were conducted. The project was categorised as a minimal risk observational study, removing the need for further submission to HDEC for approval, as detailed in Appendix F.

5.1.3 Ethical Location of the Research

5.1.3.1 Principles of Research Ethics

In the pursuit of promoting positive change and facilitating best evidence-based practice, research allows for the exploration of knowledge and future development in diverse fields and disciplines (Royal Society of New Zealand Te Apārangi, 2022). However, it is incumbent upon researchers to meticulously consider the potential impact their projects may have on all stakeholders involved (Boulton, 2009). Such considerations must be integrated throughout every phase of the research process, spanning the initial design and implementation to the evaluation and dissemination of results. To foster the establishment of high-quality research, the National Ethics Advisory Committee – Kāhui Matatika o te Motu [NEAC] (2022) has issued the New Zealand National Ethical Standards. These standards articulate the ethical requirements to which all health and disability research within the nation must adhere, setting a benchmark for ethical conduct.

In Aotearoa New Zealand, all health and disability research must align with Te Ara Tika and bioethical principles (NEAC, 2022). Translating to ‘the right path’, Te Ara Tika encompasses principles that have been passed down by Māori for
generations (NEAC, 2022). Nevertheless, these principles extend to benefit all individuals in Aotearoa New Zealand (Hudson et al., 2017). The Te Ara Tika principles, as delineated by NEAC (2022), encompass tika, manaakitanga, whakapapa, and mana. In a research context, tika pertains to the study design, focusing on the outcomes and potential benefits that may catalyse change. Manaakitanga underscores cultural and social responsibilities, emphasising the manner in which individuals are treated with respect and dignity. Whakapapa relates to relationships and the imperative to foster and uphold them. In the ethical research context, it involves meaningful consultation and engagement with Māori throughout all research phases. Lastly, mana embodies notions of power, prestige, leadership, and authority that individuals or teams bring to a situation. It also acknowledges that each person shapes their own destiny and that shared knowledge contributes to the attainment of mana in research. Throughout this study, these principles underpinned the approach in every facet of the research process.

At the outset, it was anticipated that participants identifying as Māori would likely be involved. To align with the needs of Māori, and the principles within Te Ara Tika, an integral part of the research design involved thorough consultation with both Māori and other stakeholders. This process commenced with extensive discussions with the Canterbury cardiology department and the Māori cardiology support team. Throughout these dialogues, the team shared their perspectives on the research project and the specific requirements for Māori participants. Consultations were further extended to representatives from the University of Canterbury, all DHBs likely to be involved in the project, and, where appropriate, regional iwi (Māori tribes). This ensured that the project was positioned to work collaboratively
with Māori communities, cater to the needs of cardiology services, provide effective feedback, and maintain cultural safety.

The consultation process underscored the importance of weaving whakawhanaungatanga (establishing relationships) into every stage of the research design. These relationships acknowledged the mana (dignity and respect) of Māori and all stakeholders, fortifying the research design process. Importantly, the consultation process fostered a sense of partnership and enthusiasm for the research project which was palpable in the support received during the distribution of recruitment packs. Te Ara Tika principles complemented the bioethical principles, collectively enhancing the ethical foundation of the research.

The bioethical principles delineated by NEAC (2022) encompass beneficence, non-maleficence, respect for people, and justice. Together with Te Ara Tika, these ethical principles establish the ethical expectations for research in the field of health and disability. The integration of bioethical principles into this study began with a comprehensive review of the literature and a consideration of the consequences of CVD and the outcomes of poor health literacy. The review further explored the national and international evidence regarding the benefits and drawbacks of cardiac rehabilitation programmes, and compared cardiac health knowledge levels among patients across multiple countries. This thorough evaluation, combined with an exhaustive consultation process, underscored the necessity for the research and its potential impact on clinical practice and patient education.

The principle of non-maleficence was a central consideration during the study design phase. A comprehensive summary of these considerations was included in the application for ethical approval which was sought and successfully obtained through
the University of Canterbury’s Human Ethics department. The University of Canterbury guidelines stipulate that any research involving the potential for physical and emotional stress, addressing personal or sensitive topics, and bearing potential risks for both researchers and participants cannot be categorised as ‘low-risk’ research. Therefore, this study warranted careful scrutiny.

An assessment of potential risks identified that there was a low risk for the research team when conducting focus groups and interviews with unknown participants at offsite locations. To mitigate potential risks, focus groups were conducted with a minimum of two research team members present. Beyond the facilitators or interviewers, other colleagues were informed of the time, location, and expected duration of the focus group and interview sessions. Additionally, a safety protocol was established, involving notifying another colleague upon the completion of each session to confirm the team’s whereabouts.

Moreover, potential physical and psychosocial risks for the research participants were acknowledged. Given that this research involved focus groups and interviews conducted at unfamiliar locations, there was a risk of potential physical harm or accidents. To minimise this risk, an environmental assessment was conducted for all research locations. In the unlikely event of an incident, individuals involved would have been strongly encouraged to seek appropriate treatment as needed. Furthermore, a small, but important, risk existed that the discussion might evoke feelings of distress among participants. To address this risk, a support system was put in place. If any participant expressed a need for additional support, information was readily accessible for an independent professional counsellor who could be made available after the focus groups and interviews. Participants were also
provided with the contact information for a 24-hour counselling hotline, ensuring that post-focus group and interview counselling support was accessible if required.

The promotion of autonomy was a paramount consideration during the design of the research. Informed consent was diligently upheld through the implementation of information sheets, provided both for the focus groups/interviews and the questionnaires. Furthermore, as the lead researcher, I was readily available to address additional questions potential participants might have, and comprehensive contact details were provided for this purpose. Focus group/interview participants demonstrated informed consent by signing a consent form; whereas for questionnaire participants, the return of the booklet or completion of the online link implied their consent. Participants were clearly informed that they could withdraw from the study at any stage without facing any penalties. It was important to note that once the data analysis process had commenced, the data could not be retracted. This was due to the removal of individual identifiers. Potential participants were also educated about the data storage procedures established to safeguard their contributions. Additionally, participants received detailed information about the measures in place to ensure the confidentiality of focus groups/interviews, as well as the anonymity of the questionnaires.

To minimise the potential for inequity and injustices, the questionnaire was translated into multiple languages to ensure accessibility across various demographic groups. The well-defined inclusion criteria determined who was eligible to participate in the research project. A policy was implemented to provide an invitation pack to anyone who met these inclusion criteria, affording an equal opportunity to all potential participants. The discussion of the results in chapter 9 will consider any potential inequities highlighted by the findings and implications for clinical practice.
In summary, this research adhered to a rigorous set of ethical principles and considerations to ensure the well-being and rights of all involved parties, from researchers to participants. These ethical guidelines encompassed both Te Ara Tika, which reflects the cultural values and principles of Māori and all New Zealanders, and the internationally recognised bioethical principles outlined by NEAC. Ultimately, these ethical considerations were vital for upholding the principles of research ethics and instrumental in fostering trust, collaboration, and meaningful contributions from all stakeholders involved in the research. The principles protected the rights and well-being of participants and ensured research credibility, validity, and social responsibility; ultimately, contributing to the development of best evidence-based practices in healthcare.

5.2 Phase One: Focus Groups and Individual Interviews

In the initial phase, qualitative data were systematically collected through a combination of focus groups and individual interviews. The denotation of ‘phase one’ is reflective of logistical timing, and does not suggest data dominance or that analytical findings went on to influence the research design of subsequent phases. In accordance with the philosophical underpinning of dialectical pluralism, all datasets were regarded as equal, devoid of any perceived dominance.

Both the focus groups and interviews were semi-structured and guided by identical topic areas. Focus groups are essentially a form of group interviews, involving the participation of multiple individuals (Bryman, 2006). The primary emphasis is on fostering group interactions centred around well-defined topics from which meaningful insights can be derived (Bryman, 2006). Semi-structured
interviews, as a data collection method, employ predetermined questions to steer discussions within a foundational philosophical framework (Flick, 2018b).

The overarching objective of both the focus groups and interviews was to work towards answering research aims numbers three to five which were essentially concerned with exploring participants’ perceptions of heart health knowledge. These approaches to data collection enabled me to explore the participants’ lived experiences of the phenomena under investigation (Robinson et al., 2020). The utilisation of semi-structured focus groups and interviews further facilitated meaningful dialogue and furnished invaluable data for subsequent analysis.

Phase one was conducted in Canterbury, Aotearoa New Zealand and comprised the following focus groups and interviews:

- **Two open demographic ‘patient participant’ focus groups:** These sessions involved patients who had experienced a first-time cardiac event or had received a new cardiac diagnosis (or had not been hospitalised for a cardiac condition in the past decade) and met the stipulated inclusion criteria.

- **Māori ‘patient participant’ focus groups:** Provisions were made for a focus group comprising participants of Māori descent, led by a facilitator of Māori heritage. However, when given the option, these participants chose to join the ‘open’ patient focus groups.

- **Two health care professional focus groups:** Consisted of health care professionals working in the cardiology and cardiothoracic clinical domains. The aim was to capture the diverse perspectives of the multidisciplinary team. These two focus groups primarily included nursing staff, as other members of the multidisciplinary team were unable to accommodate the scheduled times.
• **Four individual staff interviews:** Staff members who could not participate in the focus group discussions were offered the opportunity to partake in individual semi-structured interviews. These interviews employed the same set of questions that guided the focus group discussions.

The Canterbury patient focus groups were conducted at a venue utilised by the hospital for its ‘phase two’ cardiac rehabilitation programmes. This venue, situated in the central business district, offered convenient parking facilities for participants. The timing of the focus groups intentionally did not align with the phase two cardiac rehabilitation programme schedule to maintain the study’s independence from the local programme. The primary rationale behind this approach was to prevent participants from feeling obliged to participate in phase two cardiac rehabilitation post-study if it was not something they would have naturally chosen to engage with. The staff focus groups and interviews were conducted at the Manawa Health Education Campus, situated adjacent to the hospital. The goal was to ensure that each focus group comprised no fewer than four participants and no more than 10. One focus group was conducted with three participants because one person unexpectedly did not attend on the scheduled day. Each focus group session extended over approximately 90 minutes.

The semi-structured questions posed during the focus groups and interviews were guided by the established guidelines and recommendations for cardiac education from Aotearoa New Zealand, Britain, and Australia (British Association for Cardiovascular Prevention and Rehabilitation, 2023; Liew et al., 2021; National Heart Foundation of Australia, 2019; Woodruffe et al., 2015). These comprehensive guidelines advocate for the inclusion of various topics in a cardiac education programme. To ensure alignment with the questionnaire tool used for data collection
during the quantitative phase, the semi-structured discussions in the focus groups and interviews (detailed in Appendices G and H) focused more explicitly on the ‘cardiac domains of knowledge’ identified by de Melo Ghisi et al. (2010). This alignment facilitated the meaningful integration of data during the MMR analysis and synthesis of findings, enhancing the overall research process.

5.2.1 Focus Group Sampling

In the recruitment process for the focus groups, interviews, pilot questionnaire, and national questionnaire, a purposive sampling approach was employed for both patient and health care professional participants. Purposive sampling entails the deliberate selection of participants based on predetermined criteria (Neale, 2009). All participants were required to meet the specific inclusion criteria delineated for this research as outlined below. If a participant consented to engage in a focus group discussion, they were subsequently deemed ineligible to participate in the quantitative phase of the research study. This decision was made from the belief that their perspectives and understanding may have been influenced or evolved as a result of the group discussions.

It is recognised that a non-randomised purposive sample can present a potential bias and may offer limitations towards the credibility of the study findings (Polit & Beck, 2021). However, the choice of purposive sampling was deliberate, driven by its inherent advantages which include the practicality of implementation, its compatibility with available resources in a complex clinical environment, and its capacity to offer deeper insights into the phenomena under investigation (Gerrish & Lathlean, 2015). Within the context of this study, purposive sampling was considered appropriate, particularly within a MMR methodology, where the integration of datasets during analysis serves to reinforce and substantiate the findings.
It is crucial to emphasise that in the context of this study, and the broader subject of cardiac educational delivery, the pursuit of a randomised control group was neither feasible nor ethical. Such an approach would have imposed limitations on educational delivery for some participants (Gerrish & Lathlean, 2015). This study did not seek to assess specific programme outcomes; rather, its primary focus was to examine the levels of knowledge among patients after their engagement with acute hospital services.

5.2.2 Inclusion Criteria for Patient Focus Groups

To participate in the focus groups, individuals needed to meet the following inclusion criteria:

I. **Consent and confidentiality agreement:** Participants were required to have the capacity to provide informed consent to take part in the study. A copy of the consent form and confidentiality agreement is provided in Appendix I.

II. **Age requirement:** Participants needed to be over the age of 30 years. This criterion was chosen to specifically target the demographic with the highest prevalence of CVD in Aotearoa New Zealand (Manatū Hauora-Ministry of Health, 2013). Originally set at 40 years, the criterion was adjusted after consultation with clinicians who highlighted that CVD was manifesting at younger ages. Consequently, an age criterion of 30 years was deemed more representative.

III. **Hospital cardiac education:** Individuals had to have received hospital cardiac education for the first time in response to specific cardiac conditions listed below. Education was administered prior to
their discharge from hospital services, recognising that the timing and content of educational packages varied across health boards. Subsequent discussions with hospital clinicians led to an extension of the criteria to include patients with a previous admission for any of the identified cardiac presentations, provided that the admission occurred more than 10 years prior. This decision was made based on the understanding that the content of education delivered within hospital services would have evolved considerably over the past decade.

IV. **Eligible cardiac presentations:** Patients diagnosed and admitted with the following cardiac presentations were eligible to participate in the study:

- Acute coronary syndrome (ACS), encompassing ST elevation MI, non-ST elevation MI, and unstable angina.
- Individuals following CABG surgery, Primary Percutaneous Coronary Intervention (PCI).
- Patients who had undergone implantation of intra-cardiac defibrillators or cardiac resynchronisation therapy, including cases unrelated to ACS and heart failure (HF).
- Those who had received heart valve replacements for reasons other than ACS and HF.
- Confirmed diagnosis of exertional angina.

V. **Language proficiency:** Focus group participants needed to self-identify as having the ability to actively engage in discussions conducted in English.
5.2.3 Inclusion Criteria for Staff Focus Groups and Interviews

Health care professionals who participated in the focus groups and interviews were required to meet the following inclusion criteria:

I. **Consent requirement:** Participants were required to provide their consent to participate in the research process. The same consent form used for patient focus groups was employed for staff participants.

II. **Clinical area affiliation:** Staff participants were required to be actively working in a clinical area that provided care for patients who met the previously identified inclusion criteria.

III. **Role in cardiac rehabilitation education:** Staff members needed to be engaged in a role that involved the provision of hospital-based cardiac rehabilitation education.

IV. **Clinical experience:** Staff were required to have a minimum of 2-years experience working with patients presenting with the cardiac conditions specified in the inclusion criteria.

5.2.4 Recruitment for Focus Groups and Interviews

To ensure the confidentiality and privacy of the hospital patient information systems, I refrained from directly engaging in the recruitment of participants for either phase of the study. Instead, recruitment was facilitated by the cardiac rehabilitation nurses at the hospital who distributed recruitment letters and information packs to potential participants for the patient focus groups (see Appendix J). These information packs were made available to all patients who met the specified inclusion criteria before their discharge from the hospital, and included the following:
• A karakia (a traditional Māori incantation)
• The lead researcher’s business card
• A welcome letter in Te Reo Māori and English
• An information letter providing details about the study
• A card on which participants could RSVP their contact details
  (these cards were placed in a designated box by the cardiac rehabilitation nurses for me to follow up with participants)
• A consent form

The cardiac rehabilitation team did not provide explanations or details about the study to potential participants. Instead, individuals were directed to me for further information, typically through email or telephone contact. Once a sufficient number of participants had registered their interest, I coordinated mutually agreeable times for conducting the focus groups. Recruitment for the patient focus groups extended from August 1, 2020, to November 1, 2020, at which point there were enough patient participants to facilitate two focus group sessions.

Recruitment for health care professionals participating in focus groups and interviews was executed through paper invitations distributed to all staff members in the cardiology and cardiothoracic wards at Christchurch Public Hospital. Additionally, I conducted a presentation session for the cardiac departments to introduce and explain the study. Recruitment posters were strategically placed in high-traffic areas and universally used staff spaces within the clinical settings. These posters provided an overview of the study and included RSVP cards where staff could provide their contact details, which were then placed in sealed boxes situated in the cardiac wards.
Upon receiving these contact details, I initiated correspondence with potential staff participants, providing further information, a welcome letter, and the consent form. Similar to patient recruitment, the recruitment process remained open until a sufficient number of participants expressed interest in either joining the focus groups or participating in an interview. This recruitment phase occurred from August 1, 2020, to mid-November 2020. Once a critical number of participants was achieved, I coordinated mutually agreed upon times for conducting the sessions.

One of the focus groups comprised participants from the specialised cardiac rehabilitation team, which included several nursing staff and a Māori support worker. The other focus group consisted of general registered nurses working with cardiac patients. Four other members of the multidisciplinary team, including professionals from physiotherapy, medicine, and social work, expressed interest in participating in the study but were unable to attend the scheduled focus group times. These individuals were subsequently offered the opportunity to partake in individual interviews.

5.2.5 Procedures
Semi-structured focus groups and interviews were guided by a set of open-ended questions commencing with opening questions to foster an atmosphere in which participants could relax, feel less self-conscious, and establish a rapport with fellow group members (in the case of focus groups), interviewer (in the case of interviews), and the facilitation team. The central discussions within both the focus groups and interviews revolved around the critical facets of heart health knowledge, as reported in the literature (de Melo Ghisi et al., 2014). These discussions closely mirrored the domains of knowledge assessed in the CADE-QII questionnaire during the second phase of the study. Key questions probed participants’ perceptions
Regarding patients’ levels of knowledge pertaining to their medical conditions, risk factors, exercise regimens, dietary management, and psychological risks. Additionally, questions explored participants’ perspectives on how patient comprehension was evaluated in clinical settings and what unanswered questions patients might have after leaving the hospital.

All focus groups and interviews were conducted face to face in the Canterbury region of Aotearoa New Zealand. Prior to commencing the focus groups and interviews, all participants signed consent and confidentiality agreements; and focus group participants were sent a set of focus group guidelines (Appendix K). Participants indicated their consent for the digital recording of the sessions, with the assurance that their names would not be disclosed in the reporting of data. Before the sessions began, participants received copies of the guiding questions to orient their discussions. They were encouraged to keep personal journals of their thoughts and bring them to the sessions. Only one participant engaged in the journaling process and consented to sharing their writings with the facilitator to support data analysis.

To ensure that the questions used in the focus groups and interviews were aligned with recommendations for effective heart health education from the literature and were in harmony with phase two of the MMR design, a review was conducted by three members of the research team (comprising two PhD supervisors and the focus group research assistant) prior to conducting the sessions. To enhance consistency in reporting across the focus groups, a reflective protocol was devised and employed as a guide for documentation by the research assistant (see Appendix L).

Immediately following the conclusion of each focus group, the research assistant and I briefly excused ourselves from the room to undertake an initial debriefing using a debriefing tool (see Appendix M). This process allowed us to
reflect on the main discussion points which were subsequently presented to the focus group members for validation, further discussion, and final conclusions, all of which occurred before participants departed. A final reflective process was undertaken within the research team before leaving the venue. This comprehensive documentation was instrumental in supporting the qualitative data analysis process. For the interviews, at the conclusion of each discussion, a summary of the key points was verbally communicated between me and the participant. Interview participants also received copies of their transcripts for verification and additional discussion.

Upon the completion of each focus group and interview, the recorded sessions were outsourced to a professional transcription service. To ensure an accurate representation of the discussions, the transcriptionist was instructed to transcribe the dialogue verbatim and separate individual participants’ comments. When returned, I conducted two review processes of the transcripts. The first review involved confirming the transcript accuracy in relation to the original recordings; while during the second review, pseudonym codes were applied to each participant’s statements for anonymity and clarity.

5.2.6 Analysis

A detailed discussion of the analytical processes employed for the quantitative, qualitative, and integration chapters will be presented at the beginning of each respective presentation of the data chapters. This departure from the traditional format of presenting all data analysis approaches together in the research methods chapter is designed to align with the nature of mixed methods research presenting multiple sets of data, allowing for a more focused examination of analytical procedures alongside the presentation of data in each methodological approach.
The analysis of focus group data is aimed at structuring information to unearth meaningful insights and articulate research findings (Doody et al., 2013). This process is inherently guided by the underlying philosophical stance of the research (Cyr, 2019). There are several frameworks that provide guidance for analysing qualitative data from focus groups and interviews (Doody et al., 2013; Jackson & Bazeley, 2019; Onwuegbuzie, 2018; Onwuegbuzie, Dickinson, et al., 2009). Analytical techniques vary and include approaches focusing on comparison analysis, classical content analysis, keyword analysis, and discourse analysis. Various published frameworks provided guidance when considering how to analyse both the focus groups and interviews within this research (Clarke & Braun, 2016; Cyr, 2019; Krueger & Casey, 2009).

A six-stage theoretical process was employed to analyse the data, consisting of the following steps: 1) data familiarisation, 2) coding, 3) searching for themes, 4) reviewing themes, 5) defining and naming themes, and 6) writing up (Clarke & Braun, 2016). Analysis commenced concurrently with the conduct of the focus groups and interviews. Initial summaries of emerging themes were generated during these sessions and were subsequently presented to participants for validation and review. A summarised outline of the qualitative analysis process for this research is provided in Figure 5.1. An exemplar of the documentation employed to support the analysis process, showcasing the ‘six-stage qualitative analysis protocol’, can be found in Appendix N.

5.2.6.1 Software to Support Qualitative Analysis

The qualitative data analysis software system NVivo was used as a foundational platform to facilitate data analysis. NVivo served as a valuable tool for
storing, organising, analysing, and visualising the data. Its use supported the development of deductive themes, inductive codes, and overarching conceptualised themes derived from the narratives shared by the participants.

**Figure 5.1**

*Focus Group and Interview Analytical Process*

![Diagram of the analytical process]

**5.2.7 Phase One Quality Assessment**

Within qualitative research, the concept of trustworthiness encompasses a rigorous and systematic approach to various facets of the research endeavour, including the research design, methodological application, researcher’s role, and the credibility of research findings (Johnson & Parry, 2015; Lincoln & Guba, 1985; Rose
& Johnson, 2020). Creswell (2014) further explained that: “Qualitative validity means that the researcher checks for the accuracy of the findings by employing certain procedures, while qualitative reliability indicates that the researcher’s approach is consistent across different researchers and different projects” (p. 201). Trustworthiness can be strengthened through techniques that improve the reliability of qualitative data (Nha, 2021). In the context of the qualitative data, trustworthiness denotes the consistent application of research methods across the design; thereby promoting uniformity within the analytical procedures (Noble & Smith, 2015).

5.2.7.1 Reliability in the Context of Qualitative Research

In the pursuit of a high level of reliability during phase one, several detailed measures were integrated into the research design. These measures encompassed participants checking abstract themes, peer review, and continuous reflexivity; all of which played pivotal roles in fortifying the reliability of the research process. After each focus group session, and before their conclusion, the key themes and primary points were presented back to the participants to allow for validation and elicit further comment. Similarly, interview participants received copies of their individual transcripts, along with a summary of the key themes and primary points identified from their discussions. This process provided participants with an opportunity to confirm and offer additional insights. Various tools were employed to enhance transparency and maintain a clear record of decision-making processes including debriefing tools, protocol documents designed to ensure consistency across the study, and researcher notes. These processes served a dual purpose, acting as an audit trail while delineating the rationale behind research decisions.
5.2.7.2 Validity in the Context of Qualitative Research

The concept of validity in qualitative research more appropriately denotes the notions of credibility, dependability, trustworthiness, transparency, and transferability (Nha, 2021). Qualitative interpretations can be strengthened through the adaptation of a quality assessment tool such as Kane’s (2013) validity framework. Kane’s framework is adaptable for both quantitative and qualitative methodologies, offering a comprehensive evaluation of research validity at four distinct levels: scoring, generalisation, extrapolation, and implications. Table 5.1 succinctly outlines how this framework lends support to the present study.

Cook et al.’s (2015) work explains the components of Kane’s framework, and how they relate to qualitative quality assessments. *Scoring* is in reference to the questions that elicit the narrative responses; and, in this study, refers to the questions that guided the focus groups and interviews. *Generalisation* pertains to the insight gained, the accuracy of the data, and the defensibility of the interpretation of the narrative. Through integration of datasets and determining saturation these processes contribute to achieving generalisation of inferences derived from the qualitative narrative. *Extrapolation* entails moving beyond data evaluation to conceptualise and contemplate the real-world implications of the findings. Finally, the last stage of Kane’s framework involves considering the *implications* of the qualitative findings; a feedback loop was employed at various stages to report the findings, thereby enhancing transparency and overall validity of the research.
### Table 5.1

**Summary of Kane’s Validity Framework in the Context of the Qualitative Data Collected**

<table>
<thead>
<tr>
<th>Kane’s Validity Assessment</th>
<th>Action</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scoring</td>
<td>- Focus group and interview question protocols/guides.</td>
<td>- Consistency of guided discussion between focus groups and interviews.</td>
</tr>
<tr>
<td></td>
<td>- Focus group observational records/researcher note-taking protocol.</td>
<td>- Rich, accurate, true accounts, and authentic data.</td>
</tr>
<tr>
<td></td>
<td>- Creditable research team undertaking data collection.</td>
<td></td>
</tr>
<tr>
<td>Generalisation</td>
<td>- Sampling criteria/purposive sampling.</td>
<td>- Sampling and integration processes are reflective of the different perspectives being presented in the data.</td>
</tr>
<tr>
<td></td>
<td>- Transcripts.</td>
<td>- A process of reflexivity strengthens the defensibility and transparency of the research design, while encouraging responsiveness within the interpretive process.</td>
</tr>
<tr>
<td></td>
<td>- Whakawhanaungatanga/rapport building.</td>
<td>- Looking for thematic saturation and consistency for final interpretations.</td>
</tr>
<tr>
<td></td>
<td>- Use of cardiac knowledge domains to support discussion.</td>
<td>- Uniformity and reflexivity of interpretations by different members of the research team promotes more reflective interpretations.</td>
</tr>
<tr>
<td></td>
<td>- Software to support analysis NVIVO.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Protocol driven interpretation process.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Reflective research team reviews.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Responsiveness to conflicting data.</td>
<td></td>
</tr>
<tr>
<td>Extrapolation</td>
<td>- Reviewing final overarching themes are reflective of the discussion and current clinical situation.</td>
<td>- Consideration of relevance of cardiac knowledge domains linked to current national and international guidelines.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Feedback to stakeholders and consider relevance of findings.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Feedback to stakeholders and consider required educational changes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Integration of results and consideration of where data are confirming or disagreeing, provides an opportunity to consider where meaningful educational change can be implemented.</td>
</tr>
<tr>
<td>Kane’s Validity Assessment</td>
<td>Action</td>
<td>Outcome</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td>Implications</td>
<td>• Action planning.</td>
<td>• Final report and recommendations to support improved practice.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Considered effectiveness of recommendations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reported implications of results for all stakeholders.</td>
</tr>
</tbody>
</table>

5.2.7.3 Trustworthiness

In addition to the previously discussed validity framework, a number of methodological strategies were meticulously integrated into the research design to ensure trustworthiness of the study findings. These strategies were pivotal in upholding the credibility and reliability of the research. From the outset of the project, the research team conscientiously considered personal biases, aiming to recognise and mitigate the impact through continuous reflection. Additionally, potential biases related to sampling and participation were considered. The awareness that interested parties might be more inclined to volunteer or be encouraged to participate by ward staff was acknowledged. To address this possibility, the study included multiple focus groups and were extended until thematic saturation was achieved, effectively reducing the potential biases associated with participant selection.

As the lead researcher, I adopted a rigorous record-keeping process, creating an audit trail that bolstered the consistency and transparency of interpretations. A thematic analysis protocol was employed to facilitate comparisons and enhance clarity across the focus groups and interviews. Furthermore, the final reporting prominently featured participants’ direct accounts, ensuring a rich and authentic representation of the narrative.
A process of triangulation, encompassing both the quantitative and qualitative data was methodically undertaken to provide a comprehensive synthesis of the research findings. This multifaceted approach contributes to a deeper understanding and more robust interpretation of the research; ultimately, enhancing the overall trustworthiness of the study.

In summary, focus groups and interviews align with dialectical pluralism and pragmatism by facilitating the inclusion of diverse perspectives, promoting dialogue and interaction, offering qualitative depth, supporting triangulation, encouraging reflexivity and openness, facilitating contextual understanding, and addressing the complexity of research topics. These methods inherently embrace the pluralistic nature of research and contribute to a more holistic and nuanced exploration of the research problem.

5.3 Phase Two: CADE-QII

The second phase was designed to address the first two research objectives: to evaluate patients’ comprehension of their cardiac health. This assessment employed the well-established and rigorously validated CADE-QII, while concurrently examining the demographic factors that influence knowledge scores.

5.3.1 Development of the CADE-QII

The CADE-QII is an established and validated instrument, originally introduced by de Melo Ghisi, Grace, Thomas, Evans et al., (2015), and described in the article ‘Development and psychometric validation of the second version of the Coronary Artery Disease Education Questionnaire (CADE-QII)’ (see Appendix O). The developer of this research instrument has expressed their explicit endorsement for its utilisation in the current study. The CADE-Q, and its subsequent iteration,
have been translated and employed in numerous countries to assess cardiac knowledge levels (Anderson-Doyley, 2020; Chen et al., 2018; de Melo Ghisi, 2018; de Melo Ghisi, Britto, et al., 2015; Ebba & Bongosia; Laskova et al., 2022; Marofi et al., 2020; Santos et al., 2018; Williamson et al., 2021; Yang et al., 2021). The established international usage of the CADE-QII across diverse cultural and linguistic contexts further strengthens its validity and applicability in the study. Its successful use in numerous countries demonstrates its versatility and underscores its effectiveness in assessing cardiac knowledge, providing a strong foundation for its integration into the research. The use of this questionnaire was to gauge Aotearoa New Zealand participants’ comprehension levels subsequent to their hospital inpatient admission but preceding their enrolment in a hospital cardiac education programme.

5.3.2 An Overview of the CADE-QII

The CADE-Q II is a comprehensive assessment designed to evaluate participants’ knowledge of CAD. It comprises a series of multiple-choice questions, each offering four answer options for participants to choose from. These answer options are categorised as follows: Correct Response, represents a complete and accurate understanding of the question topic and is assigned a score of 3. Partially Correct Response, indicates a partial or incomplete understanding of the topic and is assigned a score of 1. Incorrect Response, signifies an inaccurate understanding of the topic and is allocated a score of 0. An ‘I Don’t Know’ Option can be selected when participants are uncertain about the correct answer; it also receives a score of 0. These answer categories help in computing an overall knowledge score, with a maximum possible score of 93 derived from 31 questions.
The CADE-Q II assesses participants’ knowledge across five distinct cardiac knowledge domains: *Medical Condition (7 Questions)*, evaluates participants’ knowledge regarding CAD, angina, angina symptoms, causes of heart attacks, and medication-related knowledge; *Risk Factors (5 Questions)*, explores knowledge related to modifiable risk factors, actions to control risk factors such as high cholesterol and blood pressure, and preventative measures for diabetes; *Exercise (7 Questions)*, considers participants’ understanding of appropriate post-cardiac event exercises, exercise monitoring, adjustments for weather conditions, and responses to cardiac discomfort during exercise is assessed in this domain; *Nutrition (7 Questions)*, evaluates knowledge about sources of omega-3 fats and trans fats, methods to increase dietary fibre, sodium intake reduction, food combinations promoting heart health, food label comprehension, and awareness of fruit and vegetable consumption; the last domain is *Psychosocial Risk (5 Questions)*, which inquires about stress, its relationship with CAD, identification of stress-increasing factors, and stress reduction and management strategies.

By segmenting knowledge assessment into these domains, the CADE-QII offers a comprehensive evaluation of participants’ comprehension of critical aspects of CAD. The structured approach helps researchers gain valuable insights into the areas where patients may require additional education and support to enhance their cardiac health knowledge.

### 5.3.3 Questionnaire Sampling

To establish a degree of generalisability to the broader population, careful consideration was given to determine a statistically significant sample size (Grinnell & Unrau, 2014). Consultation with the University of Canterbury statistician indicated a confidence interval of 95% would be appropriate. To calculate the sample size for
the national questionnaire, an online population calculation tool, ‘OpenEpi’ was utilised (Dean et al., 2013). The All of New Zealand Acute Coronary Syndrome – Quality Improvement Registry (ANZACS-QI) (Kerr et al., 2016) provided valuable national statistics pertaining to the conditions outlined in the study’s inclusion criteria. Based on these data, it was determined that a statistically significant sample size would exceed 370 questionnaire responses.

However, due to contextual constraints (as covered in Chapter 1), a sample size of 136 was ultimately collected. Consequently, while this research refrains from making claims of generalisability to the entire population, it nevertheless offers valuable insights into the phenomena under investigation. Furthermore, the findings are reinforced by the MMR methodology employed.

5.3.4 Inclusion Criteria for Questionnaire Participants

Similar to the qualitative inclusion criteria, the inclusion criteria for selecting participants in the questionnaire phase were developed by drawing guidance from both national and international clinical guidelines and informed by a collaborative clinical consultation process (British Association for Cardiovascular Prevention and Rehabilitation, 2023; Liew et al., 2021; National Heart Foundation of Australia, 2019; Woodruffe et al., 2015). This inclusive approach ensured that the research study was closely aligned with the specific healthcare context of Aotearoa New Zealand. The inclusion criteria were as follows:

I. **Cardiac conditions**: Participants included individuals who had been diagnosed with the following cardiac conditions and had received inpatient cardiac education for the first time (or more than 10 years prior):
• ACS encompassing ST elevation MI, non-ST elevation MI, and unstable angina.
• Post-CABG or PCI.
• Implantation of intra-cardiac defibrillator or cardiac resynchronisation therapy, regardless of whether it was related to ACS or HF.
• Heart valve replacements, excluding cases related to ACS or HF.
• Confirmed diagnosis of exertional angina.

I. **Age requirement**: Participants were required to be over the age of 30 years, focusing on the population segment with the highest burden of CVD in Aotearoa New Zealand (Manatū Hauora-Ministry of Health, 2018a).

II. **Language proficiency**: For the pilot study, participants needed to be able to complete the survey in English. Once the pilot study confirmed the questionnaire’s face validity within the Aotearoa New Zealand context, it was subsequently translated into other languages: Samoan, Tongan, Hindi, Tagalog, Mandarin, or Te Reo. These translations were further piloted with two to four participants for each of the translated languages.

III. **Literacy proficiency**: For the national questionnaire, participants were required to self-identify as having literacy proficiency in one of the aforementioned languages to complete the survey.

These inclusion criteria were designed to ensure that the participant group represented a diverse yet relevant group of individuals with cardiac conditions in the
Aotearoa New Zealand context. Drawing from both clinical guidelines and a consultation process ensured the criteria were comprehensive and aligned with the study objectives.

5.3.5 Recruitment for Questionnaire Participation

Invitations to participate in phase two, the CADE-QII questionnaire, were extended to all patients meeting the inclusion criteria. These individuals received comprehensive information packs inviting their involvement (see Appendix O). Recruitment for phase two commenced in May 2021, albeit with a delayed start due to the global COVID-19 pandemic of 2020. The initial plan was to execute a 3-month recruitment period, with flexibility to extend if statistical significance and generalisability thresholds were not met. The objective was to distribute the national questionnaire to eligible patients across various cardiac centres in Aotearoa New Zealand, including Canterbury DHB, Southern DHB, Capital and Coast DHB, Waikato DHB, Waitemata DHB, and Counties Manukau DHB. Clinical staff members did not explain the specific study details during patient interactions. Their role was to inform potential participants about the research project, emphasising the value of their participation. If individuals expressed interest, clinical staff collected their RSVP cards and relayed them to me, the lead researcher, indicating a desire for contact.

A number of contextual issues influenced the distribution and subsequent response rates of the questionnaire as outlined in Chapter 1, Section 1.6. Despite these challenges, efforts persisted and the recruitment period was extended until December 31, 2021. Subsequently, recruitment was concluded, resulting in the collection of 136 completed questionnaires for analysis. This represented an average overall response rate of 31% across all sites where questionnaires were distributed.
5.3.6 Procedure
5.3.6.1 Access to the Field: Consultation and Additional Ethics Processes

Phase two was initiated with a series of consultation processes involving hospital clinicians and Māori iwi representatives in five DHBs with cardiac services including open heart surgery. The primary objective of these consultations was to collaboratively establish appropriate inclusion criteria for the study. A summarised account of these consultation processes is available in Table 5.2. In addition to these initial consultations, further engagement took place with three cardiac rehabilitation specialist nurses to review the CADE-QII questionnaire and assess its suitability for the Aotearoa New Zealand context. As a result of all these consultations, only minimal adjustments were made to the questionnaire, primarily to align its language with everyday terminology and avoid the use of medical jargon.

In addition to seeking approval from the university’s ethics committee, the study also required locality agreement approvals from all participating DHBs before any research activities could commence. This regulatory requirement was a fundamental part of conducting research within the former DHBs, ensuring that all research conducted in these health institutions is registered with the local research office and undergoes a thorough local approval process (Auckland DHB, 2021).
### Clinical and Māori Iwi Consultation/Approval Process

The 6 DHBs each have a unique process for completing consultation and gaining locality agreement.

<table>
<thead>
<tr>
<th>CDHB</th>
<th>Waikato DHB</th>
<th>Southern DHB</th>
<th>Waitematā DHB</th>
<th>Wellington DHB</th>
<th>Counties Manukau DHB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior to commencing project, face to face consultation meeting with clinical director, nursing management team and clinical nursing teams.</td>
<td>Prior to commencing project, face to face consultation meeting with clinical director, nursing management team and clinical nursing teams.</td>
<td>Prior to commencing project, face to face consultation meeting with clinical director, nursing management team and clinical nursing teams.</td>
<td>Prior to commencing project, face to face consultation meeting with clinical director, nursing management team and clinical nursing teams.</td>
<td>Prior to commencing project, face to face consultation meeting with clinical director, nursing management team and clinical nursing teams.</td>
<td>Prior to commencing project, face to face consultation meeting with clinical director, nursing management team and clinical nursing teams.</td>
</tr>
<tr>
<td>Meeting and consultation with local Iwi prior to commencing study/local agreement process.</td>
<td>Completed and signed locality form</td>
<td>Completed and signed locality form</td>
<td>Completed and signed locality form</td>
<td>Completed and signed locality form</td>
<td>Completed and signed locality form</td>
</tr>
<tr>
<td>Completed locality application document</td>
<td>- Budget summary.</td>
<td>- Budget summary.</td>
<td>- Budget summary.</td>
<td>Summary of the research project/proposal.</td>
<td>- Budget summary.</td>
</tr>
<tr>
<td>Completed locality application document</td>
<td>- Patient information and recruitment letters.</td>
<td>- Patient information and recruitment letters.</td>
<td>- Patient information and recruitment letters.</td>
<td>- Patient information and recruitment letters.</td>
<td>- Patient information and recruitment letters.</td>
</tr>
<tr>
<td>Completed locality application document</td>
<td>- Completed peer review to chair letter.</td>
<td>- Completed peer review to chair letter.</td>
<td>- Completed peer review to chair letter.</td>
<td>- Completed peer review to chair letter.</td>
<td>- Completed peer review to chair letter.</td>
</tr>
<tr>
<td>Completed locality application document</td>
<td>- Copy of research proposal</td>
<td>- Copy of research proposal</td>
<td>- Copy of research proposal</td>
<td>- Copy of research proposal</td>
<td>- Copy of research proposal</td>
</tr>
<tr>
<td>Completed locality application document</td>
<td>- Ethics committee feedback and responses.</td>
<td>- Ethics committee feedback and responses.</td>
<td>- Ethics committee feedback and responses.</td>
<td>- Ethics committee feedback and responses.</td>
<td>- Ethics committee feedback and responses.</td>
</tr>
<tr>
<td>Completed locality application document</td>
<td>Sign off forms</td>
<td>Sign off forms</td>
<td>Sign off forms</td>
<td>Sign off forms</td>
<td>Sign off forms</td>
</tr>
</tbody>
</table>

- CDHB Te Komiti Whakarite Māori consultation letter
- Summary of the study for locality agreement
- RAGM – charged to complete $250.
- Patient information
- Recruitment letter.
- Budget summary.
- Sign off forms
- Māori consultation summary
- A copy of both the patient information sheets and recruitment letters.
The process of securing locality approvals involved extensive consultation and collaboration with various stakeholders within each cardiology department. These stakeholders included clinical directors, cardiac rehabilitation teams, clinical nursing managers, Māori cardiac liaison representatives, and, where applicable, representatives from the local iwi. This comprehensive consultation process ensured compliance with regulatory requirements and provided a valuable platform for seeking expert advice on enhancing response rates, refining inclusion criteria, and gaining a clearer understanding of local practices related to patient education delivery.

Furthermore, the locality approval process served as an opportunity to establish collegial relationships and foster collaborations between the research team and the health care professionals and organisations involved. This process also brought to light certain inconsistencies and variations across different regions in Aotearoa New Zealand, both in terms of the processes for completing locality agreements and in the delivery of cardiac education. These discrepancies underscored the need for broader discussions and coordination within the healthcare system.

Throughout these consultation processes, ongoing discussions were also held with the National Heart Foundation of New Zealand, further strengthening the research’s ethical foundation and ensuring alignment with best practices in the field of cardiac education and patient care. These comprehensive consultations and locality approvals played a pivotal role in supporting the ethics application and facilitating the successful implementation of the research.
5.3.6.2 Questionnaire Translation and Piloting

In response to consultations with national cardiac departments, and to cater to the diverse populations, the questionnaire, along with the welcome letter and information sheet, underwent translation into multiple languages: English, Te Reo, Samoan, Tongan, Hindi, Tagalog, Chinese, and Korean. A thorough process of forward and backward translation was undertaken for all language versions of these documents.

Subsequently, to ascertain the face validity of the questionnaire for usability in the Aotearoa New Zealand context, all translated versions were pilot-tested with two to four participants fluent in each respective language. An exemplar of one of the translations (Te Reo) has been included in Appendix P. During this pilot study, participants were requested to complete the questionnaire and rate the clarity of each question on a Likert scale, ranging from ‘1’ (not clear) to ‘5’ (very clear). It is important to note that the data from the pilot study questionnaires were not included in the final dataset for phase two. Minimal modifications were deemed necessary following the pilot study, primarily related to language spelling and grammar. With the pilot study concluded, the formal recruitment of participants into phase two commenced.

5.3.6.3 Processes for Completing National Questionnaire

Participants had the option to complete the questionnaire either in paper format or online via a dedicated website (https://www.heart-ed-nz-study.com/) specially developed for the study. Fifty-five participants chose to complete the questionnaire online; 81 participants opted for the paper version, returning it in a prepaid envelope. It was estimated that the questionnaire would take approximately 20-30 minutes to complete. Qualtrics, the web-based survey tool, was employed to
conduct the survey and manage responses. Participants completing the online version had their responses automatically recorded in Qualtrics. Manual submissions were double-checked at the initial point of entry by the first member of the research team. Following this process, a research assistant completed a second independent review to confirm the data were correctly entered into the Qualtrics system. This two-tier verification process ensured that data were correctly entered into the Qualtrics system, enhancing data accuracy and reliability.

5.3.6.4 Processes to Promote Engagement

I proactively contacted participants who completed the RSVP cards received via telephone calls, text messages, or emails. The primary aim of this contact was to address any questions or concerns they might have had about their involvement in the study. Typically, these follow-up calls occurred approximately 4-6 weeks after discharge, allowing time for acute recovery. This practice proved to be highly effective in improving response rates. Many participants mentioned that they had initially forgotten about the information packs, which had been set aside with their discharge paperwork.

To maintain engagement with clinical teams during the challenging period following the outbreak of COVID-19, I kept regular contact with the departments every 1-2 weeks to address any inquiries from the clinical teams, provide updates on response rates specific to their department, and ensure the research project remained a prominent focus. Clinical environments often had multiple research projects underway simultaneously, and regular follow-up helped ensure that my study was not overlooked.
5.3.6.5 Post Completion of the Questionnaire

Upon finishing the questionnaire, all participants had the option to request a copy of the ‘correct’ answers to the questions. Given that this research aimed to explore patients’ understanding following the delivery of health education, it was essential to offer participants an opportunity to receive further information. The goal was not to ‘grade’ their questionnaire responses but to provide them with comprehensive and accurate answers. These answers were sent to participants who had provided their address details and expressed a desire to receive the answers. Importantly, this information was not linked to the anonymous questionnaire data at any stage of the study. A total of 37 participants requested a copy of the questionnaire answers. To incentivise participation in the study, several spot prizes were offered and randomly allocated. These spot prizes consisted of gift vouchers valued at NZ$50, serving as a token of appreciation for participants’ involvement in the research.

5.3.7 Analysis

In the analysis phase of the study, the focus primarily rested on examining statistical findings pertaining to patients from Aotearoa New Zealand, as the questionnaire tool utilised had previously undergone validation in several other countries. Given the robust validation conducted elsewhere, the decision not to re-validate the tool specifically in the New Zealand context was made. Furthermore, following consultation with local experts and piloting, it was determined that there were no significant changes warranted.

The analysis of the results of this study encompassed various aspects, including psychometric analysis, demographic characteristics, and the utilisation of descriptive and inferential statistics. To evaluate the knowledge scores of the cohort,
a mean total score was calculated using the CADE-QII questionnaire. Additionally, statistical methods such as t-tests and one-way analysis of variance (ANOVAs) were employed to scrutinise the differences between variables associated with demographic characteristics.

Data analysis for the questionnaire employed the Statistical Analysis in Social Science (SPSS) software package (Version 28). The dataset was downloaded from Qualtrics and imported directly into SPSS for analysis. To enhance the reliability and validity of the phase two data collection process, consultation was sought from the supervisory team, two university statisticians, and a Qualtrics liaison support representative. Consultation also facilitated refinement of the questions related to participant demographics. The team provided ongoing support during the analysis phase and assisted in interpreting the findings.

5.3.7.1 Demographic Analysis

Demographic data were collected to gather information about participant characteristics and included details such as ethnicity, employment status, gender, age, the number of weeks since they received hospital education, the total number of educational hours they received in the hospital, the hospitals they utilised, geographical residence, prior education level/qualification, household income, associated heart procedures, comorbidities, and smoking history. The subcategories within these demographic questions were guided by the subcategories outlined in the Aotearoa New Zealand Census (StatsNZ-Tatauranga Aotearoa, 2018). This information provided statistical data about the demographic characteristics of the cohort and was used to analyse the descriptive results from the variables against CADE-QII knowledge scores.
5.3.7.2 International Analysis

After calculating the CADE-QII knowledge scores for the Aotearoa New Zealand participants, these scores were compared to scores reported in the literature from other countries. Only results from countries that used the CADE-QII were included in the analysis. The purpose of this international comparison was to assess how the knowledge scores in Aotearoa New Zealand compared to those in other regions where the questionnaire had also been used.

5.3.7.3 Variable Analysis (Demographic Factors)

The collected variables were subjected to analysis to determine whether they represented nominal or ordinal data which was essential for determining the appropriate inferential statistical tests for comparing the data. Inferential data analysis aims to draw inferences between the findings and the general population of the cohort (Taherdoost, 2022). Various analytical methods were employed to assess differences between demographic variables concerning CADE-QII knowledge scores. For each variable, calculations were performed to establish total numbers, corresponding percentages, and knowledge scores (including standard deviations). Statistical tests were also conducted to evaluate the equality of variances among populations and to identify any statistical significance. These results will be presented in Chapter 6.

5.3.7.4 Cardiac Knowledge Domain Analysis

The final phase of quantitative analysis involved a more detailed examination of the CADE Q-II data, focusing on the five cardiac knowledge domains and the corresponding questions from the returned questionnaires. SPSS was used to calculate the frequency of responses for each individual question, considering the
four options provided in the questionnaire. The findings were reported in terms of response frequency, response percentage, valid percentages, and cumulative percentages. Regarding each of the knowledge domains, percentages were computed for correct, partially correct, and incorrect/I don’t know responses. These outcomes were presented graphically when reporting the results. Following the individual quantitative analysis, the results were integrated with the qualitative findings as part of the mixed methods analysis.

5.3.8 Phase Two Quality Assessment

In the landscape of quantitative research, several fundamental characteristics are pivotal in assessing quality and robustness. These characteristics include validity, reliability, replicability, and generalisability. As articulated by Andrew and Halcomb (2009), validity is the measure of how effective data collection tools measure and observe what is claimed to be assessed. Reliability, pertains to the degree to which the tools are consistently measuring the parameters they claim to calculate. Replicability, a cornerstone of research integrity, evaluates the degree to which a study provides comprehensive information regarding its procedures and findings, enabling other researchers to validate and replicate the study in the future. Lastly, generalisability gauges the degree to which research findings can be generalised beyond the study population. It assesses the relevance and application of these findings to broader context, enhancing the study’s broader significance and impact.

5.3.8.1 Validity

Validity was strengthened by using a previously validated tool. The primary objective was not to devise and validate a new assessment tool; rather, to employ this established questionnaire to assess the current levels of patient knowledge post-
hospital cardiac education in Aotearoa New Zealand. The CADE-QII had undergone a comprehensive validation process during its original development (de Melo Ghisi, Grace, Thomas, Evans et al., 2015) which encompassed various facets of validity. Internal consistency, criterion validity, factor structure, and content validity were meticulously established and verified during its creation. These robust validations provide a strong foundation for its application in the current study.

In this case, the questionnaire effectively assessed cardiac knowledge domains, closely aligned with global cardiac education guidelines and recommendations. The alignment assured that the tool indeed measured what it claimed to assess. Moreover, by employing multiple questions within each cardiac knowledge domain, the questionnaire exhibited enhanced content validity, assuring that knowledge was thoroughly evaluated across various dimensions. Although pilot testing could have been conducted if significant changes were necessary, the absence of such changes in this study negated the need for further construct validity testing.

A rigorous process was adopted to establish face validity for the questionnaire in the Aotearoa New Zealand context. Face validity is an assessment concerned with the clarity, relevance, and avoidance of ambiguity in scale items (Gerrish & Lacey, 2010). Expert reviews were conducted both before and after the pilot study, involving three independent cardiac specialist nurses who assessed the questionnaire. Their invaluable feedback ensured that the questionnaire items were relevant and comprehensible. Subsequently, a pilot study was executed for all proposed language versions, further substantiating the questionnaire’s face validity. The combined efforts of expert review and the pilot study collectively reinforced the questionnaire’s face validity, contributing to its overall reliability and trustworthiness.
5.3.8.2 Reliability

The reliability of the original CADE-QII questionnaire was meticulously evaluated by its developers (de Melo Ghisi, Grace, Thomas, Evans et al., 2015). Reliability, as reported by the authors, was primarily assessed through Cronbach’s alpha, a widely recognised measure of internal consistency. For this instrument, each cardiac knowledge domain and, by extension, each individual question within the domains, underwent scrutiny. To demonstrate reliability, a requisite level of internal consistency, typically set at $\alpha > 0.7$, needed to be achieved for each domain. Importantly, all categories in the questionnaire exceeded this reference threshold. The calculated Cronbach’s alpha value was 0.809, and the intraclass correlation coefficient further underscored the questionnaire’s reliability, registering at 0.846.

5.3.8.3 Replicability

The current study has made diligent efforts to enhance replicability by providing a comprehensive and detailed account of the research methods. Within the confines of this thesis there are explicit explanations of various aspects, including the sampling and recruitment processes, copies of the research materials used for both quantitative and qualitative data collection, and detailed research protocols for qualitative data collection. These resources have been included to facilitate replication and verification of the study results. Furthermore, the analytical processes employed in this study have been extensively outlined, ensuring clarity on the handling of variables and data analysis procedures. The philosophical position discussed in the methodology chapter provides an additional layer of support for replication in future studies, contributing to the overall replicability of the research.
5.3.8.4 Generalisability and Meaningfulness

As previously mentioned, challenges were encountered related to the COVID-19 pandemic which limited face-to-face interactions between me and the hospital teams responsible for distributing questionnaires. Consequently, the response rate for the questionnaires fell below the initially anticipated figure of 380, which was calculated to yield statistically significant results. While the total number of questionnaire responses reached 136 and may not achieve statistical significance, it is essential to acknowledge the pandemic’s impact on data collection as a potential limitation.

However, the chosen MMR methodology inherently supports the meaningfulness of the research findings. This approach allows for the transferability of concepts derived from the study findings, as noted by (Brown, 2015). Transferability in the context of this research enables readers to assess the applicability and significance of the results to their own research, educational environments, and clinical practices. By offering a rich, multifaceted view of the subject matter through both quantitative and qualitative lenses, this study enhances its potential to inform and impact a broader audience beyond the immediate study population.

In summary, the utilisation of the CADE-QII as a data collection method complements dialectical pluralism and enhances it by providing a structured, quantitative dimension to the findings (also aligning with the principles of pragmatism), which can be combined with qualitative data to offer a multifaceted understanding of the knowledge of patients newly diagnosed with CVD. This approach adheres to the philosophy of embracing diverse perspectives and data sources to explore the complex phenomena of the notion of understanding.
5.4 Mixed Methods Integration and Analysis

Throughout the study, a MMR methodology played a crucial role, aligning with both philosophical principles and practical considerations. As detailed in the methodology chapter, the integration of these diverse data sets is pivotal for legitimising MMR, facilitating the analysis, and synthesising the results. To guide this integration and interpretation, the current research has adopted Creswell and Plano Clark’s (2018) six stage analytical process as overviewed in Table 5.3.

Table 5.3

Six Stage Analytical Process

<table>
<thead>
<tr>
<th>Stage</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Complete analysis of the quantitative and qualitative data through suitable methodological processes for each dataset.</td>
</tr>
<tr>
<td>2</td>
<td>Identify common concepts across the quantitative and qualitative data.</td>
</tr>
<tr>
<td>3</td>
<td>Develop joint displays/graphs to represent the data side by side so that comparisons and differences can be identified.</td>
</tr>
<tr>
<td>4</td>
<td>Compare the results and analyse how and why they ‘agree’, ‘disagree’, and/or ‘expand the findings’.</td>
</tr>
<tr>
<td>5</td>
<td>Consider the findings with a more detailed analytical lens to consider why results may be ‘disagreeing’ between the datasets in greater detail.</td>
</tr>
<tr>
<td>6</td>
<td>Complete an advanced interpretation process which considers why relationships between the sets of data may be present, and what insights these may be providing in relation to the research questions.</td>
</tr>
</tbody>
</table>

5.4.1 Application of Stages

In stage one, separate analysis of the quantitative and qualitative data was completed as outlined in this chapter. Subsequently, in stage two, a process of conceptualising common themes that emerged across both quantitative and qualitative data was completed. This stage began by consolidating the qualitative
themes that had surfaced in the various focus groups and interviews. These themes were initially analysed separately within the patient focus groups, staff focus groups/interviews, and then comparatively between staff and patient data. Key findings from the quantitative datasets were also considered and included analysis of international scores for comparison, examination of demographic variables, and CADE-QII responses.

The key findings from both the quantitative and qualitative analysis formed the foundation of stage three which involved the creation of a joint display that would enable a side-by-side representation of the data, facilitating comparisons and the identification of differences. A joint display is a research method used to integrate, collect, analyse, and interpret data between datasets in a MMR project (McCrudden et al., 2021). An illustrative example of the joint display used to support mixed data analysis in this research study can be found in Table 8.3. The display incorporated both the quantitative and qualitative data. The data have been displayed under the ‘cardiac health domains of knowledge’ as this commonality was used to both support quantitative and qualitative data collection and promoted a meaningful analysis. The joint display was dedicated to making meta inferences between the quantitative and qualitative datasets.

The fourth and fifth stages of the mixed analysis built upon the groundwork laid in the joint displays, delving deeper into the comparison of results across the datasets. This process involved a thorough examination of where quantitative and qualitative data were either confirming or diverging in their findings. Overall, the findings from the discussion and questionnaire knowledge scores exhibited considerable alignment. However, key insights surfaced that would not have been unearthed if only one approach to data collection had been employed.
Stage six further expanded upon the findings and delved deeper into the overarching themes that had emerged. A comprehensive discussion of these themes can be found in the subsequent chapters of this thesis. The themes, identified through the mixed analysis, provide a comprehensive framework for understanding the complex dynamics of patient education and knowledge in the context of cardiac health.

5.4.2 Rationale for Mixed Methods Integration

Creswell and Plano Clark (2018) underscored the diverse purposes of data integration in MMR. These purposes encompass establishing connections, consolidating, merging quantitative and qualitative data, and deriving meta-inferences essential for drawing robust conclusions. The versatility in integration is facilitated through various methods, each offering unique advantages. These methods include data transformation, social network analysis, matrix pattern analysis, case analysis (Bazeley, 2018), triangulation (Flick, 2018a), as well as the effective use of joint displays (Fetters et al., 2013; Fetters & Tajima, 2022; Guetterman et al., 2021; Guetterman et al., 2015; Younas et al., 2020). Additionally, researchers have explored alternative approaches like the four-stage pillar integration (Johnson, 2017) and paradigm parley within a dialectic stance (Cronenberg, 2020). The existence of these varied integration methods illustrates the adaptability and applicability of data integration in MMR.

Notwithstanding the widespread acknowledgment of the significance of data integration by eminent MMR scholars, such as Bazeley (2018), Creamer (2018), Fetters et al. (2013), and Guetterman et al. (2015), concerns linger over the persisting absence of robust integration processes and subsequent reporting in the literature. Recent reviews have drawn attention to this issue, notably citing shortcomings in
current research practices (Bressan et al., 2017; Fàbregues et al., 2020; Younas et al., 2019). These observations underline the critical need for rigorous integration methods, as simply combining data is insufficient for comprehensive and insightful MMR outcomes. In light of these considerations, this study strategically adopts joint displays as the chosen method to underpin the seamless integration of quantitative and qualitative data. Joint displays facilitate the harmonious integration of diverse data and enrich the mixed analysis process, offering a systematic approach for bridging the qualitative-quantitative divide.

5.4.3 Quality Assessment of MMR Process

This chapter has detailed the quality assessment procedures for both the quantitative and qualitative components of the research study. However, it is important to recognise that MMR necessitates a distinct approach to quality assessment that extends beyond the evaluation of individual quantitative and qualitative methods. Creswell and Plano Clark (2018) endorsed that MMR needs a separate approach to quality assessment that goes beyond merely evaluating the quantitative and qualitative methods. O’Cathain (2010) explored the evaluation of mixed methods studies within the broader context of MMR as a holistic process. O’Cathain’s work introduced a set of evaluation criteria that MMR researchers can employ to assess the overall quality of their studies. This framework built upon the foundation laid by the collaborative efforts of O’Cathain, Murphy, and Nicholl (2008), resulting in the creation of a set of quality criteria known as the Good Reporting of Mixed Methods Study (GRAMMS).

Both O’Cathain’s framework and GRAMMS played pivotal roles in shaping the quality assessment process of this research study. How this quality assessment was conducted is summarised in Table 5.4.
Table 5.4

Quality Assessment Summary

<table>
<thead>
<tr>
<th>Domains of quality</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Planning Quality</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Overall research aims:</strong></td>
<td></td>
</tr>
<tr>
<td>1. To investigate and evaluate the current comprehension levels of individuals diagnosed with cardiovascular disease in NZ regarding their heart health.</td>
<td></td>
</tr>
<tr>
<td>2. To conceptualise a future model for cardiac health education in acute care settings.</td>
<td></td>
</tr>
<tr>
<td><strong>Use of MMR definition</strong> as per methodology chapter (Johnson et al., 2007).</td>
<td></td>
</tr>
<tr>
<td><strong>Consideration of underlying theoretical position:</strong></td>
<td></td>
</tr>
<tr>
<td>Ontological – Dialectical pluralism</td>
<td></td>
</tr>
<tr>
<td>Epistemology – Pragmatism</td>
<td></td>
</tr>
<tr>
<td><strong>Alignment with theoretical health frameworks:</strong></td>
<td></td>
</tr>
<tr>
<td>HBM</td>
<td></td>
</tr>
<tr>
<td>CCM</td>
<td></td>
</tr>
<tr>
<td><strong>Utilisation of a typology</strong></td>
<td></td>
</tr>
<tr>
<td>Fixed convergent mixed method design</td>
<td></td>
</tr>
<tr>
<td><strong>Justification for design:</strong></td>
<td></td>
</tr>
<tr>
<td>Chapter 3:</td>
<td></td>
</tr>
<tr>
<td>1. ‘Understanding’ is considered a changing and fallible entity.</td>
<td></td>
</tr>
<tr>
<td>2. ‘Understanding’ can be viewed through multiple interpretations.</td>
<td></td>
</tr>
<tr>
<td>3. Using only one approach to seeking ‘true meaning’ could result in a misrepresentation of results.</td>
<td></td>
</tr>
<tr>
<td><strong>Research questions:</strong></td>
<td></td>
</tr>
<tr>
<td>1. What do newly diagnosed patients understand about heart health following their first engagement with acute cardiac hospital services?</td>
<td></td>
</tr>
<tr>
<td>2. What are cardiac patients’ and health care professionals’ understandings of patients’ levels of heart health knowledge.</td>
<td></td>
</tr>
<tr>
<td><strong>Research objectives:</strong></td>
<td></td>
</tr>
<tr>
<td>1. To assess what newly diagnosed patients understand about their cardiac health, following engagement with acute cardiac hospital services, utilising a previously validated and verified CADE-QII).</td>
<td></td>
</tr>
<tr>
<td>2. To describe the patient demographics that may influence heart health knowledge scores.</td>
<td></td>
</tr>
<tr>
<td>3. To investigate what patients and cardiac health care professionals understand patients know after engagement with acute cardiac hospital services.</td>
<td></td>
</tr>
<tr>
<td>4. To explore how patients and cardiac health care professionals assume patients’ knowledge is assessed.</td>
<td></td>
</tr>
<tr>
<td>5. To analyse and identify, through the integration of data, variations between knowledge scores and participants’ assumptions of patients’ understandings.</td>
<td></td>
</tr>
</tbody>
</table>
### Domains of quality

<table>
<thead>
<tr>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. To use the research outcomes as guidance to inform acute cardiac rehabilitation education for acute hospital services.</td>
</tr>
</tbody>
</table>

**Design Quality**

- **Design transparency:**
  - As per the typology
- **Design suitability:**
  - Design is appropriate to answer the research questions and objectives
- **Design strength:**
  - Strengths and weaknesses of designed were considered for qualitative, quantitative, and mixed methods research design throughout this chapter
- **Design rigor:**
  - Assessment of rigor using the O’Cathain’s/GRAMMS framework

**Data Quality**

- **Data transparency:**
  - Methods discussion and outlines of this chapter.
- **Data rigor:**
  - Data discussion and outline in this chapter.
- **Sampling:**
  - Purposive sampling.
- **Analytical adequacy and integrity:**
  - Clarke and Braun’s (2016) six-stage theoretical process.
  - Psychometric analysis, demographic characteristics, descriptive and inferential statistics, CADE-Q II knowledge scores, T-tests and one-way ANOVAs.
  - Creswell and Plano Clark’s (2018) six stage analytical process – integration and confirmation of results.

**Interpretive rigour**

- **Interpretive transparency:**
  - Reporting of key findings.
  - Reporting findings to stakeholders and research partners – dissemination of results.
- **Theoretical confidence:**
  - Results discussed in relation to current literature.
- **Interpretive agreement:**
  - Discussion and agreement researched between the research team and key stakeholders.
- **Interpretive bias:**
  - Bias identified, discussed, and process of management discussed within this chapter.
- **Interpretive correspondence:**
  - Discussion regarding the relationship between findings and research question - findings chapters.
<table>
<thead>
<tr>
<th>Domains of quality</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inference Transferability</td>
<td>Consideration of external validity and generalisability/meaningfulness of quantitative data. Reporting of meta-inferences between datasets.</td>
</tr>
<tr>
<td>Reporting Quality</td>
<td>Quality assessment frameworks: Qualitative design: Kane’s validity framework. Quantitative design: Evaluation of validity, reliability, replicability, and generalisability/meaningfulness. Mixed methods design: O’Cathain’s/GRAMMS frameworks and Hong et al.’s MMAT. Dissemination of results.</td>
</tr>
<tr>
<td>Synthesisability</td>
<td>Synthesising findings with literature review around cardiac rehabilitation, heart health knowledge and knowledge assessments in health research. Using JBI quality assessment tools and MMAT to support literature review.</td>
</tr>
<tr>
<td>Utility</td>
<td>Reporting the implications of the findings for clinical practice, underpinned within the perspectives of the HBM and CCM.</td>
</tr>
</tbody>
</table>

5.4.3.1 Mixed Method Appraisal Tool

Another valuable resource for evaluating the quality of mixed methods research is Hong et al.’s (2018) Mixed Method Appraisal Tool (MMAT). While this instrument was originally designed to facilitate the critical appraisal of mixed methods research studies within the context of systematic reviews, it has found utility beyond its initial scope in this thesis. The MMAT has been employed as a checklist for appraisal, offering an additional perspective for quality assessment.

The MMAT, first developed in 2009 (Pluye et al., 2009), subsequently revised in 2011 (Pace et al., 2012) and again most recently in 2018 (Hong et al., 2018), serves as a complementary tool to O’Cathain’s framework. By integrating both approaches at the research design stage, this study benefited from enhanced reflection, evaluation, and the implementation of processes conducive to producing
high-quality findings and outcomes. A concise overview of how the MMAT assessment was conducted is presented in Table 5.5.

**Table 5.5**

**Mixed Method Appraisal Tool**

<table>
<thead>
<tr>
<th>Category of study designs</th>
<th>Methodological quality criteria</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S1. Are there clear research questions?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>S2. Does the collected data allow to address the research questions?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Further appraisal may not be feasible or appropriate when the answer is ‘No’ or ‘Can’t tell’ to one or both screening questions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.1. Is the qualitative approach appropriate to answer the research question?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>1.2. Are the qualitative data collection methods adequate to address the research question?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>1.3. Are the findings adequately derived from the data?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>1.4. Is the interpretation of results sufficiently substantiated by data?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>1.5. Is there coherence between qualitative data sources, collection, analysis, and interpretation?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.1. Is randomisation appropriately performed?</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>2.2. Are the groups comparable at baseline?</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>2.3. Are there complete outcome data?</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>2.4. Are outcome assessors blinded to the intervention provided?</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>2.5. Did the participants adhere to the assigned intervention?</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>3.1. Are the participants representative of the target population?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>3.3. Are there complete outcome data?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>3.4. Are the confounders accounted for in the design and analysis?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>3.5. During the study period, is the intervention administered (or exposure occurred) as intended?</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>4.1. Is the sampling strategy relevant to address the research question?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>4.2. Is the sample representative of the target population?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>4.3. Are the measurements appropriate?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>4.4. Is the risk of nonresponse bias low?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>4.5. Is the statistical analysis appropriate to answer the research question?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>5.1. Is there an adequate rationale for using a mixed method design to address the research question?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>5.2. Are the different components of the study effectively integrated to answer the research question?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>5.3. Are the outputs of the integration of quantitative and qualitative components adequately interpreted?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?</td>
<td>X</td>
</tr>
</tbody>
</table>

*Considered and action taken to minimise*
5.5 Considerations of Bias

Bias can manifest in various forms throughout the research process, potentially leading to prejudiced consideration of questions and outcomes (Pannucci & Wilkins, 2010). Susceptibility to bias exists at multiple stages spanning from the initial design phase to data collection, data analysis, and even the reporting and publication of the findings (Gabr et al., 2016). Completing a bias-free study is nearly impossible. Therefore, it is crucial to recognise and address potential sources of bias to mitigate their impact on the validity and reliability of the study findings (Smith & Noble, 2014).

5.5.1 Position of Researcher

The researcher’s position was carefully considered during the design phase to proactively identify and mitigate potential biases that could affect the research process. This approach aimed to ensure the research was conducted objectively and without undue influence. The research team consisted of nurse educators who had previously worked as registered nurses in the Canterbury region, which raised awareness of the possibility that some research participants might be familiar to the team, potentially impacting trust or coercion dynamics.

To address this concern, the research team took steps to minimise the risk of bias. At the time of the research project, none of the team members had been directly involved in clinical areas for several years, which reduced the likelihood of familiarity with current patients. However, since most team members had prior experience in cardiac clinical settings, there was a possibility of inherent bias favouring perceived best practices for patient education. To counteract this bias, the research team engaged in a reflective process before conducting focus groups and interviews. They openly discussed their past clinical experiences to raise awareness
of any potential biases and ensure they would not inadvertently influence the discussions. This reflective process continued throughout the data collection and analysis phases. By incorporating these practices, the research team worked to minimise foreseeable conflicts and uphold the integrity of the research process.

5.5.2 Response and Participation bias

Response (and non-response) biases were identified as a potential threat for this study and several strategies were employed to mitigate risk. These biases could lead to inferences about a population from a subset that may not be representative (Berg, 2005). One measure implemented to reduce potential response bias was the utilisation of an anonymous questionnaire. An anonymous format was incorporated into the CADE-QII questionnaire to encourage honest responses. This anonymity assured participants that their responses would not be linked to their identities, fostering a sense of security. Participants also knew that their participation was voluntary. By completing the questionnaire and returning it, participants implied their consent for participation and subsequent reporting. A research assistant separated RSVP address cards from the questionnaires before analysis. Thus, as lead researcher, I never had access to address details to maintain participant anonymity. All these actions were documented on the participant information sheet, reinforcing transparency and minimising response bias, and to encourage willing participation.

In relation to the focus groups and interviews, response bias can occur when the participant’s responses may be prejudiced due to conscious and unconscious factors such as study design, desire to conform, or researcher-participant dynamics (Ming et al., 2021). Therefore, along with anonymity of the questionnaire, during the focus groups and interview discussions a process of embedding a culture that valued confidentiality was implemented to work towards protecting the participants’ privacy.
while developing trust, rapport, and an environment conducive to open discussion. Prior to agreeing to participate, participants were advised that no identifying information would be published from either individuals or the organisations.

Participants were advised that their names would not be recorded on the transcripts but would be assigned a code. For example; FGP1:A, meaning first patient focus group, participant A. Data from the focus groups were reported as group findings rather than individual statements. As a result, if a participant had decided to voluntarily withdraw from the study after the data analysis stage, their individual contribution to the group discussion could not be separated from the overall discussion. Interview participants could withdraw at any time, and withdraw their data any time prior to final analysis, at which stage findings were reported as group themes. All focus group participants, interviewees, the research assistant, and the transcriptionist were required to sign a confidentiality agreement regarding the focus group sessions. The completed consent forms were stored in a locked filing cabinet within my place of work and was not accompanied by any other data collected in the research. All these processes encouraged a relaxed environment and helped develop relationships from which participants felt more open to discuss their true experiences and were less likely to be biased toward the need to conform.

The ‘Hawthorne effect’, where participants may unintentionally alter their responses to align with perceived researcher expectations (Gerrish & Lathlean, 2015) was considered in this study. To mitigate this potential bias, a combination of semi-structured focus groups and interviews, along with audio recording, was employed. However, it is important to acknowledge that these methods have limitations and may contribute to the Hawthorne effect. The act of recording conversations can inadvertently create a power imbalance between the research team and participants.
To address this dynamic, the research process began with light conversations and ice breakers, encouraging participants to be genuinely honest and open (Ritchie et al., 2014). Additionally, the principle of whakawhanaungatanga (relationship building) was integrated at the start of focus groups and interviews, fostering a relaxed atmosphere that facilitated open discussions, allowing participants to share their authentic experiences. Potential biases in this research study were systematically identified and summarised in Table 5.6. This summary provides insight into the actions taken to minimise these biases.

Table 5.6

Study Biases and Actions to Minimise Affects

<table>
<thead>
<tr>
<th>Types of biases</th>
<th>Identified biases within study</th>
<th>Actions taken to minimise biases</th>
</tr>
</thead>
</table>
| Observation bias  | • May occur during the observational component of the study (collection of the qualitative data through focus groups and interviews).  
• Researcher’s prior experiences could result in subconscious bias during interviews and result in ‘directing’ of the discussion.  
• Could in turn influence selection, confirmation, and information bias. | • Use of two research team members while conducting focus groups.  
• Team briefing before, during, and after focus groups.  
• Participant reviews of transcripts and/or key findings.  
• Team review of analysis of focus groups and interview findings.  
• Standardisation of procedures by having protocols to guide both the focus group discussions and interviews.  
• Recording of focus groups and interviews.  
• MMR design and triangulation of results. |
| Selection bias    | • Use of non-randomised purposive sample.                                                      | • Use of a selection criterion to support recruitment.  
• Selection criteria developed in response to reviewing the literature and consultation with clinical experts. |
| Information bias  | • Previous reviews of the literature could result in misinterpretation of key findings.        | • Using a structured and systematic process to review and assess literature for quality.  
• Support and use of experience researchers during the design, implementation, and synthesis of study findings. |
<p>| Researcher bias   | • The research team consisted of experienced registered nurses. Two members of the team had    | • Reflective process and journaling towards the position of the researcher documented for the lead researcher (thesis) |</p>
<table>
<thead>
<tr>
<th>Types of biases</th>
<th>Identified biases within study</th>
<th>Actions taken to minimise biases</th>
</tr>
</thead>
</table>
| Interviewer bias | • The interviewing team consisted of experienced registered nurses who had worked in cardiology.  
• Prior experience could influence the objectivity of the research team. | • Use of protocols to guide the discussion processes to reduce bias and ensure consistency.  
• Use of a multi-person research team during focus groups and when reviewing the data analysis.  
• Incorporating a participant feedback process and an opportunity to review transcripts for interviewees.  
• The research team remained separated from the selection process to minimise bias towards selecting participants for discussions. |
| Confirmation bias | • The researcher may inadvertently favour information to support previously held positions or beliefs. | • Researcher reflection and journaling before, during, and after data collection and analysis.  
• A reflection process amongst research team to consider personal beliefs and inferences form during data analysis.  
• Open worded questions.  
• Included a process of stakeholder review of the research findings.  
• Mixed method design for triangulation of quantitative and qualitative findings.  
• Compared results with other research studies that have used the same questionnaire.  
• Guided the analytical process through the use of a pre-planned protocol tool. |
| Response bias | • Participants may respond differently to how they truly believe.  
• For the questionnaire participants may use other resources to provide what they perceive to be the best response.  
• Only participants who had an invested ‘interest’ in the topic would choose to be involved. | • Incorporating a process of whakawhanaungatanga into the beginning of focus groups and interviews, to encourage a relaxed environment and help develop relationships from which participants felt more open to discuss their true experiences.  
• In the information sheet provided to the questionnaire participants, reassurance was provided that the questionnaire was not a test and participants were asked to answer without using Google or other resources.  
• Distribution of a recruitment invitation to all eligible participants.  
• Involvement of the clinical stakeholders in the design of the selection criteria. |
<table>
<thead>
<tr>
<th>Types of biases</th>
<th>Identified biases within study</th>
<th>Actions taken to minimise biases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recall bias</td>
<td>• Participants may not remember the educational process or may be influenced by subsequent experiences.</td>
<td>• Including a follow-up process by the research team; all participants who received a pack and completed the personal detail RSVP card received a follow-up telephone call or email to encourage return of the questionnaire to avoid bias in the response rate.</td>
</tr>
<tr>
<td>Publication bias</td>
<td>• All the results of the data analysis may not be reported.</td>
<td>• Explanations about the intended focus of discussions were incorporated into the beginning of the focus groups, interviews, and questionnaires. At the beginning of the data collection, participants were reminded that the questions related to their experience of the hospital journey.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The patient participant focus groups were held before patients attended the outpatient rehabilitation programmes to reduce recall confusion between educational programmes. Reporting of all results in full detail within the analysis, discussion, and findings chapters.</td>
</tr>
</tbody>
</table>

5.7 Conclusion

This chapter has methodically outlined the research design processes, the strategies and the methods used to answer the research questions. It has explained the strategies that underpin data collection and analysis, and clarified the approaches that are positioned to yield valuable insights, enriching the existing body of knowledge in the field of cardiac education.

Robust frameworks were employed to reinforce the integrity of the research findings which encompassed a thorough quality assessment of the qualitative, quantitative, and MMR. Additionally, the chapter critical examined the researcher’s position, diligently aligning with the ethical principles that underscored the study’s ethical conduct. The meticulous planning and execution outlined in this chapter equip subsequent researchers with a design for replicating the study, and lays the groundwork for the comprehensive reporting of analytical procedures and findings, a process undertaken in greater detail in the ensuing chapters. Ultimately, this chapter
serves as the cornerstone upon which the research endeavours of this study are designed, providing an opportunity for meaningful contribution to the field of cardiac education.
Chapter 6: Presentation of the Quantitative Data

6.1 Introduction

In this chapter, the quantitative aspect of the study is explored, specifically the CADE-QII, as detailed in Appendix O. The sequence of presentation differs from the order of data collection. As the questionnaire’s key headings were employed to structure the focus group and interview discussions (see Appendix G and H), the findings begin with the presentation of the quantitative analysis before reporting the qualitative findings. It is important to reiterate that the focus of this study was not to further validate the tool but to conduct an extensive psychometric analysis with a specific emphasis on patients from Aotearoa New Zealand. This analysis encompassed the examination of various demographic characteristics and the resulting knowledge scores, employing both descriptive and inferential statistical techniques. A mean total score was calculated to ascertain the knowledge levels within the cohort, and t-tests and one-way ANOVAs were conducted to explore relationships between parametric demographic variables. Additionally, descriptive statistics were used to explore the relationship between knowledge scores and non-parametric demographic attributes. Lastly, international comparisons were made by juxtaposing the findings from this study with those from studies that utilised the same data collection tool in a congruent format.

This chapter serves as a dedicated presentation of the quantitative analysis and results, and will be built upon in the succeeding chapter, where the qualitative findings were presented. Chapter 8 will seamlessly integrate these outcomes within a comprehensive mixed methods analytical framework, fostering a holistic understanding of the research.
6.1.1 Purpose of the Quantitative Analysis

The primary aim of this chapter is to present the findings from the quantitative data analysis to address the first research question: What do newly diagnosed patients understand about their heart health following their first engagement with acute cardiac hospital services? The specific objectives are to evaluate the level of understanding among newly diagnosed patients, and to delineate the demographic characteristics that have an impact on knowledge scores. This section will present the results collected to accomplish these objectives.

6.1.2 Response Rate for Quantitative Data

An overall return rate for the quantitative data was calculated to be 33% (n=136/408). Additionally, the return rate of 33% serves as a noteworthy indicator of the study's strength, reflecting an acceptable level of participant engagement (Jirojwong, et al., 2014), especially in the context of mixed-method research where data integration is crucial for comprehensive analysis. A comprehensive overview of response rates for each DHB is reported in Appendix Q.

6.1.3 Overview of the Demographic Analysis

Demographic characteristics provided information regarding ethnicity, employment status, gender, age, the number of weeks since the provision of hospital education, the total number of educational hours provided in hospital, which hospitals the participants utilised, geographical residence, prior education level/qualification, household income, associated heart procedures, comorbidities, and smoking history. The demographic characteristics from the 136 participants are presented in Table 6.1.
Collecting data regarding respondent characteristics was essential to enable subsequent analysis of the relationship between demographics and CADE-QII scores, which will be reported in Section 6.2.1. It is important to acknowledge that some variables exhibit underrepresentation within certain subgroups. The potential impact of this underrepresentation on findings and the reporting of significance levels will be addressed when presenting the results in the next section.

6.1.4 Overview of the Variable Analysis
The variables were subject to an initial analysis to determine their nature, whether nominal or ordinal, which was crucial for deciding the appropriate inferential statistical methods. Inferential data analysis aims to derive conclusions from the descriptive data and establish inferences between the findings and the broader population of the cohort (Taherdoost, 2022). Various analytical techniques were employed to assess the disparities among demographic variables in relation to the CADE Q-II knowledge scores. Each variable was subjected to calculations to ascertain the total counts, corresponding percentages, and knowledge scores, including standard deviations. Statistical tests were conducted to assess variances between populations and identify potential statistical significance. For the interpretation of results, the level of significance was set at $p < 0.05$. A more comprehensive presentation of these results is reported in Section 6.2, which presents the quantitative findings in detail.

6.1.5 Overview of the Cardiac Knowledge Domain Analysis
Subsequently, the quantitative analysis proceeded to examine the CADE-QII knowledge data in more depth, focusing on the five distinct cardiac knowledge domains and their associated questionnaire items. SPSS software was utilised to
compute the mean score and standard deviation for individual items within each domain. The results were reported in terms of frequency, mean item knowledge scores, and the average CADE-QII score for the domain total. Pertaining to each knowledge domain, percentages were calculated to categorise responses as correct, partially correct, or incorrect/I don’t know. These outcomes were cross-referenced with the respective questionnaire items.

6.1.6 Overview of the International Analysis

A comparative analysis was conducted on the CADE-QII knowledge scores obtained from Aotearoa New Zealand and those reported in previous studies from other countries (Anderson-Doyly, 2020; Chen et al., 2018; de Melo Ghisi, Grace, Thomas, Evans et al., 2015; de Melo Ghisi, Grace, Thomas & Oh., 2015; Santos et al., 2019; Williamson et al., 2021), as detailed in Table 6.6. It is important to note that while the CADE-QII questionnaire has been used in various countries, some have made modifications to adapt it to their local context. These adaptations may potentially affect the comparability of mean total scores with the results of the current study. To address this issue and ensure like-for-like comparisons, CADE-QII total group mean percentages were also calculated and reported.

The comparative analysis encompassed an examination of international results, considering CADE QII knowledge scores, the respective demographic characteristics, and mean scores for individual domains and questionnaire items. Analysis provided insights into variations in cardiac health knowledge across different populations and identified potential differences and trends in understanding among patients from different countries.
6.2 Reporting of the Quantitative Results

This investigation considered demographic attributes, knowledge scores, and international comparisons to identify potential patterns and variations in understanding within the Aotearoa New Zealand population. In the following sections, the results of the quantitative analysis will be presented to comprehensively address the quantitative research question. This presentation will provide valuable insights into the cardiac health knowledge of newly diagnosed patients, both within the context of Aotearoa New Zealand and in comparison, to international publications.

6.2.1 Demographic Cohort Characteristics

In this section, an overview of the demographic characteristics of the participant cohort is presented in Table 6.1.

Table 6.1
Demographic Characteristics of Study Participants

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N 136</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>93</td>
<td>(68)</td>
</tr>
<tr>
<td>Female</td>
<td>38</td>
<td>(28)</td>
</tr>
<tr>
<td>Preferred not say</td>
<td>5</td>
<td>(4)</td>
</tr>
<tr>
<td>Language CADE-QII completed in*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>133</td>
<td>(98)</td>
</tr>
<tr>
<td>Chinese</td>
<td>3</td>
<td>(2)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>European (including New Zealand European)</td>
<td>113</td>
<td>(83)</td>
</tr>
<tr>
<td>Māori (including Māori /European)</td>
<td>6</td>
<td>(4)</td>
</tr>
<tr>
<td>Asian</td>
<td>15</td>
<td>(11)</td>
</tr>
<tr>
<td>Other (dual ethnicities)</td>
<td>1</td>
<td>(1)</td>
</tr>
<tr>
<td>Missing data</td>
<td>1</td>
<td>(1)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>59 years or less</td>
<td>34</td>
<td>(25)</td>
</tr>
<tr>
<td>60-69 years</td>
<td>26</td>
<td>(19)</td>
</tr>
<tr>
<td>Characteristics</td>
<td>N 136</td>
<td>(%)</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-------</td>
<td>-----</td>
</tr>
<tr>
<td>70-79 years</td>
<td>31</td>
<td>(23)</td>
</tr>
<tr>
<td>80-95 years</td>
<td>8</td>
<td>(6)</td>
</tr>
<tr>
<td>Missing data</td>
<td>37</td>
<td>(27)</td>
</tr>
</tbody>
</table>

**Employment status**

<table>
<thead>
<tr>
<th>Employment status</th>
<th>N 136</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed fulltime</td>
<td>44</td>
<td>(32)</td>
</tr>
<tr>
<td>Employed part time 20+ hours per week</td>
<td>11</td>
<td>(8)</td>
</tr>
<tr>
<td>Employed part-time or casual less than 20 hours per week</td>
<td>4</td>
<td>(3)</td>
</tr>
<tr>
<td>Not in employment</td>
<td>14</td>
<td>(10)</td>
</tr>
<tr>
<td>Retired</td>
<td>52</td>
<td>(38)</td>
</tr>
<tr>
<td>Semi-retired with some employment/casual work</td>
<td>10</td>
<td>(7)</td>
</tr>
<tr>
<td>Missing data</td>
<td>1</td>
<td>(1)</td>
</tr>
</tbody>
</table>

**Highest level of education**

<table>
<thead>
<tr>
<th>Highest level of education</th>
<th>N 136</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>4</td>
<td>(3)</td>
</tr>
<tr>
<td>High school 2 years</td>
<td>10</td>
<td>(7)</td>
</tr>
<tr>
<td>High school 3 years</td>
<td>21</td>
<td>(15)</td>
</tr>
<tr>
<td>High school 4 years</td>
<td>19</td>
<td>(14)</td>
</tr>
<tr>
<td>High school 5 years</td>
<td>18</td>
<td>(13)</td>
</tr>
<tr>
<td>Trade Qualification</td>
<td>23</td>
<td>(17)</td>
</tr>
<tr>
<td>Undergraduate degree</td>
<td>30</td>
<td>(22)</td>
</tr>
<tr>
<td>Postgraduate degree</td>
<td>10</td>
<td>(7)</td>
</tr>
<tr>
<td>Missing data</td>
<td>1</td>
<td>(1)</td>
</tr>
</tbody>
</table>

**Income (yearly)**

<table>
<thead>
<tr>
<th>Income (yearly)</th>
<th>N 136</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $20,000</td>
<td>19</td>
<td>(14)</td>
</tr>
<tr>
<td>$20,001-$40,000</td>
<td>26</td>
<td>(19)</td>
</tr>
<tr>
<td>$40,001-$70,000</td>
<td>24</td>
<td>(18)</td>
</tr>
<tr>
<td>$70,001-$100,000</td>
<td>18</td>
<td>(13)</td>
</tr>
<tr>
<td>$100,001-$150,000</td>
<td>16</td>
<td>(12)</td>
</tr>
<tr>
<td>$150,001+</td>
<td>18</td>
<td>(13)</td>
</tr>
<tr>
<td>Missing data</td>
<td>15</td>
<td>(11)</td>
</tr>
</tbody>
</table>

**Region of residence**

<table>
<thead>
<tr>
<th>Region of residence</th>
<th>N 136</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North of North Island (Northland, Auckland, and Manawatu &amp; Wanganui)</td>
<td>50</td>
<td>(37)</td>
</tr>
<tr>
<td>South of North Island (Wellington)</td>
<td>32</td>
<td>(24)</td>
</tr>
<tr>
<td>North of South Island (Canterbury)</td>
<td>10</td>
<td>(8)</td>
</tr>
<tr>
<td>South of South Island (Otago and Southland)</td>
<td>42</td>
<td>(31)</td>
</tr>
<tr>
<td>Missing data</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DHB**

<table>
<thead>
<tr>
<th>DHB</th>
<th>N 136</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canterbury</td>
<td>10</td>
<td>(7)</td>
</tr>
<tr>
<td>Southern</td>
<td>42</td>
<td>(31)</td>
</tr>
<tr>
<td>Capital and Coast</td>
<td>33</td>
<td>(24)</td>
</tr>
<tr>
<td>Waitemata (North Shore and Waitakere)</td>
<td>38</td>
<td>(28)</td>
</tr>
<tr>
<td>Counties Manukau</td>
<td>11</td>
<td>(8)</td>
</tr>
</tbody>
</table>
### Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N 136</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing data</td>
<td>2</td>
<td>(2)</td>
</tr>
</tbody>
</table>

### Heart Procedures

<table>
<thead>
<tr>
<th>Procedure</th>
<th>N</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CABG</td>
<td>14</td>
<td>(10)</td>
</tr>
<tr>
<td>Stent</td>
<td>81</td>
<td>(60)</td>
</tr>
<tr>
<td>None</td>
<td>22</td>
<td>(16)</td>
</tr>
<tr>
<td>Other</td>
<td>12</td>
<td>(9)</td>
</tr>
<tr>
<td>Multiple procedures</td>
<td>7</td>
<td>(5)</td>
</tr>
</tbody>
</table>

### Other health issues

<table>
<thead>
<tr>
<th>Issue</th>
<th>N</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High BP</td>
<td>8</td>
<td>(6)</td>
</tr>
<tr>
<td>Heart attack</td>
<td>12</td>
<td>(9)</td>
</tr>
<tr>
<td>Heart failure</td>
<td>2</td>
<td>(1)</td>
</tr>
<tr>
<td>Diabetes Type 1</td>
<td>1</td>
<td>(1)</td>
</tr>
<tr>
<td>Diabetes Type 2</td>
<td>3</td>
<td>(2)</td>
</tr>
<tr>
<td>High cholesterol</td>
<td>10</td>
<td>(7)</td>
</tr>
<tr>
<td>Mental health issues</td>
<td>2</td>
<td>(2)</td>
</tr>
<tr>
<td>Multi conditions</td>
<td>79</td>
<td>(58)</td>
</tr>
<tr>
<td>Others</td>
<td>5</td>
<td>(4)</td>
</tr>
<tr>
<td>No other issues noted</td>
<td>14</td>
<td>(10)</td>
</tr>
</tbody>
</table>

### Smoking

<table>
<thead>
<tr>
<th>Status</th>
<th>N</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never smoked</td>
<td>75</td>
<td>(56)</td>
</tr>
<tr>
<td>Current smoker</td>
<td>3</td>
<td>(2)</td>
</tr>
<tr>
<td>Past smoker</td>
<td>56</td>
<td>(42)</td>
</tr>
<tr>
<td>Missing data</td>
<td>2</td>
<td>(1)</td>
</tr>
</tbody>
</table>

### Weeks since education provided

<table>
<thead>
<tr>
<th>Duration</th>
<th>N</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 week</td>
<td>39</td>
<td>(29)</td>
</tr>
<tr>
<td>1 week</td>
<td>11</td>
<td>(8)</td>
</tr>
<tr>
<td>2 weeks</td>
<td>15</td>
<td>(11)</td>
</tr>
<tr>
<td>3 weeks</td>
<td>15</td>
<td>(11)</td>
</tr>
<tr>
<td>4 weeks</td>
<td>13</td>
<td>(10)</td>
</tr>
<tr>
<td>5 weeks</td>
<td>12</td>
<td>(9)</td>
</tr>
<tr>
<td>6 weeks</td>
<td>23</td>
<td>(17)</td>
</tr>
<tr>
<td>Missing data</td>
<td>8</td>
<td>(6)</td>
</tr>
</tbody>
</table>

### Hours of education received

<table>
<thead>
<tr>
<th>Duration</th>
<th>N</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 hour</td>
<td>52</td>
<td>(38)</td>
</tr>
<tr>
<td>1 hour</td>
<td>38</td>
<td>(28)</td>
</tr>
<tr>
<td>2 hours</td>
<td>18</td>
<td>(13)</td>
</tr>
<tr>
<td>3 hours</td>
<td>8</td>
<td>(6)</td>
</tr>
<tr>
<td>4 hours +</td>
<td>11</td>
<td>(8)</td>
</tr>
<tr>
<td>Missing data</td>
<td>9</td>
<td>(7)</td>
</tr>
</tbody>
</table>

* *No other available language options completed*

The gender distribution showed a notable skew, with a higher proportion of males (68.4%) compared to females (27.9%), in alignment with national statistics on hospitalisations for ischaemic heart disease (Ministry of Health, 209).
The questionnaire was available in several languages for potential participants to access. Three of the 136 responses were completed in Chinese and all other responses were completed in English. A number of ethnic backgrounds were reported; a significant majority identified as European (83%), followed by Asian (11%), Māori (4.4%), and one participant indicated dual ethnicity. Age groups displayed relatively even distribution, there was a relatively even spread across three age demographics: 59 years or less (25%), 60-69 years (19.1%), 70-79 years (22.8%), except for participants aged 80-95 (5.9%) years, who were underrepresented.

Data were also collected to reflect employment status, educational background, and yearly household income. The majority of participants reported being either in fulltime employment (32.4%) or retired (38.2%). Less responses were returned in the remaining categories as seen in Table 6.1.

Education was recorded in relation to highest level attended at high school or above. Education levels encompassed a diverse range with respondents reporting: no education (2.9%), high school 2 years (7.4%), high school 3 years (15.4), high school 4 years (14.0%), high school 5 years (13.2%), trade qualification (16.9%), undergraduate degree (22.1%) and post graduate degree (7.4%). There was also a distribution across the household incomes categories: less than $20,000 (14%), $20,001-$40,000 (19.1%), $40,001-$70,000 (17.6%), $70,001-$100,000 (13.2%), $100,001-$150,000 (11.8%), and $150,001 or more (13.2%).

Two demographic categories provided insight into geographical distribution: participant’s region of residence and the associated DHB where they received treatment and education. These geographical percentages reflect that the regional questionnaire return was not proportional to the population distribution. Region of
residence was divided across four geographical regions: North of North Island (Northland, Auckland, Manawatu and Wanganui) (36.8%); South of North Island (Wellington) (23.9%); North of South Island (Canterbury) (7.5%); and South of South Island (Otago and Southland) (31.3%). The participants were from the following DHBs: Canterbury (7.4%), Southern (30.9%), Capital and Coast (24.3%), Waitemata (North Shore and Waitakere) (27.9%), and Counties Manukau (8.1%).

Demographic data were also collected with the subsequent intention to analyse the relationship between health-related conditions and CADE-QII scores. These demographic categories gathered information regarding heart procedures, comorbidities, and smoking history. The heart procedures included CABG (10.3%) or a coronary stent/angioplasty (59.6%), and an option to indicate if the patient had no heart interventions (16.2%), which would reflect a medical management pathway. Participants also had the option to report any other heart procedure (8.8%), and responses included cardiac ablation, aortic dissection repair, valve replacements, angiography, and pacemakers/intracardiac device insertion. Where patients reported having multiple procedures, these responses were combined into a final category – multiple procedures (5.1%).

Data were also collected on other health issues known as co-morbidities. Participants reported if they had one of the following medical conditions: high blood pressure (5.9%), heart attack (8.8%), heart failure (1.5%), diabetes type 1 (0.7%), diabetes type 2 (2.2%), high cholesterol (7.4%), or mental health issues (1.5%). However, if a participant reported multiple comorbidities (more than one of the aforementioned conditions) they were sorted into a ‘multi conditions’ category. This category represented the largest number of participant responses, with a total of 58.1%. A small number of responses reported other health issues (3.7%), such as
arthritis, sleeping problems, rheumatic fever, and cancers. A history of no other health issues was reported in 10.3% of responses. The participants’ smoking histories was also collected. The majority of patients reported to have never been tobacco smokers 55.9%, with a further 41.7% identifying as past smokers and 2.2%, current smokers.

The final demographic data collected reflected the delivery of cardiac education. Information was collected to analyse the CADE QII scores against the weeks since the delivery of education, and how many hours of education were provided. Most participants (28.7%) completed the questionnaire within the first week (less than one week following discharge), and then completion of the questionnaire was distributed across the following 6 weeks; 1 week (8.1%), 2 weeks (11%), 3 weeks (11%), 4 weeks (9.6%), 5 weeks (8.8%), and 6 weeks (23%). Further information was collected on how many hours of education a participant perceived they received. Most participants reported receiving less than 1 hour (38.2%) or 1 hour (27.9%) of education. Other participants reported receiving the following amounts of education: 2 hours (13.2%), 3 hours (5.9%) and 4 or more hours (8.1%). The aggregation of these demographic attributes empowers insightful analysis using the CADE-QII to determine potential correlations.

### 6.2.2 Variable Analysis Between Demographic Factors and CADE-QII Scores

Analysis was conducted to assess the relationship between CADE-QII scores and various demographic factors, considering individual variables within each category. The results of this analysis are presented in Tables 6.2 and 6.3.

Demographic categories were systematically categorised into nominal and ordinal datasets, allowing for the calculation of skewness and kurtosis reports. These statistical measures are instrumental in determining whether the data warrant
parametric or non-parametric variable analysis using SPSS software. Following the establishment of data distribution characteristics, a comprehensive analysis was conducted to explore the relationships between CADE-QII scores and demographic variables.

Before any variable testing was completed, the overall CADE-QII results for the cohort was calculated. The calculated mean total CADE-QII score for the cohort was 63.04 ± 13.38 out of a potential maximum of 93. The median score was 64.50, with a mode of 58. The scores spanned from a minimum of 21 to a maximum of 93, demonstrating the wide range of cardiac health knowledge levels within the participant group. Knowledge levels were categorised as follows: ‘Great’ for a CADE-QII score of 83-93 (90-100%), ‘Good’ for 65-82 (70-89%), ‘Acceptable’ for 46-64 (50-69%), ‘Poor’ for 28-45 (30-49%), and ‘Insufficient’ for scores below 28 (< 30%). A total of 89% of participants achieved an acceptable level of knowledge or higher, with the distribution as follows: Great, 3 (2.2%); Good, 59 (43.4%); Acceptable, 59 (43.4%); Poor 12, (8.8%); and Insufficient, 3 (2.2%).

Parametric tests were employed for demographic categories exhibiting an appropriate distribution curve, enabling a meaningful evaluation of the statistical significance of these variables. The following demographic categories underwent parametric testing: employment status, age, weeks since education, DHBs, region of residence, educational level, income, and smoking status. When the P-value was ≤ 0.05, a post hoc SPSS multiple comparison test was applied to pinpoint the specific variables where a significant relationship existed.

Within the educational level demographic category, which yielded a P-value of 0.05, a post hoc test was conducted. Additional post hoc tests were carried out for categories with borderline P-values to explore potential significance at a finer level.
These categories included employment status (P-value/Sig 0.052), DHBs (P-value/Sig 0.08), and smoking status (P-value/Sig 0.057). It is important to note that the N(%) values among variables within certain demographic categories differ considerably. Consequently, caution is required when interpreting the true significance of P-value/Sig findings.

Table 6.2

Demographic Categories and CADE-QII Scores for Parametric Tests

<table>
<thead>
<tr>
<th>Variable</th>
<th>N(%)</th>
<th>Score</th>
<th>T/F</th>
<th>df</th>
<th>P-value/Sig</th>
<th>Test completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment status</td>
<td></td>
<td>2.262</td>
<td>5</td>
<td>0.052</td>
<td>One-way ANOVA</td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>44(32.4)</td>
<td>65.27±13.37</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Fulltime</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed part-time 20+ hours per week</td>
<td>11(8.1)</td>
<td>68.64±12.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed part-time or casual less than 20 hours per week</td>
<td>4(2.9)</td>
<td>71.50±11.24</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Not in employment</td>
<td>14(10.3)</td>
<td>61.29±13.77</td>
<td></td>
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<td></td>
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<tr>
<td>Retired</td>
<td>52(38.2)</td>
<td>58.94±13.82</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semi-retired with some employment/casual work</td>
<td>10(7.4)</td>
<td>67.30±7.07</td>
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</tr>
<tr>
<td>Post hoc multiple comparison – significant findings</td>
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<tr>
<td>Retired compared with Employed fulltime</td>
<td></td>
<td></td>
<td></td>
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<td>0.020</td>
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</tr>
<tr>
<td>Retired compared with Employed part-time or casual less than 20 hours per week</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.028</td>
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<tr>
<td>Age</td>
<td></td>
<td>0.763</td>
<td>3</td>
<td>0.517</td>
<td>One-way ANOVA</td>
<td></td>
</tr>
<tr>
<td>40-59 years</td>
<td>34(25.0)</td>
<td>65.88±14.42</td>
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<tr>
<td>60-69 years</td>
<td>26(19.1)</td>
<td>65.81±10.08</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>70-79 years</td>
<td>31(22.8)</td>
<td>61.87±11.39</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Variable</td>
<td>N(%)</td>
<td>Score</td>
<td>T/F</td>
<td>df</td>
<td>P-value/Sig</td>
<td>Test completed</td>
</tr>
<tr>
<td>--------------------------------</td>
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<td>-------------------------</td>
</tr>
<tr>
<td>80-95 years</td>
<td>8(5.9)</td>
<td>63.00±10.74</td>
<td>0.841</td>
<td>6</td>
<td>0.541</td>
<td>One-way ANOVA</td>
</tr>
<tr>
<td>Weeks since education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1 week</td>
<td>39(28.7)</td>
<td>61.54±15.45</td>
<td>0.841</td>
<td>6</td>
<td>0.541</td>
<td>One-way ANOVA</td>
</tr>
<tr>
<td>1 week</td>
<td>11(8.1)</td>
<td>57.73±12.55</td>
<td></td>
<td></td>
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<tr>
<td>2 weeks</td>
<td>15(11.0)</td>
<td>63.67±9.99</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3 weeks</td>
<td>15(11.0)</td>
<td>61.80±13.15</td>
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<td></td>
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<tr>
<td>4 weeks</td>
<td>13(9.6)</td>
<td>66.69±11.01</td>
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<tr>
<td>5 weeks</td>
<td>12(8.8)</td>
<td>63.83±8.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 weeks</td>
<td>23(16.9)</td>
<td>66.78±15.97</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>DHBs</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Canterbury</td>
<td>10(7.4)</td>
<td>68.20±15.09</td>
<td>2.134</td>
<td>4</td>
<td>0.08</td>
<td>One-way ANOVA</td>
</tr>
<tr>
<td>Southern</td>
<td>42(30.9)</td>
<td>62.43±11.37</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Capital and Coast</td>
<td>33(24.3)</td>
<td>64.76±13.64</td>
<td></td>
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<td></td>
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<tr>
<td>Waitemata (North Shore and Waitakere)</td>
<td>38(27.9)</td>
<td>63.39±14.25</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Counties Manukau</td>
<td>11(8.1)</td>
<td>53.00±13.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post hoc multiple comparison – significant findings</td>
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<tr>
<td>Counties Manukau compared with Canterbury</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.010</td>
<td></td>
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<tr>
<td>Counties Manukau compared with Southern</td>
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<td></td>
<td></td>
<td>0.037</td>
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<tr>
<td>Counties Manukau compared with Capital Coast</td>
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<td></td>
<td></td>
<td>0.012</td>
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</tr>
<tr>
<td>Counties Manukau compared with Waitemata (North Shore and Waitakere)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.023</td>
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<tr>
<td>Region where living</td>
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<td></td>
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</tr>
<tr>
<td>North of North Island (Northland, Auckland, and Manawatu &amp; Wanganui)</td>
<td>50(36.8)</td>
<td>61.26±14.61</td>
<td>1.128</td>
<td>3</td>
<td>0.340</td>
<td>One-way ANOVA</td>
</tr>
<tr>
<td>South of North Island (Wellington)</td>
<td>32(23.9)</td>
<td>65.34±13.43</td>
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<tr>
<td>North of South Island (Canterbury)</td>
<td>10(7.5)</td>
<td>68.20±15.09</td>
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<td></td>
</tr>
<tr>
<td>Variable</td>
<td>N(%)</td>
<td>Score</td>
<td>T/F</td>
<td>df</td>
<td>P-value/Sig</td>
<td>Test completed</td>
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<td>-------------</td>
<td>----------------</td>
</tr>
<tr>
<td>South of South Island (Otago and Southland)</td>
<td>42(31.3)</td>
<td>62.43±11.37</td>
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</table>

**Educational level**

<table>
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<tr>
<th>Level</th>
<th>N(%</th>
<th>Score</th>
<th>T/F</th>
<th>df</th>
<th>P-value/Sig</th>
<th>Test completed</th>
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</thead>
<tbody>
<tr>
<td>None</td>
<td>4(2.9)</td>
<td>55.25±7.36</td>
<td>2.084</td>
<td>7</td>
<td>0.050</td>
<td>One-way ANOVA</td>
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<tr>
<td>High school 2 years</td>
<td>10(7.4)</td>
<td>55.60±14.38</td>
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<tr>
<td>High school 3 years</td>
<td>21(15.4)</td>
<td>57.90±8.43</td>
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<tr>
<td>High school 4 years</td>
<td>19(14.0)</td>
<td>60.74±15.04</td>
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<tr>
<td>High school 5 years</td>
<td>18(13.2)</td>
<td>66.06±11.70</td>
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<tr>
<td>Trade Qualification</td>
<td>23(16.9)</td>
<td>64.00±13.90</td>
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<tr>
<td>Under graduate degree</td>
<td>30(22.1)</td>
<td>68.17±12.29</td>
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</tr>
<tr>
<td>Post graduate degree</td>
<td>10(7.4)</td>
<td>65.60±18.82</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Post hoc Multiple comparison – significant findings**

- High school 2 years compared with high school 5 years: 0.045
- High school 2 years compared with Under graduate degree: 0.009
- High school 3 years compared with Under graduate degree: 0.007

**Income**

<table>
<thead>
<tr>
<th>Income</th>
<th>N(%</th>
<th>Score</th>
<th>T/F</th>
<th>df</th>
<th>P-value/Sig</th>
<th>Test completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $20,000</td>
<td>19(14.0)</td>
<td>57.89±15.12</td>
<td>1.362</td>
<td>5</td>
<td>0.244</td>
<td>One-way ANOVA</td>
</tr>
<tr>
<td>$20,001-$40,000</td>
<td>26(19.1)</td>
<td>60.50±14.55</td>
<td></td>
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<tr>
<td>$40,001-$70,000</td>
<td>24(17.6)</td>
<td>65.25±12.70</td>
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<td></td>
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</tr>
<tr>
<td>$70,001-$100,000</td>
<td>18(13.2)</td>
<td>62.39±11.32</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>$100,000-$150,000</td>
<td>16(11.8)</td>
<td>66.50±11.79</td>
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<tr>
<td>$150,000+</td>
<td>18(13.2)</td>
<td>66.94±15.15</td>
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</tbody>
</table>

**Post hoc multiple comparison – significant findings**

- Less than $20,000 compared with $150,000+: 0.046
### Table

<table>
<thead>
<tr>
<th>Variable</th>
<th>N(%)</th>
<th>Score</th>
<th>T/F</th>
<th>df</th>
<th>P-value/Sig</th>
<th>Test completed</th>
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<tbody>
<tr>
<td>Smoking</td>
<td></td>
<td>2.933</td>
<td></td>
<td>2</td>
<td>0.057</td>
<td>One-way ANOVA</td>
</tr>
<tr>
<td>Never smoked</td>
<td>75(55.1)</td>
<td>65.31±12.71</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current smoker - any amount</td>
<td>3(2.2)</td>
<td>52.67±19.14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Past smoker</td>
<td>56(41.2)</td>
<td>60.63±13.75</td>
<td></td>
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</tr>
</tbody>
</table>

#### Post hoc Multiple comparison – significant findings

| Never smoked compared to Past smoker | 0.048 |

In the analysis of the relationship between demographic characteristics and CADE-QII knowledge scores, several noteworthy patterns emerged. First, it was observed that individuals with an employment history of ‘employed part-time or casual, less than 20 hours per week’ and ‘employed part-time, 20+ hours per week’ tended to exhibit the highest CADE-QII knowledge scores. Conversely, those who reported a history of retirement had the lowest scores. Additionally, there was a trend of increasing knowledge scores among participants in younger age categories.

Regarding the variable of time since education, the findings did not yield any significant results, indicating that no specific period strongly correlated with high CADE-QII scores. The results were generally evenly distributed across the time since education categories, with the only exception being at the 1-week period. During this time, scores are noted to be lower.

When considering geographical location, the results found that the DHB to which participants were aligned showed a significant correlation with CADE-QII scores. However, due to the substantial disparities in response rates among different DHBs, generalising these findings would be inappropriate. Some DHBs had considerably higher response rates than others.
Notably, a significant difference emerged concerning the variable of prior education, indicating a clear relationship with CADE-QII scores. This suggests that individuals with higher levels of educational attainment, both in terms of schooling and post-school education, generally exhibited higher CADE-QII scores. A similar upward trend, although not statistically significant, was also observed in the variable of household income. Higher associated household income tended to correspond with higher CADE-QII scores.

Finally, in the category related to smoking history, it was observed a borderline relationship between current smokers and individuals who had never smoked existed. Those who identified as past smokers tended to record CADE-QII scores in between the other two groups.

Non-parametric tests were performed for the demographic categories that did not demonstrate a standard distribution. These included ethnicity, educational hours, heart procedures, other health issues, and gender. The results from these categories will be evaluated as descriptive statistics only (see Table 6.3).

### Table 6.3

*Demographic Categories and CADE-QII Scores for Non-Parametric Tests*

<table>
<thead>
<tr>
<th>Variable</th>
<th>N(%)</th>
<th>Score</th>
<th>T/F</th>
<th>df</th>
<th>Sig</th>
<th>Test completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity</td>
<td></td>
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<td>0.388</td>
<td>3</td>
<td>0.762</td>
<td>One-way ANOVA with calculated square root variable and log variable</td>
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<tr>
<td>European (inc. New Zealand European)</td>
<td>113(83.1)</td>
<td>62.87±13.79</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Māori (inc. Māori/European)</td>
<td>6(4.4)</td>
<td>60.17±9.90</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>15(11.0)</td>
<td>64.67±12.37</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Other</td>
<td>1(.7)</td>
<td>74</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education Hours</td>
<td></td>
<td></td>
<td>0.810</td>
<td>5</td>
<td>0.545</td>
<td>One-way ANOVA with calculated square root variable</td>
</tr>
<tr>
<td>Less than 1 hour</td>
<td>52(38.2)</td>
<td>63.83±13.65</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In the context of ethnicity, the findings did not reveal any significant relationships between different ethnic groups and CADE-QII knowledge scores. However, it is important to note that the cohort sizes for various ethnic subgroups were not uniform, which may have influenced the results. Further research is necessary to establish more conclusive relationships within this category. Similarly, when examining the variable of the number of educational hours received in relation to CADE-QII knowledge scores, no discernible trend was observed.
In relation to heart procedures, this study investigated the knowledge scores in relation to CABG, stenting, the absence of any heart procedure, or other heart procedures. Notably, the analysis did not uncover any significant relationships. However, when considering the presence of co-morbidities, the findings revealed intriguing patterns. Participants who reported having either diabetes type 1 or mental health issues tended to have higher CADE-QII scores. In contrast, those with a history of high cholesterol or reported no other concurrent health issues exhibited the lowest CADE-QII scores. It is important to note that, statistically speaking, between these comorbidity categories a significant relationship with CADE-QII scores was not demonstrated. Finally, the results of the analysis clearly indicated that the male CADE-QII scores were higher than those of their female counterparts. This finding underscores a noteworthy gender base disparity in CADE-QII performance within the study cohort.

6.2.3 CADE-QII Knowledge Domain Findings

Means and standard deviations for the cohort for each item and each domain within the CADE-QII questionnaire are presented in Table 6.4. Each item was scored on a scale of three, where three denoted complete understanding, one indicated partial understanding, and zero was assigned when participants either selected an incorrect answer option, chose the ‘I don’t know’ option, or selected multiple answer options. This reporting format aligns with several of the international publications, facilitating comparisons with their findings.
**Table 6.4**

*CADE-QII – Domain and Item Scores*

<table>
<thead>
<tr>
<th>Domain questions and answer options</th>
<th>Item M±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medical condition</strong></td>
<td><strong>15.52±2.68</strong></td>
</tr>
<tr>
<td>CAD is:</td>
<td>2.49±.89</td>
</tr>
<tr>
<td>Angina (chest pain or discomfort) occurs:</td>
<td>2.03±.63</td>
</tr>
<tr>
<td>In a person with coronary artery disease, which of the following is a usual description of angina?</td>
<td>2.24±.55</td>
</tr>
<tr>
<td>A heart attack occurs:</td>
<td>2.40±.96</td>
</tr>
<tr>
<td>The best resources available to help someone understand his/her medications are:</td>
<td>1.98±1.02</td>
</tr>
<tr>
<td>Medications such as Aspirin and Clopidogrel are important because:</td>
<td>2.50±.63</td>
</tr>
<tr>
<td>The “statin” medications, such as Atorvastatin (LipitorTM), Rosuvastatin (CrestorTM), or Simvastatin (ZocorTM), have a beneficial effect in the body by:</td>
<td>1.90±1.09</td>
</tr>
<tr>
<td><strong>Risk factors</strong></td>
<td><strong>11.16±1.58</strong></td>
</tr>
<tr>
<td>The risk factors for heart disease that can be changed are:</td>
<td>2.10±1.03</td>
</tr>
<tr>
<td>The actions that can be taken to control cholesterol levels include:</td>
<td>2.23±.48</td>
</tr>
<tr>
<td>The actions that can be taken to control blood pressure include:</td>
<td>2.75±.48</td>
</tr>
<tr>
<td>The first step towards controlling risk factors (such as blood pressure or cholesterol) is:</td>
<td>2.29±.90</td>
</tr>
<tr>
<td>The actions to prevent developing diabetes include:</td>
<td>1.80±.85</td>
</tr>
<tr>
<td><strong>Exercise</strong></td>
<td><strong>15.41±3.06</strong></td>
</tr>
<tr>
<td>What are the important parts of an exercise prescription?</td>
<td>2.09±.47</td>
</tr>
<tr>
<td>For a person living with heart disease, it is important to do a cardiovascular warm-up before exercising because:</td>
<td>1.91±1.10</td>
</tr>
<tr>
<td>The pulse can be found:</td>
<td>2.57±.87</td>
</tr>
<tr>
<td>Three things that one can do to exercise safely outdoors in the cold winter are:</td>
<td>1.89±.98</td>
</tr>
<tr>
<td>The benefits of doing resistance training (lift weights or elastic bands) include:</td>
<td>2.68±.87</td>
</tr>
<tr>
<td>If a person gets chest discomfort during a walking exercise session, he or she should:</td>
<td>2.86±.42</td>
</tr>
<tr>
<td>How does a person know if they are exercising at the right level?</td>
<td>1.45±.92</td>
</tr>
<tr>
<td><strong>Nutrition</strong></td>
<td><strong>16.14±2.72</strong></td>
</tr>
<tr>
<td>What is the best source of omega 3 fats in food?</td>
<td>2.94±.54</td>
</tr>
<tr>
<td>Trans fats are:</td>
<td>2.38±1.17</td>
</tr>
<tr>
<td>What is one good way to add more fibre to your diet?</td>
<td>2.43±.90</td>
</tr>
<tr>
<td>Which of the following foods has the most salt?</td>
<td>1.96±.81</td>
</tr>
<tr>
<td>What combinations of food can help lower blood pressure?</td>
<td>2.90±.40</td>
</tr>
<tr>
<td>When reading food labels, what should one look at first?</td>
<td>1.37±.85</td>
</tr>
<tr>
<td>How many servings of fruit and vegetables should adults consume?</td>
<td>2.16±.59</td>
</tr>
<tr>
<td><strong>Psychosocial</strong></td>
<td><strong>11.05±2.53</strong></td>
</tr>
<tr>
<td>Which of the below are effective stress management techniques?</td>
<td>2.66±.88</td>
</tr>
<tr>
<td>What stresses have been related to increased risk for heart attacks?</td>
<td>1.75±1.10</td>
</tr>
<tr>
<td>Which of the following describes your best option for reducing your risk from depression?</td>
<td>2.10±.51</td>
</tr>
<tr>
<td>It is important to recognise “sleep apnoea” because:</td>
<td>2.43±.81</td>
</tr>
</tbody>
</table>
“Chronic stress” is defined as: 2.12±0.93

In addition to assessing the mean CADE QII scores for each item within the domains, a comprehensive analysis was conducted to examine the percentage of correct, partially correct, and incorrect answers. This careful examination aimed to uncover nuanced trends within the cardiac knowledge domains. The detailed results can be found in Table 6.5, with an overview across all domains presented in Figure 6.1.

The results revealed that the psychosocial domain exhibited a high percentage of correct responses, accompanied by the second-largest percentage of incorrect responses. Conversely, the nutrition domain showed the highest percentage of incorrect answers, with a concerning 22.4% of all questions answered incorrectly. Across all five domains, a majority exceeding 50% of participants provided answers at a ‘fully’ correct level. Notably, a sub-analysis focused on the medication questions within the medical condition domain indicated that the majority of participants did not respond at a ‘fully’ correct level to these specific questions.

Table 6.5

<table>
<thead>
<tr>
<th>Domain</th>
<th>MC answer percentage:</th>
<th>Answers</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical condition</td>
<td>Correct</td>
<td>549/952</td>
<td>57.6%</td>
</tr>
<tr>
<td></td>
<td>Partially correct</td>
<td>301/952</td>
<td>31.6%</td>
</tr>
<tr>
<td></td>
<td>Incorrect/Don’t know</td>
<td>102/952</td>
<td>10.7%</td>
</tr>
<tr>
<td><strong>Medication questions</strong></td>
<td>Correct</td>
<td>171/408</td>
<td>41.9%</td>
</tr>
<tr>
<td></td>
<td>Partially correct</td>
<td>198/408</td>
<td>48.5%</td>
</tr>
<tr>
<td></td>
<td>Incorrect/Don’t know</td>
<td>39/408</td>
<td>9.5%</td>
</tr>
<tr>
<td>Risk factors</td>
<td>Correct</td>
<td>342/680</td>
<td>50.3%</td>
</tr>
<tr>
<td></td>
<td>Partially correct</td>
<td>235/680</td>
<td>34.5%</td>
</tr>
</tbody>
</table>
Answers Across all Cardiac Domains of Knowledge

Figure 6.1 categorises the questionnaire items into three distinct categories: ‘fully correct’, ‘partially correct’, or ‘incorrect/don’t know’. These categories are based on the prevailing response patterns among the participants. Notably, within the psychosocial domain, fully correct was the predominant choice for all items, distinguishing it as the sole category where this was observed.

However, within the domains of risk factors, exercise, and nutrition, there was an occurrence where, for a specific question within each category, the partially correct option was favoured by the majority of participants. Moreover, within the
medical condition domain, for two questions—pertaining to medications—most participants chose the partially correct option. In contrast, the risk factors and nutrition domains experienced instances where questions were predominantly answered incorrectly by the majority of participants. Specifically, two questions within the nutrition domain had a notably higher percentage of incorrect responses; similarly, one question in the risk factors domain was primarily answered incorrectly.

6.2.4 International Comparison for CADE-QII

The study findings were subjected to a comparative analysis against published results from six related studies that employed the CADE-QII. The data presented in Table 6.6 include studies conducted in Canada (three studies, spanning a 6-year period), China, Brazil, and the United States. These CADE-QII scores represent baseline patient scores, reflective of their knowledge prior to participating in a comprehensive cardiac rehabilitation programme. China reported the lowest CADE-QII score, registering 45.74 ± 18.94 out of a total of 84, corresponding to a mean group percentage of 54.4%. Brazil followed with the second-lowest CADE-QII score of 53 ± 14 out of 81, reflecting a mean group percentage of 62%. Conversely, a Canadian study reported the highest CADE-QII score of 68.48 ± 14.31 out of 93, resulting in a mean group percentage of 74%.

This Aotearoa New Zealand based study provides comparative results, with a CADE-QII score of 63.04 ± 13.38 and a mean group percentage of 67.7%. These comparisons demonstrate variances in cardiac knowledge levels across diverse populations and settings.
Table 6.6

CADE-QII International Comparisons

<table>
<thead>
<tr>
<th>Aotearoa New Zealand CADE-QII scores</th>
<th>Mean total knowledge score</th>
<th>Mean group percentage</th>
<th>Medium</th>
<th>Mode</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>63.04</td>
<td>67.7</td>
<td>64.50</td>
<td>58</td>
<td>21</td>
<td>93</td>
<td>13.38</td>
</tr>
<tr>
<td>Skewness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.659</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skewness</td>
<td>Std. Error of Skewness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.208</td>
<td>0.558</td>
<td>0.413</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kurtosis</td>
<td>Std. Error of Kurtosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal distribution curve</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

International comparisons

<table>
<thead>
<tr>
<th>Publication</th>
<th>CADE-QII</th>
<th>Mean total knowledge score</th>
<th>Mean group percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ontario Canada</td>
<td>64.2±18.1 out of 93</td>
<td>69%</td>
</tr>
<tr>
<td>2</td>
<td>Ontario Canada</td>
<td>64.72±17.35 out of 93</td>
<td>70%</td>
</tr>
<tr>
<td>3</td>
<td>China</td>
<td>45.74±18.94 out of 84</td>
<td>54.4%</td>
</tr>
<tr>
<td>4</td>
<td>Brazil</td>
<td>53±14 out of 81</td>
<td>62%</td>
</tr>
<tr>
<td>5</td>
<td>Texas USA</td>
<td>58.04±15.89</td>
<td>62%</td>
</tr>
<tr>
<td>6</td>
<td>Canada</td>
<td>68.48±14.31/93</td>
<td>74%</td>
</tr>
</tbody>
</table>

The comparison of demographic characteristics alongside CADE-QII means and standard deviations poses a considerable challenge, primarily due to the inconsistency in the presentation of findings across various publications. This section provides a coherent analysis, recognising the limitations of available data. Table 6.7 presents the demographic details that could be compared across the international studies and the findings from the current study. Notably, the results across these publications consistently reveal certain trends. Gender-based analyses of these publications consistently indicate that males tend to exhibit higher CADE-QII scores.
than females, with the exception of one publication. Additionally, a general trend emerges wherein increased prior educational experience is associated with higher CADE-QII scores.

However, it is important to acknowledge that the presentation of CADE-QII score-related comorbidities varies significantly across the studies. The diversity in reporting comorbidities between publications necessitates caution when drawing conclusive insights from these findings. Nevertheless, this section provides an overview of the trends and challenges encountered during this comparative analysis.

Subsequently, Table 6.8 presents a comprehensive comparison of mean and standard deviation scores within various knowledge domains. The examination of these domains across the seven studies offers valuable insights, with specific reference to findings in this research. Among the studies, the research conducted in Canada (de Melo Ghisi, Grace, Thomas, Evans et al., 2015; de Melo Ghisi, Grace, Thomas, & Oh, 2015) yielded results most congruent with the outcomes of the current study.
### Table 6.7

**CADE-QII - International Demographic Comparisons**

<table>
<thead>
<tr>
<th>Gender</th>
<th>N (%)</th>
<th>CADE QII m±SD</th>
<th>Comparison Publication 1</th>
<th>Comparison Publication 2 (CADE QII score not reported with demographics)</th>
<th>Comparison Publication 3</th>
<th>Comparison Publication 4</th>
<th>Comparison Publication 5</th>
<th>Comparison Publication 6 (CADE QII score not reported with demographics)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>93 (68.4%)</td>
<td>64.31±12.49</td>
<td>149 (48.5%)</td>
<td>Not reported</td>
<td>215 (68%)</td>
<td>200 (65.1%)</td>
<td>11 (44%)</td>
<td>Not reported</td>
</tr>
<tr>
<td>Female</td>
<td>38 (27.9%)</td>
<td>59.82±15.21</td>
<td>158 (51.5%)</td>
<td>64.31±12.49</td>
<td>149 (48.5%)</td>
<td>215 (68%)</td>
<td>200 (65.1%)</td>
<td>Not reported</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>5 (3.7%)</td>
<td>64.00±13.11</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Educational level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>4 (2.9%)</td>
<td>55.25±7.36</td>
<td>20 (6.5%)</td>
<td>Primary school and below</td>
<td>3 (1%)</td>
<td>59±15</td>
<td>59±15</td>
<td>Not reported</td>
</tr>
<tr>
<td>High school 2 years</td>
<td>10 (7.4%)</td>
<td>55.60±14.38</td>
<td>58 (19.9%)</td>
<td>High school/graduation</td>
<td>58 (20.8%)</td>
<td>59±15</td>
<td>59±15</td>
<td></td>
</tr>
<tr>
<td>High school 3 years</td>
<td>21 (15.4%)</td>
<td>57.90±8.43</td>
<td>60.4±17.8</td>
<td>Middle school</td>
<td>60.4±17.8</td>
<td>59±15</td>
<td>59±15</td>
<td></td>
</tr>
<tr>
<td>High school 4 years</td>
<td>19 (14.0%)</td>
<td>60.74±15.04</td>
<td>64.00±13.90</td>
<td>High school</td>
<td>64.00±13.90</td>
<td>59±15</td>
<td>59±15</td>
<td></td>
</tr>
<tr>
<td>High school 5 years</td>
<td>18 (13.2%)</td>
<td>66.06±11.70</td>
<td>68.17±12.29</td>
<td>University</td>
<td>68.17±12.29</td>
<td>59±15</td>
<td>59±15</td>
<td></td>
</tr>
<tr>
<td>Trade</td>
<td>23 (16.9%)</td>
<td>64.00±13.90</td>
<td>57.1±18.2</td>
<td>Bachelor degree and above</td>
<td>57.1±18.2</td>
<td>59±15</td>
<td>59±15</td>
<td></td>
</tr>
<tr>
<td>Qualification</td>
<td>30 (22.1%)</td>
<td>68.17±12.29</td>
<td>66 (54.1%)</td>
<td>Bachelor degree and above</td>
<td>66 (54.1%)</td>
<td>59±15</td>
<td>59±15</td>
<td></td>
</tr>
<tr>
<td>Undergraduate degree</td>
<td>30 (22.1%)</td>
<td>68.17±12.29</td>
<td>66 (54.1%)</td>
<td>Bachelor degree and above</td>
<td>66 (54.1%)</td>
<td>59±15</td>
<td>59±15</td>
<td></td>
</tr>
<tr>
<td>Postgraduate degree</td>
<td>10 (7.4%)</td>
<td>67.4 ±16.0</td>
<td>72 (22.8%)</td>
<td>58.78±13.95</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------</td>
<td>------------</td>
<td>------------</td>
<td>-------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employment</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed</td>
<td>44 (32.4%)</td>
<td>65.27±13.37</td>
<td>Employment</td>
<td>98 (31.0%)</td>
</tr>
<tr>
<td>Fulltime</td>
<td></td>
<td></td>
<td></td>
<td>48.11±17.91</td>
</tr>
<tr>
<td>Employed part time 20+ hours per week</td>
<td>11 (8.1%)</td>
<td>68.64±12.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed part time or casual less than 20 hours per week</td>
<td>4 (2.9%)</td>
<td>71.50±11.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not in employment</td>
<td>14 (10.3%)</td>
<td>61.29±13.77</td>
<td>Unemployment</td>
<td>34 (10.8%)</td>
</tr>
<tr>
<td>Retired</td>
<td>52 (38.2%)</td>
<td>58.94±13.82</td>
<td>Retirement</td>
<td>184 (58.2%)</td>
</tr>
<tr>
<td>Semi-retired with some employment/casual work</td>
<td>10 (7.4%)</td>
<td>67.30±7.07</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Co-morbidities</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>High BP</td>
<td>8 (5.9%)</td>
<td>143 (46.9%)</td>
<td>178(58%)</td>
<td>21 (84%)</td>
</tr>
<tr>
<td>Heart Attack</td>
<td>64.00±9.65</td>
<td>64.2±17.2</td>
<td>52.5±17</td>
<td>CADE QII Score not reported</td>
</tr>
<tr>
<td>Heart Failure</td>
<td>12 (8.8%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes Type 1</td>
<td>64.50±12.44</td>
<td>64.2±17.2</td>
<td>52.5±17</td>
<td></td>
</tr>
<tr>
<td>Diabetes Type 2</td>
<td>2 (1.5%)</td>
<td>114 (37.1%)</td>
<td>222 (72.3%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>63.00±7.07</td>
<td>65.0±18.4</td>
<td>52±16.25</td>
<td></td>
</tr>
<tr>
<td>High Cholesterol</td>
<td>Mental Health Issues</td>
<td>Multi conditions</td>
<td>Others</td>
<td>No other issues noted</td>
</tr>
<tr>
<td>------------------</td>
<td>----------------------</td>
<td>------------------</td>
<td>--------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>1 (0.7%)</td>
<td>70.00</td>
<td>63.33±12.50</td>
<td>3 (2.2%)</td>
<td>57.70±14.39</td>
</tr>
<tr>
<td>18 (5.9%)</td>
<td>67.4±8.6</td>
<td>57.6±21.5</td>
<td>21 (6.8%)</td>
<td>63.6±16.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>76 (24.8%)</td>
<td>10 (7.4%)</td>
<td>50 (16.3%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>54±14.5</td>
<td>57.00±14.39</td>
<td>63.6±16.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>160 (52.1%)</td>
<td>2 (1.5%)</td>
<td>Not reported</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 (96%)</td>
<td>79.50±4.95</td>
<td>Depression</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>79 (58.1%)</td>
<td>79 (2.9%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>62.99±14.23</td>
<td>67.8±18.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 (3.7%)</td>
<td>Reported individually</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>68.40±9.68</td>
<td>Cardiac conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>14 (10.3%)</td>
<td>reported in article</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>60.57±13.13</td>
<td>Not reported</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*CADE QII Score not reported*
Table 6.8

CADE-QII International Item (Question) Comparisons

<table>
<thead>
<tr>
<th>Domain</th>
<th>Item M±SD for this study</th>
<th>Comparison Publication 1</th>
<th>Comparison Publication 2</th>
<th>Comparison Publication 3</th>
<th>Comparison Publication 4</th>
<th>Comparison Publication 5</th>
<th>Comparison Publication 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAD is:</td>
<td>2.49±0.89</td>
<td>2.9±0.7</td>
<td>2.17±1.27</td>
<td>1.94±1.32</td>
<td>3±2</td>
<td>2.32±1.14</td>
<td></td>
</tr>
<tr>
<td>Angina (chest pain or discomfort) occurs:</td>
<td>2.03±0.63</td>
<td>2.1±0.6</td>
<td>2.58±1.00</td>
<td>2.05±1.23</td>
<td>3±2</td>
<td>1.92±1.38</td>
<td></td>
</tr>
<tr>
<td>In a person with CAD, which of the following is a usual description of angina?</td>
<td>2.24±0.55</td>
<td>2.3±0.7</td>
<td>2.42±1.09</td>
<td>2.17±1.10</td>
<td>3±2</td>
<td>1.72±1.40</td>
<td></td>
</tr>
<tr>
<td>A heart attack occurs:</td>
<td>2.40±0.96</td>
<td>2.8±0.8</td>
<td>2.36±1.10</td>
<td>1.45±1.25</td>
<td>1±2</td>
<td>2.12±1.13</td>
<td></td>
</tr>
<tr>
<td>The best resources available to help someone understand his/her medications are:</td>
<td>1.98±1.02</td>
<td>1.7±1.1</td>
<td>2.29±1.06</td>
<td>Not asked</td>
<td>1±0</td>
<td>2.04±1.14</td>
<td></td>
</tr>
<tr>
<td>Medications such as Aspirin and Clopidogrel are important because:</td>
<td>2.50±0.63</td>
<td>2.7±0.6</td>
<td>1.90±1.13</td>
<td>2.04±1.33</td>
<td>1±2</td>
<td>1.56±1.04</td>
<td></td>
</tr>
<tr>
<td>The “statin” medications, such as Atorvastatin (LipitorTM), Rosuvastatin (CrestorTM), or Simvastatin (ZocorTM), have a beneficial effect in the body by:</td>
<td>1.90±1.09</td>
<td>2.1±1.1</td>
<td>1.51±1.27</td>
<td>1.22±1.27</td>
<td>1±1</td>
<td>1.68±1.25</td>
<td></td>
</tr>
<tr>
<td><strong>Domain total</strong></td>
<td><strong>15.52±2.68</strong></td>
<td><strong>15.24±4.77</strong></td>
<td><strong>10.86±4.72</strong></td>
<td><strong>15.87±3.29</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Risk Factors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The risk factors for heart disease that can be changed are:</td>
<td>2.10±1.032</td>
<td>2.6±0.9</td>
<td>2.30±1.08</td>
<td>1.60±1.26</td>
<td>3±2</td>
<td>2.04±1.14</td>
<td></td>
</tr>
<tr>
<td>The actions that can be taken to control cholesterol levels include:</td>
<td>2.23±4.86</td>
<td>2.3±0.6</td>
<td>2.45±1.05</td>
<td>1.78±1.31</td>
<td>3±0</td>
<td>1.92±1.19</td>
<td></td>
</tr>
<tr>
<td>Domain</td>
<td>Item Mean ± Standard Deviation</td>
<td>Comparison Publication 1</td>
<td>Comparison Publication 2</td>
<td>Comparison Publication 3</td>
<td>Comparison Publication 4</td>
<td>Comparison Publication 5</td>
<td>Comparison Publication 6</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>--------------------------</td>
<td>--------------------------</td>
<td>--------------------------</td>
<td>--------------------------</td>
<td>--------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>The actions that can be taken to control blood pressure include:</td>
<td>2.75 ± 0.48</td>
<td>2.9 ± 0.5</td>
<td>2.48 ± 1.01</td>
<td>2.10 ± 1.13</td>
<td>3 ± 2</td>
<td>2.68 ± 0.90</td>
<td></td>
</tr>
<tr>
<td>The first step towards controlling risk factors (such as blood</td>
<td>2.29 ± 0.90</td>
<td>2.5 ± 1.0</td>
<td>0.55 ± 0.94</td>
<td>Not asked</td>
<td>0 ± 1</td>
<td>0.48 ± 0.71</td>
<td></td>
</tr>
<tr>
<td>pressure or cholesterol) is:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The actions to prevent developing diabetes include:</td>
<td>1.80 ± 0.85</td>
<td>1.9 ± 1.2</td>
<td>1.72 ± 1.34</td>
<td>1.34 ± 1.23</td>
<td>1 ± 2</td>
<td>1.56 ± 1.26</td>
<td></td>
</tr>
<tr>
<td>Domain total</td>
<td>11.16 ± 1.58</td>
<td>9.49 ± 3.32</td>
<td>6.82 ± 3.55</td>
<td>10.43 ± 3.28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What are the important parts of an exercise prescription?</td>
<td>2.09 ± 0.47</td>
<td>1.8 ± 1.1</td>
<td>2.63 ± 0.95</td>
<td>1.22 ± 1.38</td>
<td>3 ± 2</td>
<td>2.28 ± 1.31</td>
<td></td>
</tr>
<tr>
<td>For a person living with heart disease, it is important to do a</td>
<td>1.91 ± 1.10</td>
<td>2.2 ± 0.6</td>
<td>2.12 ± 1.16</td>
<td>2.01 ± 1.26</td>
<td>1 ± 2</td>
<td>2.04 ± 1.14</td>
<td></td>
</tr>
<tr>
<td>cardiovascular warm-up before exercising because:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The pulse can be found:</td>
<td>2.57 ± 0.87</td>
<td>2.7 ± 0.8</td>
<td>2.32 ± 1.12</td>
<td>1.49 ± 1.29</td>
<td>3 ± 2</td>
<td>1.92 ± 1.19</td>
<td></td>
</tr>
<tr>
<td>Three things that one can do to exercise safely outdoors in the</td>
<td>1.89 ± 0.98</td>
<td>2.2 ± 1.0</td>
<td>1.94 ± 1.30</td>
<td>Not asked</td>
<td>3 ± 0</td>
<td>1.6 ± 1.32</td>
<td></td>
</tr>
<tr>
<td>cold winter are:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The benefits of doing resistance training (lift weights or elastic</td>
<td>2.68 ± 0.877</td>
<td>2.2 ± 1.0</td>
<td>2.17 ± 1.19</td>
<td>1.88 ± 1.26</td>
<td>3 ± 2</td>
<td>2.12 ± 1.24</td>
<td></td>
</tr>
<tr>
<td>bands) include:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If a person gets chest discomfort during a walking exercise</td>
<td>2.86 ± 0.42</td>
<td>2.9 ± 0.5</td>
<td>2.35 ± 1.08</td>
<td>2.23 ± 1.07</td>
<td>1 ± 2</td>
<td>1.96 ± 1.14</td>
<td></td>
</tr>
<tr>
<td>session, he or she should:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How does a person know if they are exercising at the right level?</td>
<td>1.45 ± 0.92</td>
<td>1.6 ± 1.1</td>
<td>2.16 ± 1.24</td>
<td>1.93 ± 1.34</td>
<td>1 ± 3</td>
<td>1.76 ± 1.16</td>
<td></td>
</tr>
<tr>
<td>Domain total</td>
<td>15.41 ± 3.06</td>
<td>15.70 ± 5.18</td>
<td>10.76 ± 4.90</td>
<td>16.79 ± 4.79</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Less one item
<table>
<thead>
<tr>
<th>Domain</th>
<th>Item M±SD for this study</th>
<th>Comparison Publication 1</th>
<th>Comparison Publication 2</th>
<th>Comparison Publication 3</th>
<th>Comparison Publication 4</th>
<th>Comparison Publication 5</th>
<th>Comparison Publication 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is the best source of omega 3 fats in food?</td>
<td>2.94±.54</td>
<td>3.0±0.7</td>
<td>2.33±1.20</td>
<td>0.68±1.12</td>
<td>3±0</td>
<td>2.36±1.19</td>
<td></td>
</tr>
<tr>
<td>Trans fat are:</td>
<td>2.38±1.17</td>
<td>2.6±1.0</td>
<td>1.67±1.41</td>
<td>0.59±1.03</td>
<td>1±2</td>
<td>1.16±1.43</td>
<td></td>
</tr>
<tr>
<td>What is one good way to add more fibre to your diet?</td>
<td>2.43±.94</td>
<td>2.7±0.9</td>
<td>2.19±1.17</td>
<td>1.74±1.40</td>
<td>3±2</td>
<td>2.08±1.19</td>
<td></td>
</tr>
<tr>
<td>Which of the following foods has the most salt?</td>
<td>1.96±.81</td>
<td>2.1±0.6</td>
<td>2.66±0.91</td>
<td>1.92±1.31</td>
<td>3±2</td>
<td>2±1.29</td>
<td></td>
</tr>
<tr>
<td>What combinations of food can help lower blood pressure?</td>
<td>2.90±.40</td>
<td>2.9±0.5</td>
<td>2.55±0.96</td>
<td>1.87±1.17</td>
<td>3±2</td>
<td>2.64±0.86</td>
<td></td>
</tr>
<tr>
<td>When reading food labels, what should one look at first?</td>
<td>1.37±.85</td>
<td>1.8±1.1</td>
<td>1.48±0.99</td>
<td>1.40±1.25</td>
<td>1±0</td>
<td>1.2±0.87</td>
<td></td>
</tr>
<tr>
<td>How many servings of fruit and vegetables should adults consume?</td>
<td>2.16±.59</td>
<td>2.1±1.1</td>
<td>1.18±1.40</td>
<td>1.08±1.36</td>
<td>0±1</td>
<td>0.48±1</td>
<td></td>
</tr>
<tr>
<td>Domain total</td>
<td>16.14±2.72</td>
<td>14.07±4.66</td>
<td>9.28±5.21</td>
<td>14.16±3.90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychosocial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which of the below are effective stress management techniques?</td>
<td>2.66±.88</td>
<td>2.8±0.7</td>
<td>2.48±1.03</td>
<td>1.78±1.24</td>
<td>3±0</td>
<td>1.88±1.33</td>
<td></td>
</tr>
<tr>
<td>What stresses have been related to increased risk for heart attacks?</td>
<td>1.75±1.10</td>
<td>1.9±1.2</td>
<td>1.79±1.40</td>
<td>1.51±1.33</td>
<td>1±3</td>
<td>2.28±1.21</td>
<td></td>
</tr>
<tr>
<td>Which of the following describes your best option for reducing your risk from depression?</td>
<td>2.10±.51</td>
<td>2.1±0.6</td>
<td>2.67±0.91</td>
<td>1.78±1.34</td>
<td>3±0</td>
<td>2.4±1.22</td>
<td></td>
</tr>
<tr>
<td>It is important to recognize “sleep apnoea” because: “Chronic stress” is defined as:</td>
<td>2.43±.81</td>
<td>2.6±0.9</td>
<td>2.01±1.37</td>
<td>1.44±1.41</td>
<td>1±3</td>
<td>2.48±1.08</td>
<td></td>
</tr>
<tr>
<td>Domain total</td>
<td>11.05±2.53</td>
<td>10.23±3.64</td>
<td>8.03±4.50</td>
<td>11.23±3.31</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
These results merit careful scrutiny due to their implications. When examining the combined domain scores, an optimistic perspective emerges. However, upon closer examination of individual item scores, a more nuanced picture materialises. Notably, the findings consistently indicate reasonable scores within the medical condition domain. In contrast, there is an observable trend of lower scores pertaining to the questions related to medications in this domain.

Within the risk factor domain, the initial three questions consistently yielded higher scores across all publications, while knowledge pertaining to diabetes prevention generally registered lower scores. In the exercise domain, the study findings align closely with those in publications one and two, where most items scored highly. However, it is worth noting that lower scores are often associated with ‘application’ questions in this domain. Furthermore, publication five reported comparatively lower scores in the exercise domain.

Regarding nutrition, all publications demonstrate evidence of higher overall domain scores; yet, this domain also presents some of the lower item scores across publications which underscores the importance of considering each result within the broader context. Lastly, the psychosocial domain exhibits a degree of variability in item scores across the seven publications, reflecting a range of perspectives and interpretations within this domain. This comparative analysis highlights the nuanced variations in knowledge domains across the studies, shedding light on both consensus and disparities within these areas of inquiry.

6.3 Conclusion

Utilising the Qualtrics online survey platform, the CADE-QII was employed to collect quantitative data. The primary objective was to address the quantitative
aspect of the research question: What do newly diagnosed patients understand about their heart health following their first engagement with the acute hospital services?

The quantitative data collected were processed using SPSS software. CADE-QII knowledge scores were calculated and subsequently analysed with respect to patient demographic characteristics. The findings indicate a potential significant association between higher knowledge scores and greater educational attainment as suggested by a positive correlation. Furthermore, the directionality and implications of the observed relationships vary across other identified borderline associations between various demographic categories. Higher knowledge scores among the employed compared to retirees suggest a positive directional relationship, implying that employment status may facilitate greater knowledge acquisition or cognitive engagement. Conversely, a negative relationship between knowledge scores a specific DHB prompt consideration of contextual factors and biases inherent to the recruitment process. Additionally, the indication of higher knowledge scores among never-smokers compared to past smokers, hints at a positive directional relationship.

Descriptive analysis revealed minimal variability in CADE-QII scores among different ethnic groups and heart procedure categories. It is observed that an increase in education hours did not appear to correlate with higher knowledge scores. In terms of patients with high cholesterol, the descriptive analysis indicated a mean CADE-QII score of 57.70±14.392; whereas all other comorbidities were associated with CADE-QII scores exceeding 60. This suggests a positive association between high cholesterol and lower knowledge levels as measured by the CADE-QII instrument.

Analysis of the CADE-QII knowledge scores revealed that the majority of participants exhibited satisfactory or high knowledge levels across all knowledge domains. However, with the exception of the psychosocial domain, several
individual items within these domains saw a majority of participants selecting partially correct or incorrect responses. The risk factor domain exhibited the highest percentage of responses that were not fully correct. Similarly, the nutrition knowledge domain displayed the highest percentage of incorrect responses among the questions. Regarding medication knowledge, most participants did not provide fully correct answers.

The findings indicate that Aotearoa New Zealand CADE-QII scores align with those reported in other countries, particularly results from the Canadian studies in 2015. Across various publications, a consistent pattern emerges, with male CADE-QII scores generally surpassing female scores. Additionally, there is a general trend of increasing CADE-QII scores associated with higher levels of education. However, the variability in reporting results across studies hinders definitive international comparisons across demographic categories.

Furthermore, when considering CADE-QII scores across knowledge domains, lower scores were consistently associated with medication-related questions and some nutrition-related queries. While the initial questions in the risk factor domain scored higher, this trend did not hold for the remaining questions within the same domain. Lastly, diverse results were reported across publications for the exercise and psychosocial domains, making it challenging to draw international parallels. The subsequent chapter will present the results obtained from the qualitative data analysis.
Chapter 7: Presentation of the Qualitative Data

7.1 Introduction

In this chapter, the qualitative findings as part of a comprehensive convergent MMR study are presented. The central focus shifts toward the examination of cardiac patients’ and health care professionals’ perceptions regarding patients’ comprehension of their heart health. Within this chapter, the purpose of the qualitative component of the study will be discussed. The chapter outlines the data analysis software used in facilitating the analytical process. Furthermore, the robust theoretical framework that provided guidance for the systematic approach, encompassing coding and categorisation is presented.

Subsequently, the focus of this chapter is the presentation of the five themes which emerged from the qualitative data analysis: (1) acquisition of cardiac knowledge, (2) checking of understanding, (3) impact on mental health, (4) information overload, and (5) unaddressed educational needs and questions. These themes offer profound insights into the multifaceted aspects of patients’ comprehension of their heart health, as perceived by stakeholders.

Prioritising education and fostering understanding are key expectations in breaking down barriers within the broader context of self-management, ultimately enhancing independent care and, consequently improving health outcomes (Adams, 2010; Hardman et al., 2020). As presented in the philosophical discussion within Chapter 3, understanding can be considered an individual construct, which should not only be ‘objectively’ assessed. To gather deeper insight into what an individual may or may not understand, consideration must be given to participants’ perceptions. For enhanced readability, concise participant quotations (less than 40 words) are are
integrated in italics within the body of the paragraph. Lengthier quotations, exceeding 40 words, are presented independently for clarity.

### 7.1.1 The Purpose of the Qualitative Analysis

The qualitative data collection aimed to address the second research question: What are the cardiac patients; and health care professionals’ understandings of patients’ levels of heart health knowledge? This question had two primary objectives: first, to investigate what patients and cardiac health care professionals understand patients know after engagement with acute cardiac hospital services; and second, to explore how patients and cardiac health care professionals assume patients’ knowledge is assessed.

### 7.1.2 Software to Support Qualitative Analysis

The software NVivo served as the foundational platform for supporting various aspects of qualitative data analysis throughout this study. Its utility encompassed data storage, organisation, analysis, and visualisation of data. The adoption of NVivo strengthened the developmental phase, aiding in the identification and structuring of deductive codes, inductive codes, and overarching conceptual themes, derived from the narratives provided by the study participants.

### 7.1.3 Overview of the Qualitative Analysis Tool: Braun and Clarke’s Six-Stage Theoretical Process

Braun and Clarke’s (2006) well-established framework for thematic analysis, a six-stage theoretical process introduced in 2006 and widely embraced in qualitative research, was applied in the current study. This process entails the following sequential stages: 1) data familiarisation, 2) coding, 3) searching for themes, 4)
reviewing themes, 5) defining and naming themes, and, finally, 6) writing up and reporting the findings.

Braun and Clarke (2006) expressly advised researchers to critically contemplate the rationale behind employing thematic analysis in a given study. This consideration encompasses a thoughtful examination of data use and interpretation, and should encompass five fundamental considerations: 1) establishing the definition of a theme, 2) providing a comprehensive description of the dataset, 3) discerning between inductive and theoretical thematic analysis, 4) distinguishing between semantic and latent themes, and 5) engaging with the chosen epistemological stance. A succinct summary of these considerations pertinent to the current study is presented in Table 7.1.
### Table 7.1

**Decisions for the Application of Thematic Analysis**

<table>
<thead>
<tr>
<th>What constitutes a theme?</th>
<th>Explanation (Braun &amp; Clarke, 2006)</th>
<th>Application to study</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>“A theme captures something important about the data in relation to the research questions, and represents some level of patterned response or meaning within the dataset” (Braun &amp; Clarke, 2006, p. 82)</td>
<td>Themes were first coded using deductive codes and then refined using inductive coding. There was no requirement for a theme to be mentioned during the first coding process but prevalence was reflected on during stages 3 and 6 of the analysis processes.</td>
</tr>
</tbody>
</table>

**Description of the dataset**

Consideration needs to be given to whether it is important to provide a thematic description of the entire dataset, or provide one particular theme or group of themes at a more nuanced level (Braun & Clarke, 2006).

**Inductive verses theoretical thematic analysis**

Patterns and themes can be identified via a deductive (theoretical) or inductive process. Deductive analysis would be driven by the researcher’s theoretical and analytical interest. Whereas, inductive coding occurs without trying to fit into pre-existing codes/themes. The decision will reflect the evolution of the research question and how the interviews were conducted (Braun & Clarke, 2006).

Detailed accounts at the nuanced levels of the themes will be presented in relation to the final themes.

For this study, thematical deductive coding was primarily employed. Segments were coded into predetermined codes that reflected the domains of cardiac knowledge and other topics that provided a semi-structured base for the discussion. The dataset was then subjected to an inductive process, where all segments were further analysed for sequential meaning. Coding was completed based on the research questions and aims.
<table>
<thead>
<tr>
<th>Explanation (Braun &amp; Clarke, 2006)</th>
<th>Application to Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sematic or latent themes</td>
<td>There are two levels of identification of themes, sematic and latent. At a sematic level, themes are identified for surface meaning of the data and the researcher is not looking beyond what the participant has said. This level still requires interpretation of the data. Latent analysis goes beyond sematic and aims to examine the underlying ideas, meaning, assumptions and concepts (Braun &amp; Clarke, 2006).</td>
</tr>
<tr>
<td>Epistemology</td>
<td>Braun and Clarke (2006) positioned thematic analysis across multiple paradigms and worldviews. They contended, the approach should be guided by the research question, philosophy, research methodological position, methods, and data.</td>
</tr>
</tbody>
</table>

7.1.3.1 Overview of Stage 1: Data Familiarisation

The process of data familiarisation commenced concurrently with the conduct of focus groups and interviews. It involved a comprehensive approach, including the reporting of summary themes back to the participants for validation and feedback. Additionally, specific procedures were tailored for focus groups and interviews. For focus groups, myself, the lead researcher and research assistant (DH) conducted a thorough debriefing session. In contrast, interviews followed a different protocol where I independently completed a debriefing tool and forwarded it to the participants for their further insights. To ensure precision and accuracy, all focus
group and interview sessions were meticulously transcribed by professional transcriptionists. I then engaged in a three-tiered process to become intimately acquainted with the data.

Firstly, I meticulously listened to the audio recordings of each session, comprehensively documenting relevant notes. Subsequently, I cross-referenced the transcriptions with the original audio recordings to confirm their accuracy. Finally, I conducted a third review, listening to the audio recordings and reviewing the transcriptions once more, while assigning anonymous labels to individual statements made by the participants. This multifaceted approach to data familiarisation ensured a thorough and nuanced understanding of the dataset.

7.1.3.2 Overview of Stage 2: Coding

The process of coding was undertaken, which is fundamentally about condensing extensive volumes of data into more manageable units for the purpose of extracting meaning (Maguire & Delahunt, 2017). Coding, as an analytical endeavour, involves the creation of descriptive labels that highlight the essential facets inherent in the data, thereby capturing both its significance and conceptual intricacies (Clarke & Braun, 2013).

Coding can be approached in various ways, contingent upon the research methodology and the overarching research question (Maguire & Delahunt, 2017). In this study, a dual approach encompassing both deductive and inductive coding was employed. The coding methodology adopted was attuned to the characteristics of a convergent MMR design. Given that the focus groups and interviews were semi-structured, the deductive codes aligned with the predetermined guiding questions, corresponding with the quantitative aspect of the study. This strategic alignment
facilitated a seamless integration and comprehensive analysis of the combined quantitative and qualitative data throughout the mixed methods analysis phase.

7.1.3.2.1 Deductive Codes

This phase involved the coding of data segments according to the deductive codes that emerged from specific questions posed during the focus groups and interviews. These questions were tailored to the cardiac domains of knowledge and were derived from national and international guidelines for cardiac rehabilitation (British Association for Cardiovascular Prevention and Rehabilitation, 2023; Liew et al., 2021; National Institute for Health and Care Excellence, 2020; Stone et al., 2021; Woodruffe et al., 2015).

In addition to these domain-specific questions, other inquiries were made during the focus groups and interviews aimed at fostering discussions on topics such as access to additional resources, perceptions regarding the assessment of understanding, and identifying unanswered questions for patients. These supplementary questions were strategically designed to address the third and fourth objectives of this research project, leading to the formulation of additional deductive themes to support coding. The deductive codes integral to the analysis are presented in Figure 7.1 and encompassed categories such as exercise, further resources, key educational points, heart health pathology, lifestyle and risk factors, knowledge assessments, medications, mental health, nutrition, unanswered questions, and the sources of information. The transcripts from all focus groups and interviews were initially processed and coded into these deductive themes using NVivo.

To provide a perspective on the frequency of discussions related to a specific deductive code during each focus group and interview, a distribution table was generated. This table offered insights into the intensity of discussion surrounding the
deductive codes across different sessions. Subsequently, these data played a pivotal role in supporting the development of overarching themes. An exemplar of the detailed distribution graphs is available in Appendix R, serving as valuable indicators of where substantive discussions transpired during the focus groups and interviews. These data strengthened the rigour of inferred theme development by highlighting areas of particular interest and intensity within the data analysis process.
Figure 7.1

Qualitative Coding Process

<table>
<thead>
<tr>
<th>Deductive Themes</th>
<th>Inductive Coding</th>
<th>Sub coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise</td>
<td>Exercise</td>
<td>Expression of confusion around exercise information</td>
</tr>
<tr>
<td>Further Resources</td>
<td>Further Resources</td>
<td>Need to individualise exercise</td>
</tr>
<tr>
<td>Key Points of Education</td>
<td>HCP perceptions of essential education</td>
<td>Perceived information delivered</td>
</tr>
<tr>
<td>Heart Health Pathophysiology</td>
<td>Heart Health Pathophysiology</td>
<td>Perception of how exercise influenced</td>
</tr>
<tr>
<td>Lifestyle and Risk Factors</td>
<td>Lifestyle and Risk Factors</td>
<td></td>
</tr>
<tr>
<td>Knowledge Check</td>
<td>Knowledge Check</td>
<td></td>
</tr>
<tr>
<td>Medications</td>
<td>Medications</td>
<td></td>
</tr>
<tr>
<td>Mental Health</td>
<td>Mental Health</td>
<td></td>
</tr>
<tr>
<td>Nutrition</td>
<td>Nutrition</td>
<td></td>
</tr>
<tr>
<td>Unanswered Questions</td>
<td>Unanswered Questions</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Management</td>
<td></td>
</tr>
<tr>
<td>Capacity to understand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Who Gave Information</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Expression of confusion around exercise information**
- **Need to individualise exercise**
- **Perceived information delivered**
- **Perception of how exercise influenced**

**TV, Media and public businesses**
- Perceived limitations of cardiac rehab class
- Pamphlets, ward videos, take home resources and books
- Other people experiences
- Online inquiry

**Knowledge or misunderstanding that developed after or in relation to admission**
- Perceived knowledge of heart disease prior to admission

**HPCs Perceived knowledge was checked in hospital**
- Participants thinking around best place to check knowledge and influences in how this is done
- Perceived knowledge was checked in hospital
- Perceived knowledge was not check in hospital but as outpatient
- Perceived knowledge was not checked in primary health care

**Overt discussion related to mental health education received**
- Subconscious discussion that uses words associated with emotions

**Confusion over where to go for further information**
- Emotional impact of unanswered questions
- Individual specifics about my case
- My prospects - my outcomes - moving forward
- Related to medications
- Unmet question around diet
- Unmet questions related to exercise moving forward
- Why me

**Factors that influence capacity to understand**
- Inpatient environment and impact on capacity to learn
- When patients have the capacity to learn
7.1.3.2.2 Inductive Coding

Deductive codes provided clusters of data, from where an inductive analytical process was employed. During the process of inductive analysis, the researcher completes a detailed reading of the data to gain a holistic understanding of what is being said and to ensure that all important concepts within the data are captured (Charmaz, 2014; Gale et al., 2013). Subsequently, the research transitioned into an inductive analytical phase. During this essential stage, thorough and comprehensive scrutiny of the textual data was undertaken, line by line, to foster a comprehensive understanding of the content and to ensure the comprehensive inclusion of relevant concepts, thoughtfully aligned with the overarching research question and aims.

As a result of this detailed inductive analysis, a set of ‘inductive codes’ emerged, encapsulating previously unexplored dimensions of the data landscape. Notably, this inductive journey unveiled alignments with the preconceived deductive themes, and introduced two entirely new codes. These broad inductive codes were subsequently subjected to a rigorous refinement process, yielding a more distinct set of sub-codes. These sub-codes, detailed in Table 7.2, constitute the nuanced facets of the emergent themes, enriching the depth and breadth of the qualitative analysis. This precisely structured approach, encompassing both deductive and inductive elements, underscores the methodological attention that underpins this research endeavour.
### Table 7.2

**Inductive Coding and Sub-Coding**

<table>
<thead>
<tr>
<th>Inductive code</th>
<th>Sub-code</th>
<th>Number of times concept captured in transcript</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise</td>
<td>• Expression of confusion around exercise information</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>• Need to individualise exercise</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>• Perceived information delivered</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>• Perception of how exercise influenced health</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>• Relationship between education and exercise outcomes</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>• Self-thinking around future exercise management</td>
<td>8</td>
</tr>
<tr>
<td>Further resources</td>
<td>• TV*, Media and public businesses</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>• Perceived limitations of cardiac rehab class</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>• Pamphlets, ward videos, take home resources and books</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>• Other people’s experiences</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>• Online inquiry</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>• Misinformation</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>• Internal conflict around where to seek further information</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>• Information overload</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>• Identified areas of limited resources</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>• Health professionals outside the cardiac team</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>• Cardiac team</td>
<td>70</td>
</tr>
<tr>
<td>HCPs’ perceptions of essential education</td>
<td>• Condition awareness</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>• Discharge management</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>• Individualised education</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>• Safety</td>
<td>6</td>
</tr>
<tr>
<td>Heart health pathophysiology</td>
<td>• Knowledge or misunderstanding that developed</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>• Perceived knowledge of heart disease prior to admission</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>• Misunderstanding around their heart disease presentation</td>
<td>30</td>
</tr>
<tr>
<td>Lifestyle and risk factors</td>
<td>• Identified risk and lifestyle factors</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>• HCPs perceptions of what patients know</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>• HCPs perceptions of what patients need to know</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>• Unidentified risk and lifestyle factors</td>
<td>13</td>
</tr>
<tr>
<td>Checking of knowledge</td>
<td>• HCPs perceptions’ that knowledge is checked in hospital</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>• Participants’ thinking around best place to check knowledge and how this</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>• Patients’ perceptions that knowledge was checked in hospital</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>• Check using - do you have any questions</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>• Checked at a deeper level</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>• Perceptions that knowledge was not checked in hospital but as an</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>• Perceptions that knowledge was not checked in primary health care</td>
<td>1</td>
</tr>
<tr>
<td>Medications</td>
<td>• Medication - emotional links</td>
<td>15</td>
</tr>
<tr>
<td>Inductive code</td>
<td>Sub-code</td>
<td>Number of times concept captured in transcript</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>Medication actions</td>
<td></td>
<td>42</td>
</tr>
<tr>
<td>Medication confusion</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>Medication management</td>
<td></td>
<td>45</td>
</tr>
<tr>
<td>Medication resources</td>
<td></td>
<td>29</td>
</tr>
<tr>
<td>Mental health</td>
<td>Overt discussion related to received MH* education</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>Emotional changes identified by participants</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>HCPs reported impact on MH</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Reported possible impact of covering MH</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Reported experience of limited MH education</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Subconscious discussions that uses words associated with emotions</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Negative emotional responses related to heart health</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Subconscious discussion that uses words associated with positive emotions</td>
<td>16</td>
</tr>
<tr>
<td>Nutrition</td>
<td>Expressed confusion around nutrition information</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Identified new information</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Perceived links to Heart Health - indirect or direct</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Perceived need for nutrition education</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Social and psychological impact in relation to nutrition education</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Voiced changes they will be making or have made</td>
<td>7</td>
</tr>
<tr>
<td>Unanswered questions</td>
<td>Confusion over where to go for further information</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Emotional impact of unanswered questions</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Individual specifics about my case</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>My prospects - my outcomes - moving forward</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Related to medications</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Unmet questions around diet</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Unmet questions related to exercise moving forward</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Why me</td>
<td>9</td>
</tr>
<tr>
<td>Management</td>
<td>Management approaches led by the health team</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Patient questions around management from the HCPs perspective</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Self-led management</td>
<td>22</td>
</tr>
<tr>
<td>Capacity to understand</td>
<td>Factors that influence capacity to understand</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Inpatient environment and impact on capacity to learn</td>
<td>33</td>
</tr>
<tr>
<td>Who gave information</td>
<td>When patients have the capacity to learn</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Conflicting information between who was delivering material</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Hospital information</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>Hospital information that did or did not add to understanding of heart disease</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Hospital information that influenced management of illness</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Impact of hospital education</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Out of hospital Information</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>GP*, GP clinics, primary health</td>
<td>14</td>
</tr>
<tr>
<td>Inductive code</td>
<td>Sub-code</td>
<td>Number of times concept captured in transcript</td>
</tr>
<tr>
<td>----------------</td>
<td>----------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Confusion and confidence around where to seek information from</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Information that contributed to knowledge around health</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Outpatient clinic or follow-up</td>
<td>9</td>
</tr>
</tbody>
</table>

*TV (Television) *HPC (Health care professional) *MH (Mental Health) *GP (General Practice)

7.1.3.3 Overview of Stage 3: Searching for Themes

In the third stage of Braun and Clarke’s (2006) thematic analysis framework, the focus shifts to the exploration and identification of themes. This phase commences after establishing an extensive list of codes and sub-codes. In this study, the facilitation of theme development was supported through the creation of mind maps, a comprehensive example of which can be found in Appendix S. These mind maps served as visual aids to amalgamate codes and deliberate over their potential to give rise to overarching thematic constructs.

This systematic process was executed independently for each focus group and interview dataset prior to all the qualitative data being integrated. Following individual analysis of the initial focus group by myself, a critical juncture was reached where collaborative engagement with the research team, consisting of research supervisors and a research assistant was vital. This collective discussion ensured consensus on the findings before proceeding with the analysis of subsequent transcripts. Next, I repeated this process for all remaining focus groups and interviews. To further support the robustness of the analysis, the research assistant independently examined the findings, reporting instances of concurrence or disparity with my analytical outcomes and overarching themes.

Upon the comprehensive completion of the deductive and inductive code mind mapping phase, the data underwent a process of synthesis into discernible
patterns. The codes were subjected to a rigorous review, with consideration given to their alignment with preliminary themes encompassing areas such as: understanding within the cardiac knowledge domains, confusion within the cardiac knowledge domains, enablers to understanding, barriers to understanding, checking of understanding, mental health implications, unmet educational needs, and the identification of further resources. These findings are systematically documented and presented in Table 7.3, contributing to the overall depth and clarity of the qualitative analysis.

**Table 7.3**

*Preliminary Thematic Themes*

<table>
<thead>
<tr>
<th>Understanding within the cardiac knowledge domains</th>
<th>Confusion within the cardiac knowledge domains</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exercise</strong></td>
<td><strong>Exercise</strong></td>
</tr>
<tr>
<td>- Understanding of what to do</td>
<td>- Lack of guidelines</td>
</tr>
<tr>
<td>- Relationship between exercise and recovery</td>
<td>- Psychological impact of confusing messages</td>
</tr>
<tr>
<td>- Self-management</td>
<td></td>
</tr>
<tr>
<td><strong>Lifestyle and Risk</strong></td>
<td><strong>Lifestyle and Risk</strong></td>
</tr>
<tr>
<td>- Awareness of risk factors</td>
<td>- Confusion about risk factors</td>
</tr>
<tr>
<td><strong>Nutrition</strong></td>
<td><strong>Nutrition</strong></td>
</tr>
<tr>
<td>- Awareness of nutritional management</td>
<td>- Conflicting advice causing confusion</td>
</tr>
<tr>
<td>- Links to heart health</td>
<td></td>
</tr>
<tr>
<td>- Self-management strategies</td>
<td></td>
</tr>
<tr>
<td><strong>Pathophysiology</strong></td>
<td><strong>Pathophysiology</strong></td>
</tr>
<tr>
<td>- Perceived knowledge of heart disease</td>
<td>- Developed misunderstandings</td>
</tr>
<tr>
<td><strong>Management of condition</strong></td>
<td></td>
</tr>
<tr>
<td>- Self-led</td>
<td></td>
</tr>
<tr>
<td>- Led by HCPs*</td>
<td></td>
</tr>
<tr>
<td><strong>Medication</strong></td>
<td><strong>Medication</strong></td>
</tr>
<tr>
<td>- Drug awareness</td>
<td>- Incomplete understanding</td>
</tr>
<tr>
<td>- Management</td>
<td>- Length of prescriptions</td>
</tr>
<tr>
<td></td>
<td>- Point of follow-up</td>
</tr>
</tbody>
</table>

**Enablers to understanding**
- Individualised guidelines
- Checking understanding
- Condition awareness
- Understanding of discharge management
- Safe for discharge
- Resources

**Barriers to understanding**
- Conflicting advice
- Social and psychological impact
<table>
<thead>
<tr>
<th>Understanding within the cardiac knowledge domains</th>
<th>Confusion within the cardiac knowledge domains</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Not checking understanding</td>
<td></td>
</tr>
<tr>
<td>• Information overload</td>
<td></td>
</tr>
<tr>
<td>• Capacity to understand</td>
<td></td>
</tr>
<tr>
<td><strong>Checking Understanding</strong></td>
<td></td>
</tr>
<tr>
<td>• Process of checking understanding</td>
<td></td>
</tr>
<tr>
<td>• No process of checking understanding</td>
<td></td>
</tr>
<tr>
<td>• Best place and time to check understanding</td>
<td></td>
</tr>
<tr>
<td><strong>Mental Health Implications</strong></td>
<td></td>
</tr>
<tr>
<td>• Emotional impact of CVD</td>
<td></td>
</tr>
<tr>
<td>• Delivery of mental health education</td>
<td></td>
</tr>
<tr>
<td>• Subconscious awareness of disease impact</td>
<td></td>
</tr>
<tr>
<td>• Conscious awareness of disease impact</td>
<td></td>
</tr>
<tr>
<td><strong>Unmet educational needs</strong></td>
<td></td>
</tr>
<tr>
<td>• Individual specifics</td>
<td></td>
</tr>
<tr>
<td>• Why me?</td>
<td></td>
</tr>
<tr>
<td>• Nutritional management</td>
<td></td>
</tr>
<tr>
<td>• Exercise management</td>
<td></td>
</tr>
<tr>
<td>• Medication management</td>
<td></td>
</tr>
<tr>
<td>• Further point of contact</td>
<td></td>
</tr>
<tr>
<td><strong>Further resources</strong></td>
<td></td>
</tr>
<tr>
<td>• Resources available</td>
<td></td>
</tr>
<tr>
<td>• Confusion over where to go next</td>
<td></td>
</tr>
<tr>
<td>• Confidence in further resources</td>
<td></td>
</tr>
</tbody>
</table>

*HCPC (Health care professional)

### 7.1.3.4 Overview of Stage 4: Reviewing Themes

Stage four, *Reviewing Themes*, was marked by a refinement process, which unfolded across two distinct levels. Upon identification of preliminary themes, and following extensive discussions with the research team, a refinement of these initial themes was commenced. The initial refinement took shape through a collaborative dialogue within the research team, where each member articulated their individual interpretations of the emerging themes. Subsequently, I assumed a central role in consolidating these multifaceted insights, reflecting upon the team’s discussions, and critically considering how the data aspects interconnected to weave a coherent narrative.

The second component of theme refinement was a tactile and manual process, manifested in the form of a 3D board (depicted in figure 7.2). This approach served
as a visual aid to explore the intricate relationships that underpinned the codes and their alignment with the preliminary themes. By leveraging this tangible 3D representation, I was able to gain a holistic perspective, facilitating a comprehensive understanding of how individual codes contributed to, or deviated from, the overarching thematic constructs. This multi-layered approach to theme refinement, characterised by both collaborative discourse and physical exploration, exemplifies the thorough and holistic nature of the analysis in this study.

Figure 7.2

Relationship Between Codes and Themes

Within the extensive amount of data gathered from the focus groups and interviews, recurring patterns formed, leading to several overarching themes. These emergent themes encapsulated aspects of the research inquiry. First, they encompassed the diverse ways in which cardiac knowledge was acquired within the cardiac domains, ranging from comprehensive understanding to partial or even misconceived comprehension. Second, they highlighted the significance of the ‘checking of understanding’ as a central concern. Additionally, the profound impact of the disease and the educational experience on individuals’ mental well-being
emerged as a significant theme. Furthermore, the analysis unveiled the phenomenon of information overload as a prevalent issue. Finally, the research exposed the existence of unmet educational needs and unresolved questions among patients, further enriching the intricacies of themes that underpinned the study findings. These overarching thematic constructs collectively offer a comprehensive lens through which to comprehend the multifaceted dimensions of the research subject.

7.1.3.5 Overview of Stage 5: Defining and Naming the Themes

Stage five involves defining, refining, and naming the identified themes. This intricate process centres on revisiting the dataset to discern patterns of consistency and variation, as explained by Braun and Clarke (2006). To initiate this phase, the overarching themes were systematically juxtaposed with the preliminary themes, allowing for the meticulous evaluation of coherence and discrepancies in the analytical decisions. This reflective exercise is documented in Table 7.4, where the interplay between overarching and preliminary themes are presented. The final step in this stage involved contextualising these themes within the context of the research
Table 7.4

Coherence Between Preliminary and Final Overarching Themes

<table>
<thead>
<tr>
<th>Acquisitions of Cardiac knowledge</th>
<th>Checking of Understanding</th>
<th>Impact on Mental Health</th>
<th>Information Overload</th>
<th>Unmet Educational Needs/Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise knowledge/deficit</td>
<td>Process of checking understanding</td>
<td>Emotional impact of CVD</td>
<td>Information overload acts as a barrier</td>
<td>Confusion over where to go next</td>
</tr>
<tr>
<td>Lifestyle and risk knowledge/deficit</td>
<td>No process of checking understanding</td>
<td>Delivery of mental health education</td>
<td>Capacity to understand</td>
<td>Individual specifics</td>
</tr>
<tr>
<td>Nutrition knowledge/deficit</td>
<td>Best place and time to check understanding</td>
<td>Subconscious awareness of disease impact</td>
<td></td>
<td>Why me</td>
</tr>
<tr>
<td>Pathophysiology knowledge/deficit</td>
<td>Capacity to understand</td>
<td>Conscious awareness of disease impact</td>
<td></td>
<td>Nutritional management</td>
</tr>
<tr>
<td>Condition management knowledge/deficit</td>
<td></td>
<td>Confidence in further resources</td>
<td></td>
<td>Exercise management</td>
</tr>
<tr>
<td>Medication knowledge/deficit</td>
<td></td>
<td></td>
<td></td>
<td>Medication management</td>
</tr>
<tr>
<td>Resources available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individualised guidelines</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.1.3.6 Overview of Stage 6: Producing the Report

Upon the completion of defining/naming themes, the subsequent and final phase of Braun and Clarke’s (2006) thematic analysis process is the production of a comprehensive report encapsulating the final themes and their nuanced insights. This concluding stage is presented in the forthcoming Section, 7.2, where the derived themes will be expanded upon, contributing to the comprehensive understanding of the research findings.

In applying Braun and Clarke’s six-phase thematic analysis framework to the current study, a rigorous and systematic approach was adopted to reveal rich insights from the qualitative data. The framework guided the progression from data collection to the identification and refinement of overarching themes, ensuring methodological rigor and alignment with the research question and aims. As this discussion transitions to presenting the qualitative findings, this robust process stands as a
testament to the thoroughness and depth of the analysis, providing a solid foundation for the forthcoming insights into the nuances of the research topic.

7.2 Reporting of the Qualitative Results

This section presents an exploration of the themes as identified through rigorous analysis. These themes are substantiated by quotes extracted from the transcripts, providing a layered understanding of the qualitative data. Tables 7.5 and 7.6 provide an overview of the demographics of the participants for a comprehensive contextual understanding. These demographic insights underpin the depth and intricacy of perspectives that inform the discussions.

Table 7.5

Patient Participants’ Demographics

<table>
<thead>
<tr>
<th>Participant Number</th>
<th>Age</th>
<th>Ethnicity</th>
<th>Gender</th>
<th>Patient diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1P</td>
<td>60-70</td>
<td>NZ European</td>
<td>Male</td>
<td>ACS*/CABG*</td>
</tr>
<tr>
<td>2P</td>
<td>50-60</td>
<td>South African</td>
<td>Male</td>
<td>ACS</td>
</tr>
<tr>
<td>3P</td>
<td>80+</td>
<td>NZ European</td>
<td>Female</td>
<td>ACS</td>
</tr>
<tr>
<td>4P</td>
<td>60-70</td>
<td>NZ European</td>
<td>Female</td>
<td>ACS</td>
</tr>
<tr>
<td>5P</td>
<td>50-60</td>
<td>Māori</td>
<td>Male</td>
<td>ACS</td>
</tr>
<tr>
<td>6P</td>
<td>50-60</td>
<td>NZ European</td>
<td>Male</td>
<td>CABG</td>
</tr>
<tr>
<td>7P</td>
<td>70-80</td>
<td>NZ European</td>
<td>Male</td>
<td>ACS</td>
</tr>
</tbody>
</table>

*ACS Acute coronary syndrome *CABG Coronary Artery Bipass Graft
Table 7.6

Staff Participants' Demographics

<table>
<thead>
<tr>
<th>Participant number</th>
<th>Years of experience</th>
<th>Ethnicity</th>
<th>Gender</th>
<th>Staff role</th>
</tr>
</thead>
<tbody>
<tr>
<td>1S</td>
<td>20+ years</td>
<td>NZ European</td>
<td>Female</td>
<td>Nurse</td>
</tr>
<tr>
<td>2S</td>
<td>20+ years</td>
<td>NZ European</td>
<td>Male</td>
<td>Allied Health</td>
</tr>
<tr>
<td>3S</td>
<td>10-20 years</td>
<td>NZ European</td>
<td>Female</td>
<td>Nurse</td>
</tr>
<tr>
<td>4S</td>
<td>20+ years</td>
<td>Māori</td>
<td>Female</td>
<td>Allied Health</td>
</tr>
<tr>
<td>5S</td>
<td>10-20 years</td>
<td>NZ European</td>
<td>Female</td>
<td>Allied Health</td>
</tr>
<tr>
<td>6S</td>
<td>20+ years</td>
<td>NZ European</td>
<td>Male</td>
<td>Doctor</td>
</tr>
<tr>
<td>7S</td>
<td>5-10 years</td>
<td>Nepalis</td>
<td>Female</td>
<td>Nurse</td>
</tr>
<tr>
<td>8S</td>
<td>20+ years</td>
<td>NZ European</td>
<td>Female</td>
<td>Nurse</td>
</tr>
<tr>
<td>9S</td>
<td>20+ years</td>
<td>NZ European</td>
<td>Female</td>
<td>Nurse</td>
</tr>
<tr>
<td>10S</td>
<td>20+ years</td>
<td>NZ European</td>
<td>Female</td>
<td>Nurse</td>
</tr>
<tr>
<td>11S</td>
<td>20+ years</td>
<td>British</td>
<td>Female</td>
<td>Doctor</td>
</tr>
<tr>
<td>12S</td>
<td>&lt; 5 years</td>
<td>NZ European</td>
<td>Female</td>
<td>Nurse</td>
</tr>
<tr>
<td>13S</td>
<td>20+ years</td>
<td>NZ European</td>
<td>Female</td>
<td>Nurse</td>
</tr>
</tbody>
</table>

7.2.1 Theme 1: Acquisition of Cardiac Knowledge

Analysis revealed the diverse perceptions held by participants regarding the extent of heart health knowledge that a new diagnosed patient with CVD possesses after their initial hospitalisation. At times there was concurrence and varied opinions described between participants, with particular divergence emerging between the patients and healthcare staff. The acquisition of cardiac knowledge was presented across the cardiac domains of knowledge: medical condition (including pathophysiology and medication understanding), risk factors, exercise, nutrition, and psychosocial.

7.2.1.1 Medical Condition

Interviews and focus groups explored participants’ understanding of their medical condition, encompassing aspects such as disease processes and medication management. Patient participants generally indicated limited pre-hospitalisation knowledge, with their awareness often growing or being reinforced during their
hospital stay. For instance, 7P remarked, “What I thought was indigestion and I thought oh that’ll go in a minute... I thought oh, I’ll go into the, 24-hour surgery and they’ll give me something to get rid of the indigestion”; while 4P stated:

I didn’t know I was having a heart attack even though, I knew things weren’t right. It was something that just told me I needed to call an ambulance because it just felt like indigestion more than anything. And my arms were heavy and, tingling at the finger tips and I thought no this isn’t right.

Yet another patient mentioned, “I’ve learned quite a lot already over that time you know um you chat just add a little bit more to your knowledge as you go long... Hospital largely, reinforced that, rather than gave me new information” (6P). This sentiment was echoed by three other patient participants (3P, 5P, 7P).

Staff perspectives on patient understanding varied, with most patients seen as having some level of comprehension, although misinformation or incorrect knowledge was also observed. Staff acknowledged that educational efforts often improved understanding, but some patients still struggled with grasping complex concepts. “Yeah and some people can tell me, other people are like oh I don’t know” (3S). For example, one staff member noted,

I think most people, have a view if they get told that they’ve had a heart attack they have a view of, well their own idea of what a heart attack is. It might not necessarily from the same perspective that we come from with it, but they have a view. (10S)

While another commented,

It’s such a wide range and it will depend very much on their condition. I think people with chronic conditions read quite a bit on the internet. It’s very hard for people to really understand it. They’re very difficult concepts. (6S)
Another staff member added, “It depends on the person. There will be exceptions anyway, like one or two persons that’s an exceptional case. But looking in general, I think it will, it usually gets better, better understanding after being admitted in the hospital” (8S), a view shared by three other participants (5S, 2S, 11S).

The discussion also touched upon medication understanding. Patients described the complexity and sheer volume of new medications as overwhelming. They highlighted the crucial role played by health care professionals in supporting their comprehension of these medications during their hospitalisation. Within the focus groups, patients often described their medication understanding at a rudimentary level, typically involving knowledge of some medication names and basic drug actions.

7.2.1.1 Overwhelming change

One patient expressed, “Obviously I’d had all these peripheral pills to take and I was taking those religiously. I didn’t quite know, really what I should know” (7P). Another patient remarked, “Like it’s about 12 different kinds of medications I’m meant to take for breakfast, I don’t know what else I was meant to have room for to eat at breakfast time it was all there!” (6P). 5P, who was initially resistant to taking pills, reflected,

I’m anti pill guy you know and now I have to take them because I know it helps certain parts of my body… I’m still in limbo at the moment you know like the pills I got I’ve never had so many in my whole life.

7.2.1.2 Professional guidance towards medications

Patients also reported on the guidance they received from health care professionals regarding their medications. Some expressed confidence in their health care providers, as 1P noted “He said we’ve done a study on older people, and he
said, it’s, better if we treat you, better outcomes, if we treat you with medicine. So that gave me a fair bit of confidence”. However, there were instances of anxiety, as a patient mentioned,

I didn’t get any info I don’t think on side effects but there was a sheet that talked of what the purpose of each was. And I felt a bit nervous going off them actually you know because after a certain time you just stop these. Oh, I felt a bit unsafe. (6P)

In contrast, others praised the quality of information provided, with one patient stating, “Information that I was given, was really, really good, even the medication information” (3P). Another patient appreciated the role of a nurse advocate, saying, “I’m glad I got a nurse advocate because she just tells me what each individual pill means to, to me” (5P). These viewpoints were reaffirmed by participants 4P and 7P.

**7.2.1.1.3 Drug action understanding**

Patients also revealed their understanding of the actions of their prescribed medications. For example, 1P shared, “These pills that they promote the growth of blood vessels and everything and they’re hoping that, if you take it – you’ll probably be on the same thing”. Another explained, “Yeah reducing the blood pressure and, and helping make the heart, make it so it works a lot easier. It doesn’t have to work as hard…. Oh, there’s one to stop clots and that forming on the stent” (2P)

Staff participants offered their insights into patients’ medication knowledge after their initial hospital admission. Similar to patients, staff acknowledged the variability in medication knowledge among patients. They recognised that patients received a significant amount of new information about their medications, often with family members involved in education and at home medication management. Staff
observations aligned with patient reports, indicating that while some patients possessed a fundamental understanding of drug actions, others did not.

As for the staff’s perceptions they discussed that patients were found to have minimal comprehension of the medications they were prescribed. For instance, 6S remarked, “They know very little, they really don’t understand. They think they take their cholesterol tablet to lower their cholesterol but they’re actually taking it to prevent heart attack and death or reduce their risk”. It was acknowledged that medications, especially their mechanisms of action, were challenging concepts to convey effectively. Despite health care providers’ efforts to educate patients, some patients still relied on their doctor’s recommendations without a deep understanding of the medications they were taking.

7.2.1.4 Knowledge varied

One staff member observed,

You might sort of enquire about what they know about their tablets and some people are amazing they say oh that’s this, this, this and this, they know all the doses, they know their names, they know what they’re for and other people they might be I don’t know what any of them are. (12S)

Another staff member emphasised the importance of patients understanding the necessity of their medications, stating, “Even if they don’t know what they’re for, that they’re going to take them, and if they’re not agreeing with them, to get help straight away not to delay. Not to delay getting help if they’re having symptoms” (8S).

In clinical practice, staff frequently encountered patients who were unable to identify their medications. As 11S shared, “Well as an example in clinic that I had yesterday morning, no patient, none of the patients knew what medication they were on. None of them! And that’s very common”. This lack of knowledge was attributed,
in part, to pronunciation difficulties. However, it was emphasised that patients who had interacted with health care professionals beyond doctors, were more likely to be more informed:

Certainly patients that have seen people other than just doctors, like the heart function nurses or the rehab nurses, they’re more likely to know what medication they’re on then somebody that’s just come in once and come back for a clinic follow up with no other interaction with anybody. (11S)

Participants 13S and 5S supported these sentiments and discussed the varied levels of knowledge towards medications.

7.2.1.5 Family support

In the context of medication management, the crucial role of family support emerged. Staff indicated that the patient’s family members, particularly spouses, played a significant role in sorting out and overseeing their medication regimens. As 12S noted, “Patients say my wife sorts it out”. Additionally, for heart surgery patients, it was observed that family members were instrumental in helping them remember their medication schedules. 1S mentioned, “I find with the heart surgery patients when I ring them after surgery they don’t remember their pills. Their relatives are helping them with their pills”.

Overall, these discussions underscored that both patients and staff recognised the limited knowledge that cardiac patients typically had before their hospital admission. However, patients indicated that their knowledge improved following their discharge. Both groups acknowledged the complexity of cardiac medications and how it could impact patients’ levels of understanding. The overwhelming amount of information patients had to navigate was also acknowledged as an obstacle towards medical condition understanding. Throughout the dialogue, the
recurring theme was the individuality of knowledge levels among patients, implying that a one-size-fits-all educational approach may not be effective. Participants also emphasised the importance of involving family or whānau in the educational delivery process.

7.2.1.2 Risk Factors

In addition to exploring participants’ perceptions of patients’ understanding of their medical condition, the focus groups and interviews inquired about patients’ comprehension of cardiac risk factors. During these discussions, patient participants identified several key risk factors associated with heart disease: family history, diet, exercise, smoking, alcohol consumption, and stress. Notably, family history was a prominent concern among patients, with many seeing it as a primary risk factor for the disease. However, there were evident knowledge gaps concerning other risk factors such as diabetes and high cholesterol levels. Some patients expressed surprise at experiencing a cardiac event because they believed they did not possess any cardiac risk factors or were implementing strategies to mitigate any risk.

7.2.1.2.1 Identification of lifestyle/risk factors

Patients shared their understanding of various lifestyle and risk factors related to heart disease. They acknowledged their awareness of the importance of diet and exercise, as 6P stated, “I knew about diet, I knew about exercise”. Another patient highlighted risk factors like smoking, drinking, and an unhealthy diet, saying, “Things like smoking and drinking. Wrong diet. And if something is very high in carbohydrates” (4P). Stress management was also recognised as a key factor, with 5P mentioning, “I don’t smoke cigarettes and things so you won’t have the nicotine blocking your walls and I try to avoid the stress factor”.

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Stress was also identified by staff as a commonly cited factor by patients when discussing the causes of heart issues. Even when patients had other evident risk factors like smoking, poor diet, or obesity, they often attributed their heart problems to stress. One staff member commented,

Many people will blame stress, will be the top of the list... they might be smokers, drink heavily, be overweight, have a terrible lifestyle, and all of that, but as far as they’re concerned, it was the stress that did it. (8S)

Patients frequently linked stressful events or periods to their cardiac disease.

7.2.1.2.2 Family history

Family history emerged as a significant concern for patients, with many revealing a familial predisposition to heart disease. One patient explained, “I mean I’ve got a long family history” (6P); while 1P shared, “My history is, my grandfather was 45, my father 41, my uncle’s 39 and another uncle, the other one 54, all dead of heart attacks”. Family history had a profound impact on patients’ perceptions of their own risk. As 7P expressed,

So, that sort of explains quite a lot, that I’ve got the family history of heart disease, so I thought oh okay but I didn’t know that. That’s filled in another gap for me. My lifestyle factor was hereditary and that was it.

However, there were exceptions, as 2P stated, “I’ve no family history, no prior symptoms”.

Staff participants also discussed how patients perceive family history and stress as major contributors to cardiac risk. They reported that some patients recognised the influence of genetics on their heart health and expected heart issues due to a family history of cardiac problems. For instance, one staff mentioned that a patient stated, “I knew I was going to have a heart attack because my brothers have
all had it, my dad had it” (12S). However, staff also recognised that there were patients who primarily attributed their heart issues to hereditary factors rather than considering their own lifestyle choices. As 7S noted, “They’re not thinking about what they have done, what sort of lifestyle they are expending, rather just the hereditary one”.

7.2.1.2.3 Discussion that suggest gaps in understanding of risk factors

Despite their awareness of some risk factors, there were notable knowledge gaps among patients. For example, one patient was surprised to learn about their high cholesterol levels, saying,

I asked him [GP] what my cholesterol level had been over the last, 3 or 4 years, and they were up around six. Which I understand is pretty high, but he [GP] had never mentioned that it was high. I guess with the build-up cholesterol that high, ended up causing blocking the artery and now I have to have a stent. (4P)

Another patient expressed similar sentiments about their cholesterol levels, stating, “I didn’t know I had cholesterol until they gave me sheets in the hospital laying everything out... I knew I was eating too much chocolate but um” (3P).

Furthermore, a patient who had been diagnosed with type II diabetes a decade prior raised questions about their heart attack, emphasising the lack of family history and prior symptoms. They remarked,

10 years ago I was diagnosed as a type II diabetic. And, since then it’s, cholesterols and sugars and have all been relatively well controlled. Until, 4 weeks ago, something was ripping my heart out of my chest. I’ve no family history, no prior symptoms… the bit that scared me and most of the family is,
I was pretty much doing the exercise and diet bit already because I’m diabetic. And why, all of a sudden do I have a heart attack?” (2P)

These discussions underscored the multifaceted nature of patients’ understanding of cardiac risk factors. While some risk factors were well recognised, such as family history, patients often exhibited gaps in their knowledge, particularly regarding conditions like high cholesterol and diabetes. These findings highlight the importance of comprehensive patient education and individualised risk assessments in managing cardiac health.

7.2.1.2.4 Sense of disbelief

Several patients expressed a sense of disbelief regarding their cardiac condition due to their healthy lifestyles. They believed that their active routines and absence of habits, like smoking and excessive drinking, would safeguard them from illness. One patient remarked,

I was sort of, won’t happen to me because I run marathons, I didn’t give up rugby until I was 43 and I was still pretty fit… Of course, they always ask do you smoke and do you drink and I said well I’ve never smoked you know. I don’t drink much either. (1P)

Another patient noted, “You never think you’re going to get sick because you’re so fit, you don’t smoke, you don’t drink and you know all that thing... you know Māori men they just eat anything on the trot and just think they can burn it off” (5P). These sentiments highlighted the common misconception that a healthy lifestyle alone guarantees immunity from cardiac issues.
7.2.1.2.5 Perceptions that people have a good level of knowledge of risk factors

Staff members expressed differing perspectives on patients’ level of knowledge regarding risk factors. One staff member stated, “It’s variable, I think it’s variable depending on the person’s experience” (3S). Another staff member noted, I just think that, people grow up in New Zealand and we, we all get the messages. About lose, keep your weight down, exercise you know, live in a healthy way so people know that stuff. It’s not like it’s a surprise. But I think, there’s a kind of gap in actually seeing, really the true benefit. (9S)

While acknowledging that patients might not know specifics, staff members believed that patients generally understood the importance of factors like diet, exercise, and weight management for heart health. They noted, Definitely know about smoking and that they’re always quite fixated about diet and weight. Even if they don’t actually do anything about it and exercise. I think those would be the main things… I do think they do know, even if they don’t know specifics, they do know that those things are important for heart health. (11S)

I think they know quite a lot about that because that’s been drummed into especially if you’re talking ischemic heart disease, so everyone knows you should exercise and eat less and lose weight. And everyone’s known that for decades, particularly older patients know that… I think people have a pretty good understanding of healthy lifestyle, they might not know much about their disease but everyone knows you should eat less and exercise more… And not smoke, you know everyone knows that. And there’s no one I tell that
stuff to, you know every clinic, every patient, I’m always telling them that stuff and they all know it. (6S)

These discussions highlighted the contrast between patients’ initial disbelief of developing heart conditions and staff members’ recognition of varying levels of patient knowledge. While patients with healthy lifestyles often found it hard to accept their cardiac issues, staff members emphasised that patients did generally grasp the fundamentals of heart health risk reduction.

Regarding cardiac risk factors, both patients and staff generally believed that patients had a good understanding of them. However, there were indications that some gaps existed in this area. For instance, patients did not always recognise the significant link between a history of diabetes and heart disease. These discussions suggested a potential gap between knowing the risk factors and knowing how to practically implement meaningful risk reduction strategies.

7.2.1.3 Exercise

The discussions surrounding patients’ levels of understanding in the context of exercise revealed some disparities between patients and staff. While some patients expressed anxiety about resuming exercise (see section 6.2.3), others reported receiving clear exercise plans. However, confusion arose for some patients when they perceived the exercise programmes as lacking clarity and relevance to their individual circumstances which lead to patients taking the initiative to self-manage their exercise resumption.

7.2.1.3.1 Programme clarity

Patients reported receiving information about exercise resumption,
When it was time to talk about going home, I was very impressed with all the information that I got. The physio put me in my place good and proper about exercise. Told me that I was not allowed to exercise like I had been, for some time. (3P)

While other patients shared their experiences and concerns about the clarity of exercise programmes provided while in the hospital. Some patients expressed confusion and uncertainty regarding the exercise plans they received. For example, 6P mentioned,

“Our talked of pushing yourself with exercise and that was always a question I felt, if I’m pushing myself and my pace of walking, or will go up a slight slope oh you ran out of breath so quickly… Yeah so do I stop or should I push myself to expand my capabilities again? My wife said, go slow. My instinct said push yourself a bit. Like coming in today it’s 10kms and I biked in.

Another patient cited a lack of clarity in the exercise plan,

In one of the documents that the physio gave, there’s this scale of 1 to 10 of ‘effortness’ if I can use that word, and you need to aim for 3 to 6 or don’t go beyond 6 or something like that. I’m going back to the analytical mind, how do you put that perspective into real terms? (2P)

These statements from patients, which were supported by participants 7P, 1P and 5P, indicated that while they received exercise programmes, they often found them difficult to interpret and apply in practice.

In contrast, staff described the provision of education to patients as an organised process. They mentioned that patients with heart attacks or heart surgery
received clearly defined pathways of information about what to expect during their recovery,

I think with people who are in hospital for treatment too with some conditions there’s quite prescribed pathways of information that are given. So, people have had heart attacks or heart surgery, there are clearly defined pathways… then people get hooked into cardiac rehab and they go along to the programmes and they’re supported. (9S)

This perspective was supported by another staff member’s discussion,

Again, it depends what they’ve come in with; so if they’ve come in with a heart attack and they’ve had bypass surgery, they’re given an exercise programme to follow. If they come in with a heart attack and they either just have the pills or they have stents then they go to rehab but the rehab kind of kicks in several weeks after. They will have seen a rehab nurse in hospital, so they will have been given some advice of about how to gradually build up their exercise regime. (11S)

Furthermore, staff emphasised that tracking of patients’ progress during their initial days at home supported their exercise knowledge,

We track them, I track them for the first 10 days at home and usually, people do small frequent walks because they’re anaemic and they couldn’t do a big one even if they wanted to. And then, usually at 10 days afterwards they can go, you know up to 20, 30 minutes easily for, the majority. (1S)

However, some staff recognised that the shorter hospital stays posed challenges in delivering comprehensive education, as 5S mentioned, “People’s stay is much shorter now... So, the pamphlet that we, give out which is called ‘rest and exercise after a heart attack,’ I basically stick to that”.
7.2.1.3.2 Individualised pathways

Some patients reported feeling more confident in their exercise routines after specific tests, such as stress tests, which helped them better understand their physical limits. For instance, 7P stated, “I felt a lot more confident after the stress test... that gave me a bit of confidence”. Additionally, patients who were accustomed to active lifestyles expressed concerns about how their previous exercise habits aligned with the recommended guidelines: “Then being quite active and hiking previously my striding out is quite astronomical it’s almost a run. But yeah, how is that fitting in terms of what they’re expecting and what I should be able to do” (2P)

7.2.1.3.3 Perceived discrepancies in exercise guidance

The qualitative findings revealed a notable lack of international guidelines for exercise resumption. One healthcare staff member candidly expressed,

It’s actually really difficult to get exercise prescription information from anywhere in the world. We’re all kind of a bit grasping at straws, but we know it’s really important initially to rest and exercise little and gradually build it up. Some people do get into a bit of strife by exercising twice as much as what they’ve been advised to and then feeling terrible. (8S)

This statement underscores the challenge of obtaining comprehensive exercise guidance and the potential consequences of misunderstanding.

Additionally, another staff member highlighted the common misconception among patients, stating, “Yeah I think some of the time people don’t realise that their day-to-day activities, just what they do in a day, you know getting up, feeding their cat, putting the washing out, that’s all part of exercise” (13S). This observation suggests that patients may not always recognise the full scope of physical activity in
their daily lives, potentially affecting their exercise routines. Education comprehension is consolidated in the rehabilitation setting:

Patients tend to go on what they feel like they can do. Actually. It’s in, the cardiac rehab environment, you know they attend the exercise classes afterwards, I see most of them the people who are there engaging keenly in it. (2S)

There was dissonance between the patients and staff findings about the clarity of exercise pathways. Whilst staff perceived that patients were presented with good guidelines and, therefore, had good understanding in this area, patients reported apprehension. This confusion was directed towards resuming exercise and may reflect reduced confidence and anxiety rather than levels of understanding.

7.2.1.3.4 Self-management

Several patients described their self-management of exercise post-discharge. They mentioned receiving detailed exercise programmes but adapting them to their unique circumstances, such as incorporating physical work into their routines. One patient explained,

I was given like an exercise programme as well where it said for the first week after getting home you walk for at just a relaxed pace for about 10 minutes. And then, do that for the week and then you increase it, for another 5 minutes and then you pick up the pace so it was sort of like a detailed exercise programme and I thought well if I was in town and, I only had a little pocket handkerchief section that I lived on then I could go and do that…. I’m doing a lot of physical work, a lot of lifting, a lot of carting, a lot of, walking. And I’m thinking well that, that’s just going to have to be my exercise… I haven’t had any adverse effects since I’ve started doing that, so as far as I’m
aware, I’m getting my exercise. I haven’t, I’m not feeling anything in my chest because I’m doing that, the way I’m doing it. So, nothing’s indicating that I should stop. (4P)

Another patient talked about adjusting their walking pace to match their comfort level:

They said to stroll, 5 minutes, 10 minutes, 15 minutes, well I’d never done 5 minutes in my life since I’d started to walk, but I didn’t even know how to stroll but I just slowed down, walked back inside again and as I get, up the chain to move a bit more, I find I’m going flat out instead of taking an easy walk. So, then I’ll slow down again. (3P)

In contrast to patients’ perceptions of exercise programme clarity, staff members believed that patients generally understood the benefits of exercise in preventing CVD. They noted that patients received education on this topic while in the hospital. However, staff acknowledged the need for individualised education and reported that patients might be anxious about exercise post-discharge. Staff considered cardiac rehabilitation classes as valuable resources for providing ongoing support in this area.

7.2.1.3.5 Knowledge around benefits of exercise

Staff offered differing perspectives regarding patients’ understanding of the benefits of exercise for heart health. Staff members generally believed that patients had a reasonable grasp of these concepts,

I think they know quite a reasonable amount, they know about Green Prescription, well a lot of my patients do. They know that even to do stuff, the small amount of exercise that it’s about consistency and regularity rather
than the amount. So, doing something rather than nothing. Exercising to
symptoms so knowing that if they have symptoms. (3S)

Staff also highlighted patients’ awareness of guidelines and the guidance
provided by physiotherapists:

I think majority, you’d like to think, the majority of people are aware of the
pamphlet and information that they’ve been given by the physiotherapist or at
least that there’s a guideline… think sometimes that guidelines don’t
necessarily cater, not as individualised, sometimes as they could be and so I
think some of them must go home and think what?!, when they get 5 minutes
three times a day and that sort of thing. (10S)

Another participant reported, “I just think that that’s a message that people get
through public, the media a lot. So, I think there wouldn’t be many people that
wouldn’t, recognise that exercise is beneficial” (9S), a sentiment shared by 2S.

Qualitative findings revealed mixed patient perceptions of exercise
resumption knowledge and importance. Some patients grasped the significance of
gradual resumption, while others felt uncertain. A disconnect existed at times
between patient and staff perceptions, potentially due to patient anxiety, emphasising
the need for more personalised education.

7.2.1.4 Nutrition

Patient focus groups extensively explored the concept of a cardioprotective
diet and participants’ understanding of it. However, it was clear that guidelines in
this regard were often perceived as confusing, primarily due to their changing nature.
These discussions also investigate the perceived impact of dietary choices on
managing CVD. Notably, the second patient focus group placed a stronger emphasis
on nutrition discussions compared to the first. It is worth noting that the first group comprised exclusively of male participants, while the second group included both female and male participants.

Within these discussions, some participants revealed that they entrusted meal management to a family member. In contrast, others expressed a desire for more comprehensive education regarding nutritional recommendations. This diversity of perspectives highlighted the complex interplay between patient understanding, dietary choices, and the need for clearer guidance in managing cardiovascular health.

7.2.1.4.1 Nutritional understanding

Some participants expressed a proactive approach to dietary changes, such as adopting more plant-based diets and reducing red meat consumption:

One thing I’m changing more now probably is I’m going more plant-based diet. I’m, I mean generally we only have chicken and fish mainly, very rarely do we have red meat. Probably once a week if that, mostly it’s either vegetarian, chicken or fish and it’s mainly, mainly just salads. So, I’ve changed that. (4P).

Others referenced external resources like the Heart Foundation booklet and online sources to gain insights into heart-healthy food choices:

Oh it [Heart Foundations booklet] just tells you what, what’s good for you and what’s not good for you and when you cook chicken anymore you just take the skin off and all that kind of stuff but it shows you in the video anyway. (5P)

They also mentioned seeking information about foods known to reduce cholesterol levels:
Because I looked up you know the, foods that are known to sort of help reduce cholesterol like your good fats, like avocado and your olive oil and you’ve got um, oats I believe is very good um. And all these sort of things.

(4P)

Participants indicated a willingness to explore further dietary changes based on their evolving nutritional understanding: “If I’ve still got high cholesterol after cutting out sweet food that I’ve been eating, then I would perhaps look at that website and see what help it could give me” (3P). Additionally, there was an awareness of the significance of vegetables in their diet, “Half your plate should be vegetables” (7P). These discussions reflect the diverse approaches and knowledge levels regarding nutrition in the context of heart health.

Health care staff also shared their perspectives on patients’ dietary knowledge and understanding. One staff member noted, “I think they have a reasonably good understanding, there’s so much information out there, there’s so many different diets being promoted and I think in the end, everyone just knows they should just be, you know, doing something” (6S).

However, staff also recognised variations in dietary knowledge among patients. Another staff member explained,

I think everybody knows they shouldn’t eat a lot of junk food or a lot of sugar but beyond that, you kind of get two extremes. People that just don’t, don’t really know what a healthy diet is. Ah and people that are absolutely obsessed with having a healthy diet that, that’s going to be how they fix their heart… I think the knowledge of, what a general healthy diet is, is probably fine. But, just specific areas are probably where people are lacking a bit of information
and then like I say the people that are really obsessed with, weird and wonderful regimes! (11S)

Furthermore, staff members observed that some patients were more conscious of certain dietary aspects, such as fats. One staff member stated,

I think they kind of get that somehow or rather fat’s a bad thing. But I don’t know how sort of well-directed it is. It varies. Often I find the one who’s, you know, the supportive partner, next of kin, desperate to save their life by only feeding them the right things, it’s a completely natural reaction and, then you meet others who ‘oh we eat pretty well’. (2S).

This quote suggests that while staff belief patients generally understood the importance of reducing fatty and unhealthy foods, the depth of their knowledge varied.

7.2.1.4.2 Dietary confusion

Participants expressed feelings of uncertainty and confusion regarding dietary choices, particularly in relation to managing high cholesterol. One participant shared, “I was doing a lot of that beforehand but my cholesterol was still high so, it’s hard to know you know, what else I could do diet wise” (4P). Additionally, the ever-changing dietary guidelines, such as recommendations on egg consumption, were a source of bemusement for some participants, as 6P stated,

And there were odd things happened like when you talk of diet, the eggs were out and then eggs were in and now it’s three a week…. There’s other things that don’t change too much in, in the diet kind of prescription, but that’s one I’ve noticed bit comical really, some things come and go.

Staff members acknowledged the prevalence of confusing dietary advice and the abundance of dietary literature. One staff member noted, “Especially with diet
there’s a lot of really confusing advice out there. You know there are so many diets” (9S). This complexity was further compounded by the unrealistic nature of some dietary recommendations, as another staff member explained, “There’s a lot of literature around, you know, supposing healthy eating... And that which is just not obtainable for a lot of the patients. So, you have to be realistic as well with your advice” (10S). These sentiments were supported in views similarly expressed by participants 3S and 1S. Staff recognised that even within the medical profession, there could be differing opinions on dietary recommendations contributing to patients’ confusion.

7.2.1.4.3 Need for more dietary education

Several participants emphasised the need for comprehensive dietary education. Some felt that they lacked sufficient knowledge about cardioprotective diets. One participant mentioned, “Having a dietician that can sort of go through all the different sorts of foods that would help” (4P); a sentiment shared by 5P, “Asking how was your diet, what was your diet prior to having that”. Discussions indicated an appreciation for the value dietary information would bring to cardiac rehabilitation. For example, 4P stated, “I actually feel that that’s really good information, that people should know”. However, not all participants shared this sentiment, with one participant expressing, “I don’t feel I want to talk to somebody more about diet” (3P).

Healthcare staff provided their insights into patients’ experiences with dietary education. One staff member highlighted a shift in approach:

I think it’s actually easier for patients now than what it was 5, 10, 20, definitely 20 years ago, because it was very prescribed in those days...

Whereas today my approach to it is, unless somebody’s got specific dietary
needs, is to take a much more holistic approach to it and go more down the sort of clean eating, less processed sort of thing rather than saying you must not eat this or you must not eat. (10S)

Another staff member emphasised that patients often expected complex dietary instructions, but the focus was on promoting a healthy, balanced, and less processed diet:

I think they expect we’re going to give them really complicated instructions and that we’re going to say you can never have chocolate again and you can never ever have takeaways. We don’t, we’re after that broad brush you know most of the time eating a really healthy, balanced, less processed diet. (8S)

However, staff acknowledged that some patients expressed a desire for more specific dietary guidance, with 8S noting, “Some of them want, prescription! we’ve got much, much broader actually”. The general discussion highlights the diversity of patient expectations regarding dietary education.

7.2.1.4.4 Family involvement/management of nutrition

Some participants reported that family members played a pivotal role in managing their diets. One participant noted, “My wife keeps me on a strict sort of, what I can eat” (1P). This quote highlighted the significance of familial support and involvement in dietary choices among patients.

7.2.1.4.5 Perceptions of diet influence on cardiac event

Patient participants in the focus groups shared their perceptions about how their diets influenced cardiovascular events. One participant reflected on past dietary habits:

I found out later on what my biggest problem is. I wasn’t eating properly for like the amount of energy I was using. I wasn’t putting enough food in me
to… I was grabbing stuff like pies and chips and all that and it wasn’t helping but I was naïve to all that… I’m on a baby diet now bugs bunny and all that kind of stuff you know I’ve sort of gone backwards. (5P)

This quote highlights a shift towards healthier eating habits following a cardiovascular event.

Another participant expressed a desire for more dietary guidance from health care providers:

I could have used some of the foods that help reduce cholesterol to start bringing it back down but he [GP] never said anything… I’ve got a heart attack and the surgeon said that generally a Mediterranean diet is very good because it’s high in good fats and you know like salmon and olive oil and all that sort of thing and the foods are whole foods and all that. (4P)

This quote suggests that participants were receptive to dietary recommendations but felt they lacked timely guidance.

Lastly, 3P acknowledged the impact of dietary choices on their health:

I thought I was this, fit old tart, I didn’t have to worry about eating too much chocolate and I knew I was eating too much chocolate… Because I thought when I got to 80, I thought well I’ve had a pretty good life and, perhaps I’ll just eat a little bit more chocolate than I used to eat and um that wasn’t wise. And I know now it wasn’t wise.

This quote underscores the realisation of the consequences of dietary choices on cardiovascular health.

In general, staff communicated that patients had good understanding of what constitutes a suitable diet. They felt this was due to the large amount of resources available to patients. However, some staff reported that the overwhelming amount of
information, which is often conflicting, can be confusing for patients. Staff also identified that dietary changes and recommendations can be an emotional experience for patients and relatives (see Section 6.2.3).

In summary, staff highlighted a shift towards a more holistic and less prescriptive approach to dietary education. They acknowledged the prevalence of confusing dietary advice and the challenges of providing realistic guidance. While staff generally believed that patients had a good understanding of dietary practices, patients expressed a desire for more education in this area, indicating potential discrepancies between perceptions. Both patients and staff recognised that nutrition could be a source of anxiety for patients due to the abundance of dietary information available.

7.2.1.5 Psychosocial

One consistent theme that emerged from both staff and patient focus groups and interviews was the limited coverage of the psychosocial impact of heart disease during inpatient education. Participants, including patients and staff, indicated that psychosocial education was not a prominent focus during initial hospital admissions. Instead, it was seen as more suitable for addressing in outpatient clinics or cardiac rehabilitation settings. Some participants even expressed concerns that introducing more psychosocial education during hospitalisation might lead to distress. Although both patient and staff participants testified that they did not feel psychosocial education was a priority during the inpatient admission, a number of discussions throughout the focus groups and interviews reflected the impact of heart disease on mental health (covered further in Section 6.2.3).
7.2.1.5.1 Patient experiences of mental health education

They didn’t talk about that in hospital other than some particular little things like you might find you’re a bit forgetful for a few days or even longer. Or you might find there are personality mood swings without talking about what those might be like. So, your poor partner is meant to cope with these somehow while they’re stressed out themselves. And just some vague statements like that. (6P)

This experience of 6P was supported by 2P

I think it was something that was highlighted, in our brief mental health scenario. And if there were deepening challenges in mental health that there are psychologists and therapists available if we needed to contact yeah. It was vague, it was general, generic almost. Wasn’t much information given on what are these ups and downs, what are they going to be.

Patients also expressed that it was not something that concerned them in hospital,

I can’t recall getting any information on it they may have talked to me about it but I just thought I’m not worried about that. I don’t know. I mean I don’t think I’ve had any issues up till now so I haven’t actually thought about but now I might! (7P)

Participants 4P and 3P supported the above sentiments. Overall, patients perceived a deficiency in psychosocial education during the hospital stay. However, they acknowledged that the initial hospitalisation may not be the ideal time to receive extensive psychosocial information and support.

7.2.1.5.2 Staff experiences of providing mental health education

Staff experiences with providing mental health education revealed varying practices. As 3S explained,
I talk to realise that they could have an array of emotions that it often is a shock, a surprise. And sometimes they just want a bit of time to be able to retreat in themselves to think about it. For some people it’s exacerbating an underlying psychological concern. But I spend time talking about the reality, it’s like any injury you know there’s the potential to feel a bit sad about that or a wee bit anxious.

Another participant also discussed the limited inpatient education and that education mostly occurs in the outpatient programmes,

Oh not much I suspect. I address that in the phase two rehab class that I teach, every 6 weeks, or have done for a number of years. I tried to, normalise the, sort of psychological shock, the sort of frightenness the scaredness, the feeling down about it. (2S)

Another staff member empathised the need for improved mental health support in the hospital setting,

So, I think that kind of aspect of people’s care their mental health isn’t really well catered for. We need a lot more support in hospital so people who have difficulty dealing with grief around their own illnesses or their things going on with their family. (9S)

A staff member also reported uncertainty towards standardised practice,

I don’t know to be fair. I don’t know what the rehab nurses will say to the patients before they leave. I don’t think any of the medical doctors would talk to inpatients about that. But I certainly do when they come back to clinic often, especially young people that have had a heart attack that is like unexpected or something… we do have a clinical psychologist attached to our
team which we do use for people that are having trouble coping with a new diagnosis or the heart implications of their condition. (11S)

The above sentiments were supported by 6S.

7.2.1.5.3 Participants’ perceptions of the impact of providing mental health education

Patients and staff had mixed perceptions about the potential impact of providing mental health education during the initial hospital admission. Some patients expressed concern that addressing mental health at this stage might add stress to an already challenging situation. One patient stated, “Yes, I say with a little bit of hesitation because I think it, would probably put a bit more stress on to the mind, this is what you’re going to be or can be expecting” (2P). Another patient, reflecting on this discussion, mentioned, “I was reasonably happy with what I had. Ah, the fact that you’re raising it as an issue today makes me start to think perhaps I should have had more. Perhaps I should be more self-aware or something now” (6P).

Staff members recognised the potential psychological impact of a heart disease diagnosis but felt that patients might not expect this aspect to be addressed during their short hospital stay. One staff member noted, “I think if you went in cold and said do you think this will have an impact on you psychologically? I don’t know whether they would expect that” (10S).

Staff also emphasised that mental health support might be necessary for some patients, especially those in denial or facing anxiety and stress:

I think if you ask them as they’re leaving, what do you know, is there anything else you’d like to know, a lot of people would say, no, no, that’s it. But those sorts of things about am I going to die they wouldn’t voice that, they wouldn’t say to you. (10S)
To mitigate the potential impact on mental well-being one staff participant talked about involving the family, “Basically they are anxious and worried is what they say. And I never educate anyone without their relatives. Because they’re stressed and they’re not knowing what to look for” (1S).

Despite acknowledging the mental health impact of heart disease and its treatment, patients and staff seemed to agree that discussing these issues during the initial hospital admission might not be the most appropriate time. They suggested that this topic might be better addressed after discharge, possibly during outpatient clinics or cardiac rehabilitation. However, it was evident that the mental health impact of a new diagnosis and hospital admission was a recurring theme across several cardiac domains, highlighting the need for proactive mental health support in these contexts.

7.2.1.6 Summary of Findings for the Acquisition of Knowledge

The qualitative findings from the focus groups and interviews across the five cardiac domains of knowledge: medical condition, risk factors, exercise, nutrition, and psychosocial risk, reveal valuable insights into the experiences and perceptions of both patients and staff. Participants demonstrated a varying degree of understanding across these domains. While patients generally had a reasonable grasp of their medical condition and some risk factors, there were notable gaps in their knowledge, particularly concerning pathophysiology and medications. Exercise and nutrition were areas where patients often expressed confusion, emphasising the need for clearer guidelines and more individualised education. Importantly, psychosocial aspects, such as mental health, were not extensively covered during the inpatient education, but both patients and staff recognised the potential impact of heart disease.
on mental well-being. These findings underscore the importance of tailored, comprehensive, and ongoing education in all these domains, both during and after hospital admission, to better support patients

7.2.2 Theme 2: Checking of Understanding

The consensus among both patients and staff within the hospital setting was that knowledge was checked. This crucial aspect of healthcare delivery was observed to be multifaceted, with distinct approaches which, in turn, influence the perception of the level of comprehension attained. Among health care professionals, some adopt proactive strategies such as the ‘teach back’ or ‘tell back’ methods as integral components of their practice to ensure effective knowledge transfer and understanding. Others opt for a more organic approach, where the assessment of comprehension naturally unfolds during opportunistic conversations while administering nursing care. Nevertheless, an overarching observation emerged, indicating that, as a general practice, knowledge evaluation predominantly revolves around a simple yet crucial question: ‘Do you have any questions?’ This query serves as the gateway to further tailoring educational interventions to directly address the needs and queries of patients, underscoring the patient-centric approach to care delivery.

7.2.2.1 Patients’ Perceptions Towards Checking of Understanding

In examining patients’ perspectives regarding the assessment of understanding during their hospital experiences, a spectrum of insights emerged. One patient described a nuanced timeline, “Probably not while in hospital but certainly it was two weeks after, we visited the outpatient rehab nurse and yeah, she was quite specific on asking have you understood” (2P). Another patient recounted an
experience wherein health care professionals posed straightforward queries, mainly revolving around the presence of questions. “I think they just asked me if I had any question so that was probably you know have you got any questions” (7P).

Another patient provided a unique perspective, highlighting the distinction between asking questions and genuinely checking understanding:

I’m too frightened to and I’m spaced out I’m not in a position to take stuff in. I don’t know if there’s an easy answer to that one. But, that question is quite different from, saying, now can you tell me, what you understand is going to be happening to you in the operation? Can you tell me, what you expect, what support is available to you when you leave hospital? That, that’s checking the understanding isn’t it? Rather than just saying questions. (6P)

One patient reported a positive experience wherein the health care professional adopted a meticulous approach. They recounted that the nurse repeatedly inquired about their comprehension, extending it to various aspects of their care, reinforcing the idea that comprehensive assessment was vital:

Yes, I think they did, well she asked me, she said do you understand what I’m saying or have you got any questions if you’re not sure. And she went, kept asking that all the way through the information around, you know my exercise programme and what the medication was and did I understand what it was for and how did it work. And she kept saying do you understand any of all this information. Have you got any questions you’d like to ask so, yeah they were very thorough that way as well. (3P)

These patient narratives underscore the multifaceted nature of assessing understanding in the hospital setting, highlighting the importance of timing, clarity, and comprehensiveness in patient-centred care.
7.2.2.2 Staff Perceptions Towards Checking of Understanding

In exploring the perspectives of health care staff on the assessment of patient understanding, a variety of approaches and insights came to light. Staff participants recognised the importance of fostering a feedback loop with patients to effectively gauge comprehension. For instance, 3S stated,

I often ask them to share with me what they think they’ve understood from that. So, getting them to feedback… that feedback loop and also asking them to identify were there any aspects of what we talked about you feel like you’d like to go back over again.

Another approach mentioned by staff involved straightforward inquiries to patients about their comprehension and needs: “Yeah, ask them whether they have any questions, whether they understand, whether they want to feedback, add something, whether they wanted to know something, yeah just check in with them” (7S).

Beyond formal interactions, health care staff also identified the value of seizing ‘teachable moments’ during daily care routines to assess understanding. These moments allowed staff to discuss key aspects of the patient’s care and gauge their grasp of critical information. As 9S described,

There are always the little teachable moments like in the shower and you know when you’re making someone’s bed and you can have those little conversations like you know. When you go home if you were to get bad chest pain like this again what would you do? And so that you know they might say oh well I’ll get my spray, and how would you use that? So, there’s the opportunity to test their understanding so sort of figure out where gaps are if there are any.
While assessing understanding, staff typically adopted an approach that encouraged patients to ask questions rather than subjecting them to formal testing. As 11S explained, “I tend to repeat myself and then ask if they have any questions...I hope that they’re going to ask me if there’s anything that they don’t understand.”

Moreover, health care staff observed that various factors could influence a patient’s capacity to understand, impacting the effectiveness of assessments. They emphasised the significance of considering factors such as patient literacy, especially in culturally diverse contexts, before making assumptions about the ability to comprehend written resources.

7.2.2.3 Assessment of Health Literacy

Discussions explored the crucial role of assessing health literacy when evaluating patient understanding and tailoring educational approaches. Health care staff recognised the significance of creating an open and relaxed environment to facilitate learning:

I think because no one’s going to learn anything if you’re all uptight. And also figuring out if they can read and write and understand the language or do they need an interpreter and do we need to look at other ways to teach so.

(8S)

Furthermore, staff members acknowledged the importance of recognising patients’ literacy levels, even though it might not always be feasible to directly ask about their reading and writing capabilities. As expressed by 5S,

You can’t ask someone if they can read and write but it would be nice to be aware of those, and occasionally you do see it that they aren’t able to read or write. So, you can do a lot more verbal stuff or get someone else from the
family in to make sure that, you know they’re fully educated as much as possible.

Highlighting a poignant example, 9S recounted an encounter with a patient that challenged their assumptions about literacy. This experience underscored the necessity of not making assumptions about patients’ literacy levels based on appearance or age:

There’s also, also the assumption that people can understand those resources, that they can actually read because I’ve certainly had the experience with a young guy in his 30s, who I thought looked to be educated and you know capable and he actually was illiterate and I was so shocked when he admitted that to me. (9S)

These insights underscore the importance of assessing health literacy as a fundamental component of understanding assessment and the necessity of adapting educational approaches to accommodate diverse literacy levels among patients.

7.2.2.4 Impact of the Hospital Environment

The hospital environment emerged as a significant factor affecting patients’ and staff’s ability to assess and comprehend information effectively. Patients, in particular, noted that the overwhelming nature of the hospital experience often led to an initial difficulty in absorbing information. One patient shared their experience:

Before I was discharged, I had quite a few people come down and talk to me about what was happening and what was going to happen. Um I don’t know if I really took a lot in but they gave me a lot of information and it was only after I left the hospital that I had a lot of time to myself that I actually read right through it and I read through it probably a couple of times just to try and
understand what I should be doing in the way of exercise because that was my main concern. (7P)

Another patient echoed this sentiment, emphasising the need for a quiet environment to process the influx of information: “I think what happens is you’re getting a hell of a lot of information and it’s just you got to sit down and, quiet time and sort of have a look at it you know” (1P).

Additionally, staff recognised that the hospital environment itself might not always be conducive to absorbing new information. The limited time available for education, diverse approaches to checking understanding, and the level of comfort patients felt in asking questions were all identified as factors influencing comprehension. These insights shed light on the diverse strategies employed by healthcare staff to assess patient understanding, as well as the contextual factors that play a crucial role in shaping the effectiveness of these assessments within the hospital setting.

Furthermore, health care staff (3S and 4S) observed that the hospital’s standardised approach might not always cater to individual patients’ needs and levels of comprehension. Staff member 3S remarked, “The cortex, the whole thing is so, one size fits all and it doesn’t. There’s nowhere really that asks the question has your patient understood simple things today”. Staff member 4S emphasised the importance of encouraging patients to write down their concerns and questions to address after leaving the hospital: “Often they don’t think about it until you’ve left, but I always say write that down”.

Time availability also emerged as a critical factor influencing the assessment of patient understanding. Staff members recognised the challenge of finding time, especially during the discharge process, when a substantial amount of information is
conveyed to patients. Staff member 9S emphasised the need to create moments to check patient understanding, even amid the rush: “Often a lot happens at the point of discharge as well, and then it’s like this barrage of information, you know. So, it’s about making time in those little moments to kind of check their understanding.”

However, time constraints can sometimes limit the extent to which healthcare professionals can assess understanding, particularly for inpatients: “As an inpatient, I don’t assess it at all because I don’t have time” (S11). Staff member 12S highlighted the balancing act required in allocating time to patients, especially when the workload is demanding: “It’s hard to be able to like have time to spend with the independent patients that you know are okay and doing well when you’ve also got the other ones so that juggle does, take a toll.” Another staff member empathised with the desire to spend more time with patients but acknowledged the constraints imposed by workload:

No, I think it’s just part of the process and I sometimes feel like being a nurse you can’t give as much time you want to the patient as well. Because of the workload. Sometimes you feel like you want to stay there, you know what I mean? Like to stay with the patient, and just talk to them. (7S)

These insights underscored the multifaceted challenges posed by the hospital environment and time constraints in the assessment of patient understanding, emphasising the need for adaptive strategies and effective time management in healthcare delivery.

Across this theme, ‘Checking of Understanding’, both patients and healthcare staff shared their perspectives on the assessment of knowledge and comprehension within the hospital setting. Participants described a diverse range of approaches, including methods such as ‘teach back’ or ‘tell back’, informal
conversations, and the simple act of asking if patients had questions. These strategies highlight the diverse ways in which understanding is evaluated. Moreover, discussions revealed the significance of health literacy, the impact of the hospital environment, and time constraints on the effectiveness of such assessments. Overall, Theme 2 illuminates the complex nature of assessing understanding in health care, emphasising the need for patient-centred approaches tailored to individual needs and circumstances.

7.2.3 Theme 3: Impact on Mental Health

The impact on mental health due to both the CVD and the delivery of education, was a common theme throughout both the focus group and interview discussions. While the Psychosocial sub-theme of Theme 1 encapsulated participants’ perspectives on the provision of mental health education, the dialogues throughout the transcripts, both explicit and implicit, revealed a broader spectrum of viewpoints concerning mental health impact. Interestingly, the two female patient participants expressed a lack of concern regarding psychosocial distress, indicating a limited need or desire for further education in this domain. In contrast, male participants engaged in more extensive discussions, providing deeper insights into the personal repercussions of CVD on their mental well-being.

7.2.3.1 Diversity in Patient Gender Perceptions Towards CVD and Mental Health

For some female participants, the diagnosis of CVD was a surprising event that, initially, left them taken aback. However, they displayed resilience in their response. One woman recounted,
I just thought, well, this is just one of those things that happen. It surprised me and shocked me at the time, but I thought, okay, now I know what to do about it, and I just carry on. I’ve never been impacted mentally by it. (4P)

Her perspective was one of practicality and acceptance, recognising that she was not alone in her experience of CVD and that it was simply a part of life.

Another female participant, reflecting on her age, expressed gratitude for her stent procedure. She remarked,

Like at my age, it’s no use me having a mental breakdown at 80 because of a heart, you know, a stent in your body, because I’m so lucky to have it. Because if I had been 40 like some people, it may have been a different story. (3P)

Her outlook underscored the importance of maintaining a positive perspective, particularly in light of her age.

Conversely, male participants had a different set of reactions to their CVD diagnoses. One man described the impact on his stress levels as, “It just brought my stress levels up... Can’t happen to me, it shouldn’t happen to me” (5P). His words reflected the shock and disbelief that can accompany a serious medical diagnosis, leading to heightened stress.

Another male participant discussed his past struggles with severe depression, recounting a period when he underwent electroconvulsive therapy (ECT) for weeks. He shared,

Yeah, I think the depression was a concern for me because, I’m probably going back 30 years now, I had a bout of quite severe depression. I was going through the ECT for weeks at a time. So, it was a concern. (2P)
This participant’s history of mental health challenges added complexity to his perspective on how CVD might impact his mental well-being.

Lastly, another male participant grappled with accepting his CVD diagnosis, initially resisting it with feelings of anger and stress. He reflected,

Didn’t want to accept it… It was the stress factor for me because I didn’t believe that I could be in this predicament and I was angry… it stressed me out a little bit but I just had to get over it and I had to accept what’s happened and get on with it and, just see what the people who are handling me give me good information back and I’ll springboard off that. (5P)

His journey underscored the importance of acknowledging and adapting to the situation, with the support of quality information and guidance.

7.2.3.2 Staff Perceptions Towards CVD and Mental Health

In considering the perceptions of healthcare staff regarding the interplay between CVD and mental health, a recurrent theme emerged. Staff members acknowledged that CVD exerted a substantial influence on patients’ mental well-being, a phenomenon that often became more pronounced once patients transitioned to their home environments. To address this challenge, staff employed an educational approach that extended beyond the patient to involve their family and whānau support networks. Nevertheless, providing comprehensive mental health support within the inpatient setting posed challenges, largely due to time constraints. Staff noted that the inpatient admission phase was often too early in the process for patients to fully grasp the potential impact on their mental health. Consequently, discussions related to the mental health consequences of CVD were more thoroughly addressed during the phase two cardiac rehabilitation programmes.
Staff perspectives on this matter were diverse, with one staff member highlighting the gap between theoretical awareness and lived experience. They noted,

I think they’ve got an awareness of it because it’s in the literature and we do address it at the bedside, but when you’re actually experiencing those low days you forget about it, you don’t have awareness of it you can just see that moment. So, I think a lot of people do struggle with that really. (13S)

Another staff member underscored the emotional challenges patients faced post-discharge, emphasising the valuable role of clinical psychologists in providing support:

But then you might see that same person 3 weeks later in clinic and they’re in tatters emotionally and not sleeping and they’re weeping and uptight and stuff, and we are very fortunate now, thank god we have our um clinical psychologist. (8S).

Moreover, staff members recognised the need to refer patients to clinical psychologists or general practitioners, who could address the emotional aspects of the patient journey beyond the hospital setting. As 1S articulated,

I’m referring to clinical psychologists or the GP [general practitioner] because they, they do the physical journey in hospital but at home they do the emotional, and some fall to bits. I get phone calls with people in tears just wanting to talk. But they do, they are aware, made aware, that their mood goes up and down lots of different things.

Several other staff members (10S, 6S, 4S) echoed similar sentiments regarding the undeniable impact of CVD on mental health; although they noted that this aspect was not always explored in depth during the hospital stay.
Beyond the direct impact of CVD on mental health, discussions within the focus groups and interviews extended to encompass the emotional outcomes associated with risk factors, exercise, and nutrition. These conversations touched on feelings of being overwhelmed, denial, confusion, and self-blame related to risk factors. Both patients and staff described the fear often associated with resuming exercise post-diagnosis. Furthermore, staff shared their experiences regarding how discussions about nutrition could elicit emotional responses from patients.

7.2.3.3 Emotional Impact Related to Risk Factors

When examining the emotional impact of risk factors, it was evident that patients’ reactions varied widely: Staff member 3S noted, “Which of the things do you think you could influence? Some people felt overwhelmed like this is in the too hard basket”. While another staff member emphasised the diverse emotional responses, explaining, “Some people were in denial and some people were beating themselves up and feeling quite guilty about lifestyle factors like smoking and being overweight” (8S). This statement shed light on the guilt and self-blame that some individuals associated with their risk factors.

The staff discussion also brought attention to another aspect, with 1S stating, “Some people that haven’t got risk factors that have got coronary heart disease and they’re saying well how did this happen? Got no family history, I’ve never had this issue, I’m not overweight, I’m fit, never smoked”. This perspective highlighted the confusion and disbelief that can arise when individuals with no apparent risk factors are diagnosed with coronary heart disease. Participants’ perceptions of risk factors in the context of CVD varied widely. Some patients expressed feeling overwhelmed, in denial, or self-critical; others were surprised and puzzled when diagnosed despite
lacking conventional risk factors, emphasising the complexity of emotional responses to these factors.

7.2.3.4 Emotional Impact of Exercise Resumption

The emotional challenges associated with resuming exercise after a cardiovascular event were also notable. One patient shared concern about exercise intensity:

I think after 6 weeks then you do a little warm-up and you really do a long stride and have a cool down… But it all seems to be based on if you get out of breath, that’s the limit you’ve got to use. Yeah, it’s a scary marker. Should one really be getting out of breath to that point where you’re out of breath? (2P)

This perspective highlighted the anxiety related to exercise intensity and its potential impact on health.

Another patient echoed similar worries,

Yes, that was my dilemma too. Was the exercise I was having yeah. How far is it safe to push yourself? And you’re sort of thinking of the, I’ve got this sort of thing in here, with some new tubes stitched in, and does that mean I’m putting pressure on the stitches, so they’ll come undone. Sort of thinking that as I’m walking along and wasn’t sure! (6P)

This quote revealed the intricate balance between the desire to regain physical fitness and the fear of jeopardising one’s health.

A staff member discussed a patient’s revelation about exercise:

I can remember a woman saying after giving her that wee afib pack and just quickly going through showing her what’s in the booklet and looking at
exercise. She saw that and said oh I was so frightened to exercise I thought it would make my condition worse. So, it was a revelation for her to see that information. (9S)

This story emphasised the importance of providing clear information to alleviate fears related to exercise.

Furthermore, staff members (11S, 6S) conveyed that some patients were hesitant to engage in exercise due to lingering fear and uncertainty. Staff member 11S noted, “Often you do have patients coming back to clinic saying I was too scared to do any exercise. I wasn’t sure if I was allowed to or not”. Staff member 6S shared similar sentiments, suggesting that patients, especially those who had experienced heart-related issues, often harboured concerns about engaging in physical activity, fearing adverse outcomes. These quotes collectively illuminated the intricate emotional landscape surrounding exercise resumption in the context of CVD, underscoring the need for tailored guidance and support to address these concerns effectively.

7.2.3.5 Emotional Impact Around Nutrition

In the landscape of nutrition and CVD, participants’ perceptions revealed varying emotional responses. Staff members noted that some patients became defensive about their dietary choices, perhaps fearing judgment or reprimand. As 9S observed, “They get defensive about the diet… Like we’re going to tell them off about it, which we would never do”. This defensiveness often arose as patients required to assert their commitment to a healthy diet, as highlighted by another staff member, “They get defensive, yeah. We have a perfectly good diet! You know, so they can get quite defensive about it… But it is something that’s quite tangible, the diet” (10S).
Interestingly, nutrition appeared to be a tangible aspect of CVD management, with some individuals finding it more approachable and manageable than other facets of their condition. According to 13S, nutrition “seems to be almost something that’s almost easier for them to tackle than anything else”. These discussions underscore the complex and emotional interplay between cardiovascular protective nutrition and mental health. The finding highlights the need for comprehensive support and education to effectively address the multifaceted aspects of cardiovascular care.

The impact of a hospital admission for CVD on individuals’ mental health varied among participants. Female patients generally reported a sense of acceptance and minimal mental distress, while male participants openly discussed their psychosocial experiences and the impact of the disease on their well-being. Staff acknowledged that CVD significantly affected mental health, but patients often realised this impact only after discharge. Throughout the focus groups and interviews, discussions unveiled the often-subconscious mental health effects of a new cardiac diagnosis. These effects surfaced during conversations exploring risk factor awareness, confidence in resuming exercise, and dietary choices. Interestingly, these subconscious discussions revealed a connection between CVD and its impact on mental health, contrasting with participants’ statements that mental health education was not a priority during the hospitalisation period.

7.2.4 Theme 4: Information Overload

Within the dataset analysis, information overload emerged as a prominent and recurrent concern expressed by both patients and health care staff during hospital admissions. Within this theme, participants engaged in discussions regarding the optimal timing for information delivery. Health care staff generally advocated for the
provision of patient education during follow-up appointments and clinics, considering these settings more conducive for effective communication. In contrast, patients’ perspectives on ongoing education as outpatients were characterised by a diverse range of sentiments. While some patients expressed intentions to enrol in a cardiac rehabilitation programme, others had reservations stemming from considerations such as time constraints, convenience issues, and personal doubts about its suitability.

Several factors were identified as contributing to the overarching sense of ‘information overload’ within this context. One notable factor was the trend toward shorter hospital stays, which posed challenges in effectively disseminating comprehensive information. Further, the frequent use of medical terminology compounded the complexity of information, intensifying the perceived overload. This multifaceted theme sheds light on the intricate dynamics surrounding information dissemination in health care, emphasising the need for tailored strategies and improved communication approaches to address these challenges.

7.2.4.1 Participants’ Perceptions of Information Overload in Hospital

In the context of ‘information overload’ the perceptions of both patients and staff shed light on the challenges associated with the volume and timing of information provided during hospital admissions. Patients frequently expressed the overwhelming nature of the information provided during their hospital stays. One patient remarked,

I don’t know if I really took a lot in but they gave me a lot of information and it was only after I left hospital that I had a lot of time to myself that I actually
read right through it and I read through it probably a couple of times just to try and understand. (7P)

Another patient shared, “I think what happens is you’re getting a hell of a lot of information and it’s just that you’ve got to sit down, and quiet time, and sort of have a look at it you know” (1P). These observations highlight the need for dedicated time and a calm environment to digest the substantial amount of medical information presented during their hospitalisation.

Healthcare staff also acknowledged the challenges posed by the volume of information given to patients. One staff member noted,

I think my main kind of concern about education that we give people is just the volume of it, there’s so much of it. So much to take on board there’s so much going on for people when they come into hospital that it is really overwhelming. (9S)

Staff members also shared strategies for addressing this concern. For instance, one staff member advised patients to revisit information after leaving the hospital, saying:

while you’re in hospital you’re going to get overwhelmed with lots of information and when you’re at home later on down the track you can always go back to like the Heart Foundation website, look at information there as a family, talk about it together and if you’ve got any further questions you can just contact, our CNSs and talk to them or go to your GP [general practitioner]. (12S)

This approach acknowledges the need for ongoing, accessible resources to combat information overload.
Additionally, staff recognised the importance of involving patients’ relatives in the education process, as IS mentioned,

I never educate anyone without their relatives. Because they’re stressed and they’re not knowing what to look for. So, we educate them on all the potential things that could happen when they’re at home and what to do if they do happen so they know clearly what to look for if their heart goes fast or they get short of breath or if they develop issues.

This approach aims to provide patients with a support system for managing the information they receive.

Both patients and staff described the challenges posed by information overload during hospital admissions. Patients and staff alike recognised the need for thoughtful strategies to address this issue, such as providing resources for post-discharge information review and involving patients’ relatives in the education process to ensure that crucial information is not lost in the midst of overwhelming hospital experiences.

7.2.4.2 Where Patients may be Engaging with Further Information to Mitigate Information Overload

Patients’ accounts revealed that they often turned to written materials provided to them during the hospital stay to refer to after leaving the hospital for a more comprehensive understanding of their condition. One patient stated, “I left hospital with a lot of information but I don’t think I took much in when they actually talked to me, but it was only after I sort of got home and started reading it that I understood” (7P). This quote underscores the importance of written resources as a means for patients to revisit and absorb information at their own pace. Similarly, another patient stated:
Because it was all very new and sudden, and a lot of other stuff happening around in the hospital, I wasn’t absorbing anything really. So, when I got home I certainly spent some time going through the whole package and yeah, still that same realisation that I wanted to know, what’s happened to me and the biology and what’s going to happen going forward in the biology. (2P)

Patients also demonstrated a proactive approach to information gathering. For instance, 5P commented, “I’ve got it at home alright. I took them, I took every information that was in the cardiology department ward”. This quote illustrates the patient’s active role in collecting and retaining information for future reference. These comments highlight how the hospital environment, with its inherent stress and distractions, can hinder patients from fully comprehending the information provided verbally, making post-discharge self-study crucial.

Staff members recognised the challenges patients face in absorbing information within the hospital setting. As one staff member noted, “When you’re sick in an unfamiliar environment you don’t take in things as if you were sitting comfortably in your chair at home and someone was talking to you” (5S). This observation underscores the difficulty patients may experience in processing information during their hospital stay due to the unfamiliar and often stressful surroundings.

However, staff also highlighted the importance of post-hospitalisation environments, specifically cardiac rehabilitation programmes, as conducive to patient engagement with information. One staff member noted, “Actually, it’s in the cardiac rehab environment, you know they attend the exercise classes afterwards, I see most of them the people who are there engaging” (2S), suggesting that patients are more
receptive to information when they are in a relaxed, post-hospitalisation environment focused on their recovery.

Furthermore, staff emphasised the significance of cardiac rehabilitation in reinforcing information dissemination. As 1S mentioned, “That’s why everyone’s encouraged to attend cardiac rehab, everyone. You know because it’s so vital and they’re ready for that then”. These discussions highlight the role of cardiac rehabilitation in addressing information overload by providing patients with the opportunity to revisit and clarify information in a supportive and recovery-oriented setting.

7.2.4.3 Confusing Medical Terms Contributing to Misunderstanding and Information Overload

The use of complex medical terminology may contribute to misunderstandings and information overload for both patients and health care staff. One staff member noted,

It’s putting the medical terms that the doctors use glibly into plain English and making it meaningful for them. Yeah… And once again it depends on the terminology that is used though because it’s not unusual if someone’s been in over a weekend and then you come to see them on a Monday and everyone’s been talking about their myocardial infarction or their MI to them and they have no idea that that’s a heart attack. (8S)

This observation highlights how patients may be left confused or unaware of the medical conditions or events being discussed, potentially leading to misunderstandings about their own health.

To mitigate this issue, staff often resort to using alternative, more patient-friendly terminology; for example, “heart event, people say” (10S), and “cardiac
event” (4S). These terms, which are simpler and more familiar to patients, serve as a means to clarify medical information and reduce the risk of information overload. Additionally, avoiding excessive use of technical terms like ‘acute coronary syndrome’ and opting for more straightforward language like ‘heart attack’ was suggested by 8S: “Yeah words, acute coronary syndrome all that sort of stuff without saying heart attack”. This approach aims to simplify communication and make it more accessible to patients.

These participants’ comments highlight the importance of clear, patient-centred communication in healthcare, particularly when it comes to complex medical terminology. Simplifying language and using terms that patients can easily understand are crucial strategies for reducing misunderstandings and preventing information overload.

In summary, the theme ‘Information Overload’ revealed the multifaceted nature of information dissemination during hospital admissions. Both patients and staff recognised the challenges associated with the volume and complexity of information and offered insights into strategies to mitigate information overload. This theme underscores the critical importance of clear, patient-centred communication in healthcare to ensure that vital information is effectively conveyed and understood, ultimately improving patient outcomes and experiences.

7.2.5 Theme 5: Unmet Educational Needs and Questions

In the analysis of the data, a consistent and significant theme emerged, denoting the unmet educational needs and questions. This theme reflects the shared perception among participants toward the unanswered questions or unmet educational needs patients had upon discharge from the hospital. Patients
participating in both focus groups expressed a common desire to understand the reasons behind their heart conditions, often encapsulated in the question, ‘why me?’ They conveyed their frustration at not always receiving satisfactory answers to this fundamental query. Patients struggled to comprehend why, despite their efforts in adhering to healthy lifestyle practices, they had still developed heart disease. Moreover, patients voiced concerns about their future, communicating uncertainties about the trajectory of their condition.

The health care staff verified these observations, acknowledging that patients frequently left the hospital with pressing questions about the underlying causes of their heart disease and a sense of bewilderment as to why they had become afflicted. Another critical concern raised by patients pertained to the management of ongoing chest pain, reflecting their need for guidance on symptom management and alleviation.

7.2.5.1 Why Me and What is Going to Happen Next? Participants’ Perceptions

Patients left the hospital with a lingering sense of uncertainty, notably encapsulated in the question ‘why me?’, and concerns about their future health. One patient articulated this feeling, stating,

the bigger questions were probably not for the hospital stage in any case and that was why, despite all my care and despite all the indications that everything was okay, why did this happen? And then what about the future? What can I expect in the future? How much control can I have over it? (6P)

Patients struggled to understand why they had developed heart disease, especially when they had been diligent in their health management practices.
Another patient expressed a similar sentiment, “The things that I was most interested in I suppose were the specifics of my situation at the time... They didn’t talk about or sort of explain what had happened, or talk about the prospect and long-term treatment” (7P). This quote highlighted patients’ desire for clarity regarding their specific medical situation and the course of their treatment.

Patients further revealed their concerns about their future well-being, with questions like, “How long have I got?” and “What’s the scenario for the future?” (1P). They yearned for information about their life expectancy and the potential for recurrence of heart-related issues. In essence, patients sought answers to the ‘why me?’ question and sought clarity about what to expect in their post-hospitalisation lives. They grappled with the sudden onset of heart disease despite their efforts to maintain a healthy lifestyle.

Healthcare staff acknowledged the prevalent concerns of patients regarding the causes of their heart disease and their future. They recognised that many patients were left pondering these questions, with one staff member stating, “Do I need to go and get a plot? is what I get from Māori, honestly” (4S). This quote highlights the depth of uncertainty patients felt about their future health.

Staff members also identified that patients often yearned for a clear cause for their condition, believing that once they knew the cause, they could take control and prevent further issues; 2S explained, “Everyone’s desperate to have a cause because once they’ve got a cause they can fix that cause and whamo they’re safe”. Staff empathised with patients’ concerns about the future, including fears of sudden adverse events and worries about exercising safely. They recognised that these concerns were typical and human, indicating that patients’ anxieties about their well-being were valid.
I think they worry about what’s going to happen to them. As I said they worry about dropping dead, when their next heart attack’s going to be. Then they’re worried they’ll do themselves harm if they exercise. They’re just sort of normal people worries. (6S)

These sentiments from staff identifying that patients are left wondering why and what is next was supported by 3S, 8S, 13S, and 10S.

7.2.5.2 Unanswered Questions Towards Medication Follow-up

Patients expressed varying degrees of confusion and uncertainty regarding their post-discharge medication instructions. One patient shared their apprehensions, saying, “But I still get paranoid because now I’m starting to run out of pills and I’m going to say oh where do I go next. Am I better after all these pills?” (5P).

Another patient described a situation where they were provided with guidance on medication timing to address side effects:

My wife rang the health board, and said right this is what’s happening what do we do? [The rehab nurse] Oh, we can fix that, that’s a side effect of this drug to grow the blood vessels. Just take them at night. Take these two at night instead of in the morning and he should be fine. I’ve been fine since because they work at night, you know what I mean?” (1P)

This story highlights the importance of knowing where to seek information and finding practical solutions to medication-related concerns.

Furthermore, another patient shared their experience of encountering discrepancies in their medication instructions, leading to confusion. They recounted,

My GP [general practitioner] I was, well I was taking six pills and I talked to him about it because one of the pills they only gave me a month’s supply but
all the others were 3 months. So, I wasn’t quite sure I thought oh, why am I stopping this one? So, I went and asked, I was at my GP for a you know just a check-up and I asked the GP and they said oh, hmm, no you should be taking that one so she gave me a prescription for another 2 months to catch up with it. (6P)

These stories highlight the need for clear and consistent communication regarding medication management post-discharge.

7.2.5.3 Unanswered Questions Toward Managing the Condition in the Future

Patients left the hospital with practical questions about managing their condition in the future. For example, one patient expressed uncertainty about whether to attend exercise classes, saying, “I’m not quite sure whether I should be going to exercise classes or not. I’m a bit unsure about that one, what I should be doing there” (7P). Another patient suggested that the yellow card provided to patients could include information about the recommended duration for taking medications, “Maybe one bit of information that could be added to the yellow card is the time period that your medications should be taken for” (2P). Patients’ demonstrated a desire for clear instructions on self-management after discharge.

Furthermore, patients expressed the need for comprehensive information on dietary changes. One patient stated,

Having the explanation of what the surgeon actually does while he’s in there and then on to the diet… I, can’t remember whether I got in my folder, anything specific to the diet. You know what they would recommend that you start eating more of. And I think that would be really important for people to
start making sure that they go off on the right track to not get back to the old
habit of what they were eating. (4P)

This participant emphasised the perceived importance of detailed dietary guidance
for patients in their post-hospitalisation journey.

Health care staff recognised that patients often had practical questions about
managing their condition once they returned home. They noted that patients might
need specifics on exercise and dietary recommendations. One staff member
mentioned, “It probably is about what they can do for themselves and maybe like I
say most people have a general view of what they should be eating and what exercise
they should be doing but maybe not specifics” (11S). This quote underscored the
importance of providing clear and practical guidance on lifestyle management post-
discharge.

However, there was a notable contrast between patients and staff in terms of
where patients could seek further information. While staff reported that patients
could turn to the cardiac team and general practitioners for guidance, patients
expressed doubts about the advice they received outside specialist cardiac teams.
Patients often sought information from various sources, including internet searches,
family, friends, and healthcare providers. This disparity between staff and patient
perceptions highlighted the need for enhancing patients’ confidence in the
information they received from diverse sources outside the specialist cardiac team.

7.2.5.4 Participants’ Perceptions Toward Where Patients Seek Answers for
Their Unmet Educational Needs

Patients shared their experiences of seeking answers to their questions from
various sources. One patient referred to online searches, saying, “Such a lot of, such
a variety! I went online to, to look up, I’m sure all medical people think ’horror,’
going online what are they going to find out? What silly stuff are they going to find out” (6P). The use of the internet, often playfully referred to as “Dr Google,” was a common approach for patients to find information and answers. Another patient mentioned relying on the internet for information, particularly regarding diet and heart health, saying, “Generally, the internet. That’s why that programme [cardiac rehabilitation] that I was told about, that I didn’t end up going along with because they talked all about diet and there was that, heart health website” (4P).

Patients also mentioned following the instructions provided on their forms, such as calling the rehabilitation unit for guidance, “Because on my form it said ring up the rehab unit, after 4 weeks. That’s what it said to me so I rung them by about the fifth week” (7P). Additionally, some patients relied on printed materials available in the hospital, such as pamphlets, which they found in the waiting room: “I got mine more from the waiting room in the hospital is where I got mine. All the pamphlets that I’m carrying around with me” (5P).

Staff provided insights into the resources they recommend to patients. They mentioned that previous patients who had undergone similar procedures sometimes visited current patients to share their experiences and provide reassurance. One staff member explained,

We actually get previous patients who have had procedures done to come in. And actually, talk to patients especially with things like implant or defibrillators. Because there’s nothing like you know the experience of somebody who’s been through that to be able to reassure and kind of talk through the process and what, what is life like living with that condition and that device, those sorts of things. (9S)
Staff members also recommended specific websites as reliable sources of information, although some patients were unfamiliar with these recommendations. One staff member mentioned, “I always tell patients I recommend this particular site as being a reliable source. And they go oh I’ve not heard of that” (3S).

Staff recognised that patients often turned to “friends and family first off. Um then probably from the nursing staff and then probably from the internet and then the doctors” (6S). Furthermore, a number of staff acknowledged that the internet was likely to be a major resource of information: “I imagine they go on Dr Google or whatever and look to see what’s going on” (5S). Participant 2S and 11S also reported that patients were using the internet as a resource for further information. This hierarchy of information sources demonstrates the roles of personal networks, the internet, and health care providers for patients when seeking further information.

In the final qualitative theme, the unmet educational needs and lingering questions that patients carried with them after their hospital discharge were reported. These questions were primarily centred around two key concerns: ‘why did this happen to me?’ and ‘what is going to happen to me in the future?’ These queries reflected patients’ profound desire for clarity regarding the causes of their heart disease and their outlook on their health in the post-discharge period.

The questions about the future extended beyond health prospects and encompassed practical matters, including confusion about whom to contact and where to seek guidance after leaving the hospital. This uncertainty generated anxiety among patients, particularly in relation to medication management, as they grappled with the complexities of their post-discharge care. Interestingly, staff believed that the necessary information to address these concerns was included in the education
packs provided to patients. However, for reasons that remained unidentified, patients struggled to effectively assimilate and internalise this information.

In summary, the final theme illuminated the profound impact of unanswered questions and unmet educational needs on patients as they transitioned from the hospital setting to their post-discharge lives. It underscored the critical importance of clear, accessible, and patient-centred communication in health care to provide reassurance, alleviate anxiety, and empower patients to navigate their health journey with confidence and understanding.

7.3 Qualitative Summary

After the comprehensive review of the identified themes, the final step in qualitative analysis was to critically examine the congruence and disparities in the perceptions of patients and health care staff. This evaluation encompassed all the themes and subthemes related to the cardiac domains of practice. The summarised outcomes are outlined in Table 7.7.

In general, the insights shared by patients and health care professionals demonstrated a substantial degree of alignment in their viewpoints. However, it is noteworthy that when exploring certain aspects, particularly risk factors, exercise, and nutrition, distinctive differences in perspectives emerged, highlighting areas of contrast in their understanding and experiences.
Table 7.7
Alignment of Participants’ Perceptions across the Key Themes

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<td><strong>Theme 5:</strong> Unmet Educational Needs/Questions</td>
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7.4 Conclusion

In the qualitative phase of this research, a rigorous process of thematic analysis was undertaken to derive meaningful insights from the focus groups and interviews. Braun and Clarke’s (2006) six-stage theoretical framework guided analysis, ensuring a reliable and systematic approach. Through this methodical process five key themes emerged, each shedding light on various aspects of patients’ and health care professionals’ experiences and perceptions.

The first of these themes was organised to align with the cardiac domains of practice, providing a structured and comprehensive view of the data. The other themes provide additional insight into the participants’ perceptions towards what it is patients understand about their heart health. In general, the findings from both patients and staff indicated substantial alignment in their perceptions and opinions. However, certain areas, notably risk factors, exercise, and nutrition, revealed more contrasting viewpoints between the two groups.
In summary, the thematic analysis effectively addressed the research objectives related to understanding what patients and health care professionals believe is comprehended by patients following their engagement with acute hospital services. Additionally, it explored how understanding is assessed in this context. The next chapter will transition to present the integration of both quantitative and qualitative results, providing a comprehensive view of the study findings.
Chapter 8: Integration of the Data

8.1 Introduction

This chapter is an exploration of data integration, a fundamental aspect of this MMR. The discussion commences by presenting the framework “Primary Data Analysis Integration” which was employed for the purpose of data integration, as derived from Creswell and Plano Clark’s (2018) work.

The chapter unfolds as follows: a comprehensive explanation of the six distinct stages constituting the integration process, which provides the foundations for presenting the outcomes of the integrated analysis. Within this context, the utilisation of joint displays as a strategic tool to harmonise the data is explained. Furthermore, the chapter examines the results derived from comparing quantitative and qualitative data sources, revealing valuable insights arising from each modality; thereby enriching the research landscape. Joint displays are employed once more, this time at a more holistic level, to present the overarching findings emerging from the mixed analysis.

The chapter culminates in a reflection upon the new learnings attained throughout the integrative journey. These newly gained insights, stemming from the amalgamation of diverse data sources, illuminate the results of the individual datasets and provide deeper insights of the phenomena under investigation. The process of data integration both deepens comprehension of the research subject and underscores the potential for novel discoveries when diverse data streams converge.
8.1.1 Mixed Analysis and Alignment with the Research Questions and Objectives

Bazeley (2018) highlighted through the process of integration the quantitative and qualitative data fosters mutual support, enabling them to collectively address the research questions. In this study, guided by a MMR worldview, two fundamental questions were asked: 1) What do newly diagnosed patients understand about heart health following their first engagement with acute cardiac hospital services? and 2) What are cardiac patients’ and health care professionals’ understandings of patients’ levels of heart health knowledge.

Furthermore, the integration of the datasets and subsequent analyses of the findings align with the fifth study objective: to analyse and identify, through the integration of data, variations between knowledge scores and participants’ assumptions of patients’ understandings. As this discussion moves into providing a rationale for data integration in the following section, it becomes clear that seamless blending of quantitative and qualitative data is not merely methodological choices, but a strategic approach to unravelling the intricacies of the research questions and objectives.

8.2 Process of Integration

Bazeley (2018) identified the central principle of MMR is the concept of integration, which should transpire at various junctures throughout the research journey. In a presentation to the Mixed Methods International Research Association - Oceania Chapter (2021), Bazeley expanded upon the critical junctures within a research project where integration should be thoughtfully considered. To begin,
Bazeley advocated for clear and evident integration between research methods, emphasising the construction of one method from another. In the analytical phase of MMR, data amalgamation should exemplify complementary inquiries, fostering comparisons and contrasts, perhaps showcased through mechanisms like joint displays, or even transformations from one data form to another. This comprehensive approach extends to the compilation of meta-inferences drawn from all available resources, ultimately culminating in results presented holistically by topics, transcending the traditional delineation of quantitative and qualitative methods (Bazeley, 2021). A succinct summary detailing how these pivotal integration stages were addressed within this research study can be found in Table 8.1.

**Table 8.1**

*Elements of Integration Throughout the Research Study*

<table>
<thead>
<tr>
<th>Key points of integration</th>
<th>Description</th>
<th>Summary of the integration purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Considerations across and between methods throughout the project</td>
<td>This research project began with a critical consideration of how the questions align with a philosophical position that integrates both quantitative and qualitative worldviews, and resulted in an ontological (dialectical pluralism) and epistemological (pragmatism) position that reflects MMR and the research questions. In addition, the study was designed so that alignment between the quantitative and qualitative data were inherent. The cardiac domains of knowledge framed the questions in both the questionnaire and focus groups. Key statistical data were analysed for each domain and knowledge scores calculated to identify areas of good and poor knowledge. Furthermore, qualitative research was completed to</td>
<td>Provides ‘completeness’ when answering the research questions.</td>
</tr>
<tr>
<td>Key points of integration</td>
<td>Description</td>
<td>Summary of the integration purpose</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td><strong>explore participants’ insight towards patients’ knowledge.</strong> Finally, this study integrated the quantitative and qualitative results.</td>
<td>The questions for the semi-structured focus groups/interviews and the national questionnaire were both constructed around the cardiac domains of knowledge.</td>
<td>Promotes integration through meaningful merging of data.</td>
</tr>
<tr>
<td><strong>Construct one method based on another</strong></td>
<td>The questions for the semi-structured focus groups/interviews and the national questionnaire were both constructed around the cardiac domains of knowledge.</td>
<td>Formation of ‘abstract meta-inferences’ through the integration of data via joint displays.</td>
</tr>
<tr>
<td><strong>Combine sources/data in complementary analyses</strong></td>
<td>Joint displays were used to combine the data under the headings that reflected the cardiac domains of knowledge. The joint displays allowed meaningful analysis between the qualitative (narrative) and quantitative (statistical) data. From here causal inferences were considered and presented.</td>
<td>Make comparisons of quantitative and qualitative findings by presenting the data side-by-side.</td>
</tr>
<tr>
<td><strong>Compare and contrast across data types and sources</strong></td>
<td>Table 8.8 presents the comparing and contrasting analysis of the datasets. The goal was to demonstrate how the results are confirming or divergent across the quantitative and qualitative data.</td>
<td>Narrative reporting of the quantitative and qualitative meta inferences.</td>
</tr>
<tr>
<td><strong>Compile using all sources together</strong></td>
<td>Meta inferences between the quantitative and qualitative data were presented as mixed method themes.</td>
<td>Reporting the implications for practice.</td>
</tr>
<tr>
<td><strong>Convey results arranged by topic, not method</strong></td>
<td>The discussion chapter presents the interpretation of the quantitative and qualitative findings within a mixed methods lens by topics.</td>
<td></td>
</tr>
</tbody>
</table>

It is important to acknowledge the intricacies surrounding the exploration of ‘understanding’, a concept inherently complex and amenable to diverse research approaches (Clark, 2019). While an MMR approach offers insightful research opportunities, it is equally important to recognise the logistical challenges inherent in seamlessly combining both quantitative and qualitative data. Within this study, a structured six-stage integration framework played a pivotal role in facilitating the
integration of data, guiding the subsequent analysis and synthesis of the results (Creswell & Plano Clark, 2018).

8.2.1 Mixed Methods Integration Framework

Table 8.2 summarises Creswell and Plano Clark’s (2018) primary data analysis integration process used to support data integration in the current study. The process emphasises that integration within a convergent design aims to yield comprehensive results that extend existing knowledge while offering confirmation and validation. It can be accomplished through data comparison or data transformation (Creswell & Poth, 2018). In the context of this study, the primary objective was to assess how the quantitative and qualitative findings align or diverge in the context of the research questions.
Table 8.2

_Six Stage Analytical Process for Convergent Mixed Methods Design (Creswell & Plano Clark, 2018)_

<table>
<thead>
<tr>
<th>Stage</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Complete analysis of the quantitative and qualitative data through suitable methodological processes for each dataset. Each strand is considered in alignment of the appropriate quantitative and qualitative research questions and aims.</td>
</tr>
<tr>
<td>2</td>
<td>Identify common concepts across the quantitative and qualitative data.</td>
</tr>
<tr>
<td>3</td>
<td>Develop joint displays/graphs to represent the data side by side. This is so comparisons and differences can be identified. With the purpose of meeting the mixed aim of the research study.</td>
</tr>
<tr>
<td>4</td>
<td>Compare the results and analyse how and why they ‘agree,’ ‘disagree,’ and/or ‘expand the findings.’</td>
</tr>
<tr>
<td>5</td>
<td>Consider the findings with a more detailed analytical lens, to consider why results may be ‘disagreeing’ between the datasets in greater detail.</td>
</tr>
<tr>
<td>6</td>
<td>Complete an advanced interpretation process which considers why relationships between the sets of data may be present, and what insights these may be providing in relation to the research question.</td>
</tr>
</tbody>
</table>

Having established the overarching principles of data integration as outlined by Creswell and Plano Clark (2018), and its significance within a convergent research design, the focus shifts to a comprehensive exploration of the six distinct stages comprising the primary data analysis integration process. Examining each stage individually will provide nuanced insights into how data comparisons were systematically implemented. This approach offers a detailed understanding of the practice employed and its implications in the context of this research.
8.3 Implementation of Stages and Reporting of Findings

In this section, an overview of the process employed in implementing the stages of the mixed methods integration for this study is provided. Following each explanation, the findings from the individual stages are detailed, offering transparency and insight into the systematic approach undertaken to ensure rigorous and coherence across the integration process.

8.3.1 Stages 1 and 2: Summary of Quantitative and Qualitative Findings

Stage 1 was dedicated to the independent analysis of both quantitative and qualitative data, as comprehensively detailed in Chapters 6 and 7. Following, stage two involved considering the key findings from the independent datasets and then conceptualising common themes emerging across both datasets. The initiation of this stage involved considering the key findings from the quantitative datasets which played a pivotal role in shaping the research insights. This comprehensive analysis encompassed an examination of international scores, demographic variables, and the responses derived from the CADE-QII cardiac knowledge domains. Notable outcomes from the quantitative exploration are discussed in detail in Chapter 6. The results focused on in this discussion pertain to the knowledge scores and, more specifically, the results regarding the cardiac domains.

An examination of the CADE-QII knowledge scores indicated that most participants demonstrated satisfactory or high levels of knowledge in all knowledge areas; apart from the nutrition and psychosocial domain, wherein numerous individual items within these domains witnessed a prevalence of participants choosing partially correct or incorrect answers. Notably, the risk factor domain
exhibited the highest proportion of responses that lacked full accuracy, while the nutrition knowledge domain featured the highest percentage of incorrect responses. Concerning medication knowledge, the data indicated that most participants did not furnish entirely correct answers. Furthermore, the exercise domain stood out with the highest percentage of correct responses. It is noteworthy that even in the psychosocial domain, which also yielded a significant percentage of correct answers, a notable number of incorrect responses were also observed.

Additionally, the aggregation of key qualitative themes identified across all focus groups and interviews was considered as part of this stage of the mixed integration framework. To reiterate, the common themes that emerged were: 1) the acquisition of knowledge, categorised within the cardiac domains of knowledge; 2) the practice of checking understanding; 3) the impact on mental health; 4) the experience of information overload; and 5) the existence of unanswered questions among patients, coupled with their unmet educational needs.

The mixed methods analysis and integration of this study, centred on participants’ perceptions regarding patients’ understanding within the five cardiac knowledge domains. This specific focus aligns with the fifth research objective which represents a mixed methods position and seeks to analyse and identify variations between knowledge scores and participants’ assumptions of patients’ understandings.

Notably, theme two from the qualitative analysis, ‘Checking Understanding’, closely mirrors the fourth research objective, which explores how patients and cardiac health care professionals assume patients’ knowledge is assessed. It is essential to underline that this aspect was a distinct qualitative research objective and
was not assessed within the quantitative strand of the study. Consequently, this particular facet of analysis is excluded from the integrated mixed methods analysis but will be integrated into the discussion chapter.

A detailed presentation of the qualitative findings was offered in Chapter 7. Findings revealed a contrast in perspectives between staff and patients regarding some cardiac knowledge domains. Both groups acknowledged limited patient knowledge upon admission, with an improvement by discharge. Medication knowledge was seen as deficient, and the information load during hospitalisation was overwhelming, impacting knowledge development.

Both staff and patients assumed patients were aware of cardiovascular risks, but patient discussions hinted at unconscious misunderstandings. The impact on mental health, marked by a sense of ‘disbelief’, emerged in risk factor discussions. Staff generally felt patients left with clear exercise plans, but patients expressed confusion and fear. Nutrition knowledge also varied; patients felt overwhelmed, while staff believed resources generally contributed to good understanding.

Both staff and patients agreed on the importance of psychosocial information but considered it a lower priority during hospitalisation. Nevertheless, the conscious and unconscious effects of CVD and educational delivery were prevalent in discussions. These findings highlight the nuanced perspectives on patient knowledge and the need for tailored education strategies across cardiac domains.

Stage three of the research process played a critical role in integrating key findings derived from both quantitative and qualitative datasets. This synthesis served as a bridge between individual findings and a broader understanding of the
research outcomes, enabling the exploration of meta-inferences drawn from these multifaceted results.

8.3.2 Stage 3: Utilising Joint Displays to Synthesise Datasets for Conceptualising Mixed Inferences

In this stage, the study harnessed joint displays to facilitate the integration of diverse datasets, with the overarching goal of conceptualising mixed inferences. Joint displays are a visual organisation of data to represent integration within the research process (Guetterman et al., 2015). They are a research method that can be used both for the reporting of the data and throughout the research integration, data collection, analysis, and/or interpretation between datasets in a MMR project (McCrudden et al., 2021). Joint displays can be an analytical framework for the integration, merging, comparing, relating, and linking of the quantitative and qualitative results; and, subsequently, supporting the development of meta inferences (Guetterman et al., 2021).

A joint display provides an efficient way for the reader to make comparisons between the different sets of data, comprehending the integration of mixed methods, and reviewing research findings (Bazeley, 2018; Guetterman et al., 2015; Younas et al., 2020). It effectively represents both quantitative and qualitative data alongside the corresponding inferences; thus, facilitating the presentation of mixed methods interpretations as meta-inferences (Creswell & Plano Clark, 2018).

Fetters et al. (2013) identified three primary intentions behind mixed integrations in mixed methods designs: merging, connecting, and building of results. The intentions align with the three core mixed methods designs—convergent,
explanatory sequential, and exploratory sequential. Merging brings together quantitative and qualitative data for comparison, correlation, and, ultimately, the generation of meta-inferences. Connecting involves using results from one strand to inform the sampling and analysis of the other. Integration with the intent of building focuses on using results from one strand to guide the approach to data collection in the other strand (Fetters et al., 2013).

In this research study, joint displays were employed at two distinct levels. The initial set of joint displays, which were part of stage three, was developed as an analytical tool to merge and integrate data strands. The insights derived from these initial joint displays were then compared with the findings from analysing where the quantitative and qualitative datasets either confirmed or contradicted each other. Subsequently, as a part of stage 5, a second set of joint displays was created to present the overarching findings resulting from the mixed analysis of the data.

8.3.2.1 Stage 3: Reporting of Results

In this section, the application of joint displays as the foundational framework supporting the mixed data analysis is portrayed in Tables 8.3 to 8.7. These tables function as an essential platform for the systematic integration of both quantitative and qualitative data. The structure of these joint displays is organised to represent the different datasets side by side.

In the leftmost column, the presentation includes the quantitative questions sourced from the CADE-QII, representing the quantitative aspect of the analysis. Adjacent to each quantitative question, the dedicated column conveys the cohort’s responses, providing a comprehensive visual representation of response distributions.
The histogram sheds light on the percentages associated with response options such as ‘correct’ (red), ‘partially correct’ (pink), and ‘incorrect’/‘did not know’, or where a participant chose more than one answer (blue).

At the bottom of the first column, *Quantitative Questions or Domain*, is a combined representation of the overall percentages for all questions in a given domain. These overall results consisted of each question having 136 responses and each domain having five to seven questions. These percentages encompass responses categorised as both ‘correct’ and ‘partially correct’, as well as those categorised as ‘incorrect’ or ‘did not know/multiple answers’. This summarisation furnishes a holistic perspective on responses within a given domain.

Following the quantitative component, the joint displays transitions to accommodate the qualitative dimension. In the third column of each joint display, systematic documentation includes qualitative questions that align with the respective cardiac knowledge domains; thus, constituting the qualitative component of the analytical approach. Column four is devoted to the presentation of the principal findings extracted from the thematic analysis, encapsulating the core qualitative insights derived from the data. To complement the qualitative analysis, column five introduces a selection of key quotes. These quotes provide additional context and lend support to the primary findings presented in column four.

The final column serves as a bridge between the quantitative and qualitative datasets, exclusively dedicated to formulating abstract inferences. This column facilitates a deeper integration of insights derived from both quantitative and qualitative sources, enriching the overall analysis.
### Table 8.3

*Joint Display Supporting the Integration and Mixed Analysis of the Quantitative and Qualitative Data in Relation to the Cardiac Knowledge Domain of Medical Condition (Including Medication Questions)*

<table>
<thead>
<tr>
<th>Quantitative questions or domains*</th>
<th>Qualitative interview questions</th>
<th>Abstract inferences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain 1 Medical condition</strong></td>
<td><strong>Patient/staff focus group</strong></td>
<td><strong>Main points across the domain</strong></td>
</tr>
</tbody>
</table>
| **Question 1**  
**CAD is:**  
Can you please share with the group your understanding of the cause of your heart issue?  
Can you please share what you know about your medications?  
**Related patient questions:**  
Knowledge may have been low prior to admission - many of the patient participants were surprised that they were having a ‘heart attack’ and identified it as indigestion or something else.  
Participants across the focus groups and interviews felt that patients often had poor knowledge before admission but this increased at the point of discharge.  
Knowledge around heart pathology is:  
- At individual levels and varies  
- Dependant on what they have heard in hospital  
**Acquisition of knowledge**  
Patient responses:  
And I’m the person in the Heart Foundation ads that’s sitting on the seat who didn’t know they were having a heart attack. (3P)  
I didn’t know I was having a heart attack even though, I knew things weren’t right. It was something that just told me I needed to call an ambulance because it just felt like indigestion more than anything. (4P)  
I’ve learned quite a lot already over that time you know um you chat just add a little bit more to your knowledge as you go long... Hospital largely, reinforced that, rather than gave me new information. (6P)  
Obviously I’d had all these peripheral pills to take and I was taking those religiously. I didn’t quite know, really what I should know. (7P)  
Information that I was given, was really, really good, even the medication information. (3P) |
| **Question 2**  
**Angina (chest pain or discomfort) occurs:**  
Can you please share with the group what you think patients understand about their heart issue?  
Can you please share what you think patients understand about their medications?  
**Related staff questions:**  
Participants across the focus groups and interviews felt that patients often had poor knowledge before admission but this increased at the point of discharge.  
Knowledge around heart pathology is:  
- At individual levels and varies  
- Dependant on what they have heard in hospital  |
| **Question 3**  
In a person with CAD, which of the following is a usual description of angina?  
**Percentage** | **Percentage** | **Percentage** |

---

*Note: The table includes quantitative data in the form of bar charts, percentages, and supporting quotes to illustrate the integration and mixed analysis of the data.*
Quantitative questions or domains*

Question 4
A heart attack occurs:

Generally, knowledge was considered to be limited across the population

Medications:
All participants identified that medication understanding was limited and patients are led by the health care professional advice in this area.

Staff identified that they felt patients had a basic understanding of medications, but patients are unlikely to have full understanding how medications linked to the heart disease process.

I’m glad I got a nurse advocate because she just tells me what each individual pill means to, to me. (SP)

Staff responses:
Yeah and some people can tell me, other people are like oh I don’t know. (3S)
Sometimes when we see them in hospital, it’s a bit of debunking some of the information that they’ve received or clarifying. (10S)
Sometimes [patients] have no idea, ‘I don’t know where this has come from’ … And, sometimes they go oh my father had a heart attack at 42 and, I guess I was waiting for mine to happen! When they stay in hospital for a week, they are surrounded by people with the same problem and they get talking and they had time to think about it and talk about it. (5S)

You might sort of enquire about what they know about their tablets and some people are amazing they say oh that’s this, this, this and this, they know all the doses, they know their names, they know what they’re for and other people they might be I don’t know what any of them are. (12S)

It varies once again depending on someone’s, you know, level of health knowledge and how much they want to know about it. (8S)

Patient responses:

knowledge* and only 10.7% (n=102/952 responses) indicated ‘incorrect or no knowledge’.

However, separate analysis of the medication questions within this domain are not congruent with the overall findings within this domain. 41.9% of questions were answered indicating (n=171/408 responses) *complete knowledge* in the medication related questions. A further 48.5% (n=198/408 responses) of answers across the domain indicated ‘incomplete knowledge’ and only 9.5% (n=39/408 responses) indicated ‘incorrect or no knowledge’.

Overall 89% of participants had some level of knowledge related to their medical condition after engaging with the acute health system. Although complete knowledge of the medication related questions was only represented in 41% of the medication answers. Overall, results still indicated that over 91% of all participants had some level of knowledge related to their medications.

The qualitative findings highlighted that patient participants felt they had limited knowledge of what it was like to be ‘having a heart attack/heart health/heart

Question 5
The best resources available to help someone understand his/her medications are:

Question 6
Medications such as Aspirin and Clopidogrel are important because:

Question 7
The “statin” medications, such as Atorvastatin (Lipitor™), Rosuvastatin (Crestor™), or Simvastatin (Zocor™), have a beneficial effect in the body by:

Abstract inferences

Percentage

Percentage

Percentage

Percentage

Percentage
**Quantitative questions or domains**

<table>
<thead>
<tr>
<th>Total percentage: all domain responses for N136 per question</th>
<th>Answers across 7 questions</th>
<th>Percentage across 7 questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct</td>
<td>549/952</td>
<td>57.6%</td>
</tr>
<tr>
<td>Partially correct</td>
<td>301/952</td>
<td>31.6%</td>
</tr>
<tr>
<td>Incorrect/Don’t know</td>
<td>102/952</td>
<td>10.7%</td>
</tr>
<tr>
<td>Total</td>
<td>952</td>
<td>99.9%</td>
</tr>
</tbody>
</table>

**Medication questions (2 questions)**

<table>
<thead>
<tr>
<th>Answer percentage:</th>
<th>Answers</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct</td>
<td>171/408</td>
<td>41.9%</td>
</tr>
<tr>
<td>Partially correct</td>
<td>198/408</td>
<td>48.5%</td>
</tr>
<tr>
<td>Incorrect/Don’t know</td>
<td>39/408</td>
<td>9.5%</td>
</tr>
<tr>
<td>Total</td>
<td>408</td>
<td>99.9%</td>
</tr>
</tbody>
</table>

**Qualitative interview questions**

<table>
<thead>
<tr>
<th>Information overload</th>
</tr>
</thead>
</table>
| I don’t know if I really took a lot in but they gave me a lot of information and it was only after I left hospital that I had a lot of time to myself that I actually read right through it and I read through it probably a couple of times just to try and understand. (7P)
| I think what happens is you’re getting a hell of a lot of information and it’s just that you’ve got to sit down, and quiet time, and sort of have a look at it you know. (1P) |

**Staff responses:**

- I think my main kind of concern about education that we give people is just the volume of it, there’s so much of it. So much to take on board there’s so much going on for people when they come into hospital that it is really overwhelming. (9S)
- Staff participants highlighted that knowledge was an individual construct, influenced by health literacy and experience.
- Both staff and patients identified that the hospital environment provided a lot of information, which can be overwhelming.

**Patient responses:**

- The things that I was most interested in I suppose were the specifics of my situation at the time… You know they didn’t talk about or sort of explained what had happened, or talk about the prospect and long-term treatment. (7P)
- I wanted to know, what’s happened to me and the biology and what’s going to happen going forward in the biology… bit that scared me and most of the family is I was pretty much doing the exercise and diet bit already because I’m diabetic. And why, all of a sudden do I have a heart attack? (2P)

**Abstract inferences**

- Disease’ prior to admission. Some ‘patient’ participants identified an increase in their knowledge after engaging with the hospital services.
- Staff participants consistently reported that they felt patients generally had limited knowledge around their medical conditions. They reported that medication knowledge was particularly limited for most patients.
- There was consensus that knowledge likely improved after engaging with the hospital services. Staff participants highlighted that knowledge was an individual construct, influenced by health literacy and experience.
- Both staff and patients identified that the hospital environment provided a lot of information, which can be overwhelming.
- Both staff and patients expressed that patients were often left unsure why this [heart attack/disease] happened to them.
<table>
<thead>
<tr>
<th>Quantitative questions or domains*</th>
<th>Qualitative interview questions</th>
<th>Abstract inferences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Everyone’s desperate to have a cause because once they’ve got a cause they can fix that cause and whamo they’re safe. When should I do this? Can he really do that? Is it alright if… The main questions. Why did this happen to me? Some of them get a nice clear answer. (2S)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Correct understanding 🟥 Partially Correct Understanding 🟢 Incorrect understanding/I don’t know/multiple responses 🟣
### Table 8.4

*Joint Display Supporting the Integration and Mixed Analysis of the Quantitative and Qualitative Data in Relation to the Cardiac Knowledge Domain of Risk Factors*

<table>
<thead>
<tr>
<th>Quantitative questions or domains*</th>
<th>Qualitative interview questions</th>
<th>Abstract inferences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain 2 Risk factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Question 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The risk factors for heart disease that can be changed</td>
<td>Related patient questions: Would you share with the group what you know are the lifestyle factors that contribute to heart issues? What are the risk factors that contribute to heart issues? Where did you learn this information?</td>
<td>Patients and staff discussions indicated that the perception is, patients have a good level of knowledge related to the risk factors of heart disease. Family history and stress were perceived by patients to be key factors for heart disease. The discussions highlighted that having knowledge of lifestyle and risk factors, did have an emotional effect on patients.</td>
</tr>
<tr>
<td><strong>Question 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The actions that can be taken to control cholesterol levels include:</td>
<td>Related staff questions: Would you share with the group what you believe patients know about the lifestyle factors that cause heart disease? What do you think they know about the risk factors that contribute to heart disease?</td>
<td></td>
</tr>
<tr>
<td><strong>Question 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The actions that can be taken to control blood pressure include:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Key summary:* The quantitative and qualitative data demonstrated a level of disagreement in the domain of risk factors. Patients talked about knowing the risk factors but there was subconscious confusion evident in the discussion. Staff have mixed views towards patients’ level of knowledge of lifestyle and risk factors. Some believed it was limited, while others identified that these are ‘messages’ people have received and in general have a good understanding. The quantitative data supports both arguments. Overall, 85% of participants did have some level of knowledge. However, the incorrect results in comparison to other domains, may indicate there are gaps in lifestyle and risk knowledge.

*Supportive discussion:* Quantitative data would suggest that for this cohort of participants, 50.3% of questions were answered indicating (n=342/680 responses) "complete knowledge". A further 35.5% (n=235/680 responses) of answers
Question 4
The first step towards controlling risk factors (such as blood pressure or cholesterol) is:

- Impact on mental health

bit that scared me and most of the family is I was pretty much doing the exercise and diet bit already because I’m diabetic. And why, all of a sudden do I have a heart attack? (2P)

Staff responses:
It’s variable, I think it’s variable depending on the person’s experience. (3S)

I just think that, people grow up in New Zealand and we, we all get the messages. About lose, keep your weight down, exercise you know, live in a healthy way so people know that stuff. It’s not like it’s a surprise. But I think, there’s a kind of gap in actually seeing, really the true benefit. (9S)

I think they know quite a lot about that because that’s been drummed into especially if you’re talking ischemic heart disease, so everyone knows you should exercise and eat less and lose weight. (6S)

Patient responses:
I was sort of, won’t happen to me because I run marathons, I didn’t give up rugby until I was 43 and I was still pretty fit… Of course they always ask do you smoke and do you drink and I said well I’ve never smoked you know. I don’t drink much either. (1P)

You never think you’re going to get sick because you’re so fit, you don’t smoke, you don’t drink and you know all that thing… you know Māori men they just eat anything on the trot and just think they can burn it off. (5P)

Staff responses:

Impact on mental health

Question 5
The actions to prevent developing diabetes include:

- Total percentage: all domain responses for N136 per question
- Answers across 5 questions
- Percentage across 5 questions
- Correct: 342/680 = 50.3%
- Partially correct: 235/680 = 34.5%
- Incorrect/Don’t know: 103/680 = 15.1%
- Total: 680 = 100.0%

In this domain, for one question the majority of responses were incorrect. 52.9% of participants had incorrect or no knowledge when answering the following question: The first step towards controlling risk factors (such as blood pressure or cholesterol) is? For another question the majority of participants (69%) only had partial/incomplete knowledge. This was for the question asking: The actions to prevent developing diabetes include?

Overall, 85% of participants had some level of knowledge related to their risk factors after engaging with the acute health system. However, some of the questions related to prevention and control were poorly answered (question 4 and 5). This may suggest, although patients are aware of risk factors, they may not know what they can personally do to control their heart health. In the qualitative patient data there was discussion about how they did not know they had risk factors and if they had known, they may have been able to do something about it. This concept could be explored in the future using a sequential MMR design.

Family history was a theme in the first focus group. Many of the
Which of the things do you think you could influence? Some people felt overwhelmed like this is in the too hard basket. (3S)

Some people were in denial and some people were beating themselves up and feeling quite guilty about lifestyle factors like, smoking and being overweight. (8S)

Some people that haven’t got risk factors that have got coronary heart disease and they’re saying well how did this happen? Got no family history, I’ve never had this issue, I’m not overweight, I’m fit, never smoked. (1S)

Participants felt their CVD was predominately linked to family history. One participant could not reconcile his prognosis because he had no family history. Staff strongly identified that ‘stress’ was the key lifestyle and risk factor often identified by patients.

Impact on mental health.
Discussion across the patient groups indicated a sense of disbelief that they had had a ‘heart attack’. They perceived their prior healthy lifestyle should have prevented this. Staff discussion also identified the emotional impact perceived risk factors could have on a patient’s mental health.

* Correct understanding
Partially Correct Understanding
Incorrect understanding/I don’t know/multiple responses

333


### Joint Display Supporting the Integration and Mixed Analysis of the Quantitative and Qualitative Data in Relation to the Cardiac Knowledge Domain of Exercise

<table>
<thead>
<tr>
<th>Quantitative questions or domains*</th>
<th>Qualitative interview questions</th>
<th>Abstract inferences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain 3 Exercise</strong></td>
<td><strong>Patient/staff focus groups</strong></td>
<td><strong>Main points across the domain</strong></td>
</tr>
<tr>
<td><strong>Question 1</strong></td>
<td>Related patient questions: Can you please share what you know about what exercise you can do since leaving hospital?</td>
<td>Staff and patients had different views on the clarity of exercise resumption plans following discharge.</td>
</tr>
<tr>
<td></td>
<td>Related staff questions: Can you please share what you think patients know in relation to what and how much exercise they should do after leaving hospital?</td>
<td>Some patients felt these were vague, while others were happy with the advice they received.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Staff indicated that they felt patients were given a clear plan.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The discussion from both patients and staff indicated that exercise guidance needs to be individualised.</td>
</tr>
<tr>
<td></td>
<td><strong>Acquisition of knowledge</strong></td>
<td><strong>Patient responses:</strong> Exercising they talked me through that. You know first week just walk down to your letterbox and back. And, and they gave me sort of a programme where I could increase it so I’ve been sticking to that as well.” (7P) And they, when it was time to talk about going home, I was very impressed with all the information that I got. The physio put me in my place good and proper about exercise. Told me that I was not allowed to exercise like I had been, for some time. (3P)</td>
</tr>
<tr>
<td></td>
<td><strong>Supporting quotes</strong></td>
<td><strong>Key summary:</strong> There is some dissonance between patients and staff discussion, and between the quantitative and qualitative findings. Patients expressed confusion around exercise resumption in the qualitative strand of the study but this was not supported in the quantitative results, where there is a majority percentage that participants had full or partial knowledge toward exercise management.</td>
</tr>
<tr>
<td><strong>Question 2</strong></td>
<td><strong>Main points across the domain</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Supportive discussion:</strong> Quantitative data would suggest that for this cohort of participants, 69.3% of questions were answered indicating (n=660/952 responses) 'complete knowledge'. A further 21.6% (n=206/952 responses) of</td>
</tr>
</tbody>
</table>

* Quantitative and Qualitative questions are cross-referenced in the table.
Question 3
The pulse can be found:

Resumption of exercise has an impact on mental health.

need to aim for 3 to 6 or don’t go beyond 6 or something like that. I’m going back to the analytical mind, how do you put that perspective into real terms? (2P)

I had an issue with that too, what does this section mean? (7P)

Then being quite active and hiking previously my striding out is quite astronomical it’s almost a run. But yeah, how is that fitting in terms of what they’re expecting and what I should be able to do. (2P)

Staff responses:
I think majority, you’d like to think, the majority of people are aware of the pamphlet and information that they’ve been given by the physiotherapist or at least that there’s a guideline… think sometimes that guidelines don’t necessarily cater, not as individualised, sometimes as they could be and so I think some of them must go home and think what?!, when they get 5 minutes three times a day and that sort of thing. (10S)

People’s stay is much shorter now and I think there’s, the capacity to absorb the information over two days instead of four or five is obviously reduced because it’s, you don’t have time to get your head, round very much. So, the pamphlet that we, give out which is called ‘rest and exercise after a heart attack’, I basically stick to that. (SS)

All CADE-QII questions in this domain had a strong correct response from participants with the exception of one: Three things that one can do to exercise safely outdoors in the cold winter are.

Patient discussion indicated that they did get some information while in hospital about exercise resumption plans but this was often confusing and they were not sure how to apply this to their own situation. This is supported within the staff discussion. They did feel that patients got information whilst in hospital. However, staff recognised that patients may find this information challenging to contextualise to their own circumstances. Staff did feel that in general people did have a good level of knowledge around the benefits of exercise for cardiovascular health.

Question 4
Three things that one can do to exercise safely outdoors in the cold winter are:

Question 5
The benefits of doing resistance training (lift weights or elastic bands) include:

Question 6
If a person gets chest discomfort during a walking exercise session, he or she should:
Question 7
How does a person know if they are exercising at the right level?

Impact on mental health
It’s actually really difficult to get exercise prescription information from anywhere in the world. We’re all kind of a bit grasping at straws, but we know it’s really important initially to rest and exercise little and gradually build it up. Some people do get into a bit of strife by exercising twice as much as what they’ve been advised to and then feeling terrible. (8S)

Patient responses:
I think after six weeks then you do a little warm up and you really do long stride and have a cool down… But it all, all seems to be based on, if you get out of breath, that’s the limit you’ve got to use. Yeah, it’s a scary marker. Should one really be getting out of breath to that point where you’re out of breath? (2P)

Staff responses:
Often you do have patients coming back to clinic saying I was too scared to do any exercise. I wasn’t sure if I was allowed to or not. (11S)
I think they’re still a bit scared probably. I think you know, the heart attack patients probably do benefit from the rehab classes for reassurance. I think people are probably, particularly if you’ve had a heart attack or any heart problem, people are worried they’re going to drop dead. (6S)

<table>
<thead>
<tr>
<th>Total percentage: all domain responses for N136 per question</th>
<th>Answers across 7 questions</th>
<th>Percentage across 7 questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct</td>
<td>660/952</td>
<td>69.3%</td>
</tr>
<tr>
<td>Partially correct</td>
<td>206/952</td>
<td>21.6%</td>
</tr>
<tr>
<td>Incorrect/Don’t know</td>
<td>86/952</td>
<td>9%</td>
</tr>
<tr>
<td>Total</td>
<td>952</td>
<td>100.0%</td>
</tr>
<tr>
<td>Unmet educational needs/questions</td>
<td>Patient responses: I'm not quite sure whether I should be going to exercise classes or, or not so. I'm a bit unsure about that one what I should be doing there. But one of the, the next session I’ve got is on exercises so that maybe that will answer some of my questions. (7P)</td>
<td>Staff responses: It probably is about what they can do for themselves and maybe like I say most people have a general view of what they should be eating and what exercise they should be doing but maybe not specifics and they'll get home and be thinking. (11S)</td>
</tr>
</tbody>
</table>

*Correct understanding* | *Partially Correct Understanding* | *Incorrect understanding/I don’t know/multiple responses*
### Table 8.6

**Joint Display Supporting the Integration and Mixed Analysis of the Quantitative and Qualitative Data in Relation to the Cardiac Knowledge Domain of Nutrition**

<table>
<thead>
<tr>
<th>Quantitative questions or domains*</th>
<th>Qualitative interview questions</th>
<th>Abstract inferences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain 4 Nutrition</strong></td>
<td><strong>Patient/staff focus group</strong></td>
<td><strong>Main points across the domain</strong></td>
</tr>
<tr>
<td><strong>Question 1</strong> What is the best source of omega 3 fats in food?</td>
<td>Related patient questions: Can you please share what you know about what should be included in your diet to promote good heart health?</td>
<td>The patient discussion indicated this was an area of confusion</td>
</tr>
</tbody>
</table>

| **Question 2** Trans fats are: | Related staff questions: Can you please share what you think patients understand about their diet in relation to promoting good heart health? | In general, staff felt that patients had good nutritional understanding and access to information via multiple resources. Both groups recognised that the amount of information can be overwhelming and confusing. Nutritional knowledge could result in having an emotional impact on patients. | **Abstract inferences** |
| **Question 3** What is one good way to add more fibre to your diet? | | | |

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Percentage</th>
<th>Percentage</th>
<th>Percentage</th>
</tr>
</thead>
</table>
0 | 100 | 50 | 0 |
60 | 100 | 50 | 0 |
20 |  0 |  0 |  0 |
80 |  0 |  0 |  0 |
**Question 4**  
Which of the following foods has the most salt?

<table>
<thead>
<tr>
<th>Food</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>50%</td>
</tr>
<tr>
<td>B</td>
<td>30%</td>
</tr>
<tr>
<td>C</td>
<td>20%</td>
</tr>
<tr>
<td>D</td>
<td>10%</td>
</tr>
</tbody>
</table>

**Staff responses:**

- There are always some improvements you can make to your diet. (7P)
- Having a dietician that can sort of go through all the different sorts of foods that would help, you know. (4P)
- I don’t feel I want to talk to somebody more about diet. (3P)

**Information overload**

There are always some improvements you can make to your prior diet. Further patient discussions suggested that they would have liked more education in this area. However, other patients did not feel they needed more information.

Both patients and staff highlighted the confusion caused by ‘ever changing’ guidelines and information available. Staff felt the current and more flexible approach to nutrition management, was easier for patients. However, patients indicated the opposite. Some staff felt the abundance of resources available may have left patients with a large amount of confusion, where other staff felt that in general people did know how to manage their nutritional health. Both subsets of participants (staff and patients) highlighted the emotional impact the area of nutrition knowledge and management can have on individuals.

**Question 5**  
What combinations of food can help lower blood pressure?

<table>
<thead>
<tr>
<th>Food Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>B and C</td>
</tr>
<tr>
<td>D and E</td>
</tr>
</tbody>
</table>

**Staff responses:**

- I think they have a reasonably good understanding, there’s so much information out there, there’s so many different diets being promoted and I think in the end, everyone just knows they should just be, you know, doing something. (6S)
- I think they know they shouldn’t be eating fatty chips and takeaways and, you know, cakes and all those sorts of things. Some are more really focussed on the fat side of things. I’m not sure if they know saturated fat, unsaturated fat. (5S)
- Some of them want, prescription! we’ve got much, much broader actually. (8S)

**Patient responses:**

- And there were odd things happened like when you talk of diet, the eggs were out and then eggs were in and now it’s three a week…. There’s other things that don’t change too much in, in the diet kind of prescription, but that’s one I’ve noticed bit comical really, some things come and go. (6P)

**Question 6**  
When reading food labels, what should one look at first?

<table>
<thead>
<tr>
<th>First Look</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>C</td>
</tr>
</tbody>
</table>

**Staff responses:**

- Information overload

attributed their heart disease to their prior diet. Further patient discussions suggested that they would have liked more education in this area. However, other patients did not feel they needed more information.

Both patients and staff highlighted the confusion caused by ‘ever changing’ guidelines and information available. Staff felt the current and more flexible approach to nutrition management, was easier for patients. However, patients indicated the opposite. Some staff felt the abundance of resources available may have left patients with a large amount of confusion, where other staff felt that in general people did know how to manage their nutritional health. Both subsets of participants (staff and patients) highlighted the emotional impact the area of nutrition knowledge and management can have on individuals.

**Question 7**  
How many servings of fruit and vegetables should adults consume?

<table>
<thead>
<tr>
<th>Servings</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>C</td>
</tr>
</tbody>
</table>

**Patient responses:**

- And there were odd things happened like when you talk of diet, the eggs were out and then eggs were in and now it’s three a week…. There’s other things that don’t change too much in, in the diet kind of prescription, but that’s one I’ve noticed bit comical really, some things come and go. (6P)
**Impact on mental health**

<table>
<thead>
<tr>
<th>Total percentage: all domain responses for N136 per question</th>
<th>Answers across 7 questions</th>
<th>Percentage across 7 questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct</td>
<td>479/952</td>
<td>50.3%</td>
</tr>
<tr>
<td>Partially correct</td>
<td>260/952</td>
<td>27.3%</td>
</tr>
<tr>
<td>Incorrect/Don’t know</td>
<td>213/952</td>
<td>22.4%</td>
</tr>
<tr>
<td>Total</td>
<td>952</td>
<td>99.9%</td>
</tr>
</tbody>
</table>

**Staff responses:**
- Especially with diet there’s a lot of really confusing advice out there. You know there are so many diets. (9S)
- I think even as doctors, we all give, different advice and think different things about diet. (11S)
- “It’s a desperately hard space to navigate. But it’s the easiest thing for people to address in the home. But sometimes it’s the most challenging thing.” (2S)
- Staff responses: They get defensive about the diet… Like we’re going to tell them off about it which we would never do. (9S)
- They get defensive yeah. We have a perfectly good diet! You know, so they can get quite defensive about it… But it is something that’s quite tangible, the diet. (10S)
- Seems to be almost something that’s almost easier for them to tackle than anything else. (13S)

* Correct understanding  ▼ ▼  Partially Correct Understanding  ▼  Incorrect understanding/I don’t know/multiple responses  ▼ ▼
### Table 8.7

**Joint Display Supporting the Integration and Mixed Analysis of the Quantitative and Qualitative Data in Relation to the Cardiac Knowledge Domain of Psychosocial Risk**

<table>
<thead>
<tr>
<th>Quantitative questions or domains*</th>
<th>Qualitative interview questions</th>
<th>Abstract inferences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 5 Psychosocial risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question 1 Which of the below are effective stress management techniques?</td>
<td>Patient responses: They didn’t talk about that in hospital other than some particular little things like you might find you’re a bit forgetful for a few days or even longer. Or you might find there are personality mood swings without talking about what those might be like. So, your poor partner is meant to cope with these somehow while they’re stressed out themselves. And just some vague statements like that. (6P) I didn’t have any. (4P) And I didn’t have any. (3P) Yes, I say with a little bit of hesitation because I think it’s, would probably put a bit more stress on to the mind, this is what you’re going to be or can be expecting. (2P) I was reasonably happy with what I had. Ah the fact that you’re raising it as an issue today makes me start to think perhaps I should have had more. Perhaps I should be more self-aware or something now. (6P)</td>
<td>Key summary: The quantitative and qualitative data findings both align within this domain. The quantitative data would suggest that the cohort had a good understanding of psychosocial risk but it also had the second highest number of incorrect answers for a domain. In general, the qualitative data suggested psychosocial knowledge was not a concern for both staff and patients while in hospital. However, there was discussion throughout the focus groups that reflected the mental health impact of the disease and provision of education.</td>
</tr>
<tr>
<td>Question 2 What stresses have been related to increased risk for heart attacks?</td>
<td>Staff responses:</td>
<td>Supportive discussion: Quantitative data would suggest that for this cohort of participants, 68.2% of questions were answered indicating (n=464/680 responses) <em>complete knowledge</em>. A further 13.2% (n=90/680 responses) of answers across the domain indicated ‘incomplete knowledge’ and 18.5% (n=126/680 responses)</td>
</tr>
<tr>
<td>Question 3 Which of the following describes your best option for reducing your risk from depression?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Key Questions

**Quantitative questions or domains**

- **Domain 5 Psychosocial risk**
  - Question 1: Which of the below are effective stress management techniques?
  - Question 2: What stresses have been related to increased risk for heart attacks?
  - Question 3: Which of the following describes your best option for reducing your risk from depression?

**Qualitative interview questions**

- **Patient/Staff focus groups**

**Main points across the domain**

- Related patient questions: Can you share what you know about the mental health effects of heart disease? Related staff questions: What do you think patients know about any mental health effects of cardiovascular disease and how to manage these?

**Themes**

- Acquisition of knowledge

**Supporting quotes**

- **Patient responses:**
  - “They didn’t talk about that in hospital other than some particular little things like you might find you’re a bit forgetful for a few days or even longer. Or you might find there are personality mood swings without talking about what those might be like. So, your poor partner is meant to cope with these somehow while they’re stressed out themselves. And just some vague statements like that.” (6P)
  - “I didn’t have any.” (4P)
  - “And I didn’t have any.” (3P)
  - “Yes, I say with a little bit of hesitation because I think it’s, would probably put a bit more stress on to the mind, this is what you’re going to be or can be expecting.” (2P)
  - “I was reasonably happy with what I had. Ah the fact that you’re raising it as an issue today makes me start to think perhaps I should have had more. Perhaps I should be more self-aware or something now.” (6P)

- **Staff responses:**

**Abstract inferences**

- **Key summary:** The quantitative and qualitative data findings both align within this domain. The quantitative data would suggest that the cohort had a good understanding of psychosocial risk but it also had the second highest number of incorrect answers for a domain. In general, the qualitative data suggested psychosocial knowledge was not a concern for both staff and patients while in hospital. However, there was discussion throughout the focus groups that reflected the mental health impact of the disease and provision of education.
Question 4
It is important to recognise “sleep apnoea” because:

Impact on mental health
So, I think that kind of aspect of people’s care their mental health isn’t really well catered for. We need a lot more support in hospital so people who have difficulty dealing with grief around their own illnesses or their things going on with their family. (9S)
Oh, not much I suspect. I address that in the phase 2 rehab class that I teach, every 6 weeks, or have done for a number of years. I tried to, normalise the, sort of psychological shock, the sort of frightenness, the scaredness, the feeling down about it. (2S)
I think if you went in cold and said do you think this will have an impact on you psychologically? I don’t know whether they would expect that. (10S)
I think if you ask them as they’re leaving, what do you know, is there anything else you’d like to know, a lot of people would say, no, no, that’s it. But those sorts of things about am I going to die they wouldn’t voice that, they wouldn’t say to you. (10S)

Patient responses:
It just brought my stress levels up... Can’t happen to me, it shouldn’t happen to me. (5P)
Didn’t want to accept it… It was the stress factor for me because I didn’t believe that I could be in this predicament and I was angry. (5P)
Yeah! She [my wife] does say, she reckoned it changed my personality. (1P)

Staff responses:
But then you might see that same person 3 weeks later in clinic and they’re in tatters emotionally and not sleeping and they’re weeping and upright and stuff and we are very fortunate now, thank

Question 5
“Chronic stress” is defined as:

Total percentage: all domain responses for N136 per question

<table>
<thead>
<tr>
<th>Answers across 5 questions</th>
<th>Percentage across 5 questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct</td>
<td>464/680</td>
</tr>
<tr>
<td>Partially correct</td>
<td>90/680</td>
</tr>
<tr>
<td>Incorrect/Don’t know</td>
<td>126/680</td>
</tr>
<tr>
<td>Total</td>
<td>680</td>
</tr>
</tbody>
</table>

Impact on mental health
A number of patients highlighted the emotional effects of having a heart event. These responses varied from disbelief to acceptance of moving forward. Both staff and patients highlighted that there is limited education given during the hospital period around heart disease. However, across the groups, the benefit of too greater focus on mental health was questioned. Several participants questioned if a strong focus on mental health implications may actually create more anxiety.

Staff members often discussed that mental health education was not formalised but interwoven throughout their therapeutic relationship with the patients.

indicated ‘incorrect or no knowledge’. This domain had the highest number of fully correct answers and second highest percent of incorrect answers. This would suggest patients either had full knowledge or none.
god we have our um clinical psychologist. (8S)
Yeah, the ones that I talk to or the whānau’s rung me because they’ve gone through that process about mood, the patient… it’s often other family members that bring it up. (4S)

| * Correct understanding | Partially Correct Understanding | Incorrect understanding/I don’t know/multiple responses |
8.3.2.2 Summary of Mixed Methods Findings in the Medical Condition Domain

In the examination of the medical condition domain, a comprehensive understanding of the findings emerges. The quantitative data reveal that this domain exhibited the third-highest percentage of fully correct responses, the second-highest percentage of partially correct responses, and the second-lowest percentage of incorrect answers. Remarkably, 89.2% of participants provided answers at either a fully correct or partially correct level, positioning this domain as the second-highest in terms of knowledge.

However, the qualitative results provide a nuanced perspective. Participants expressed the belief that patients often possess limited understanding of their medical condition upon admission. Interestingly, participants noted an improvement in knowledge levels following hospital education.

A specific sub-analysis focused on medication-related questions due to the critical role of medications in managing CVD. The quantitative findings revealed only 41.9% of participants demonstrated comprehensive knowledge when responding to the CADE-QII, while an additional 48.5% provided partially correct responses. The qualitative responses echoed the quantitative data, emphasising the incomplete nature of medication knowledge. Furthermore, they shed light on the overwhelming volume of information imparted within the hospital setting, a factor contributing to confusion. Additionally, the wording used by health care professionals, such as referring to medications as ‘blood thinners’, appeared to contribute to partially correct responses, a topic to be explored further in the subsequent chapter.
Lastly, the qualitative data within this domain highlighted that patients often departed the hospital with unanswered questions about the reasons behind their medical condition. This gap in understanding may also contribute to incomplete levels of knowledge in this critical domain.

8.3.2.3 Summary of the Mixed Methods Findings in the Risk Factor Domain

The risk factor domain shares an interesting profile with the nutrition domain, boasting the lowest percentage of questions answered at a fully correct level. Within this domain, an additional 34.5% of questions received partially correct responses, resulting in a combined total of 84.9% of participants demonstrating some level of knowledge regarding risk factors. Notably, one question within this domain garnered a high rate of incorrect responses, with 52% of participants providing inaccurate answers. Specifically, this pertained to question four, which queried the initial steps toward controlling risk factors like blood pressure or cholesterol. Additionally, question five, which explored actions to prevent diabetes, saw the majority of participants opting for partially correct responses, accounting for 50% of responses.

The qualitative data offer insights into these quantitative findings. During discussions, patients exhibited the ability to identify major risk factors for heart disease. Staff conversations aligned with these findings, affirming that most patients possessed a sound level of knowledge concerning risk factors. However, discussions with patients also revealed a degree of confusion regarding some risk factors. Both staff and patient conversations indicated a likely gap between knowledge and practical application in managing risk factors. This observation substantiates the quantitative findings within this domain, where participants demonstrated a lower
rate of correct responses, shedding light on the complexity of translating knowledge into effective risk factor management strategies.

8.3.2.4 Summary of the Mixed Methods Findings in the Exercise Domain

The exercise domain emerges as the domain with the highest number of fully correct responses within an individual domain. When addressing exercise-related questions, 69.3% of participants provided entirely correct answers, with an additional 21.6% offering partially correct responses. Thus, in this domain, over 90% of responses indicated some level of knowledge.

However, the qualitative data again introduce a nuanced perspective. Patients, in their accounts, expressed a lack of adequate individualised knowledge concerning exercise resumption post-discharge. Many patients reported managing this process according to their unique needs, which often left them with unanswered questions. In contrast, healthcare staff indicated that patients were typically provided with exercise plans for discharge and generally concluded that patients possessed knowledge in this area. However, staff also acknowledged the necessity for individualised education and highlighted the absence of current national and international guidelines.

Patients, in their narratives, underscored the mental health impact associated with exercise resumption, suggesting that the challenge may be entrenched in confidence rather than knowledge deficiencies. Thus, the exercise domain presents a complex interplay between knowledge and psychological factors that influence post-discharge exercise practices.
8.3.2.5 Summary of the Mixed Methods Findings in the Nutrition Domain

As previously highlighted, the nutrition domain exhibited a relatively low percentage of fully correct responses, accounting for 50.3%, along with an additional 21.6% of partially correct answers. Therefore, the nutrition-related questions displayed the lowest percentage of total answers indicating some level of knowledge, totalling 77.6%. Curiously, this domain also registered the highest percentage of incorrect responses, at 22.4%.

Notably, two questions within this domain stood out as particularly challenging, with a majority of participants answering them incorrectly. First, in response to the question regarding trans fats, only 30% of participants provided correct responses. Second, when asked about the recommended servings of fruits and vegetables for adults, 27% answered correctly, highlighting a significant knowledge gap. In another question, which inquired about the primary aspect to consider when reading food labels, 84% of participants selected the partially correct option.

The quantitative responses closely mirrored the sentiments expressed by patients who often described feeling confused due to conflicting and overwhelming nutritional information. Furthermore, the results underscored the presence of outdated understanding of revised information and guidelines in Aotearoa New Zealand, particularly concerning recommended daily servings. This discrepancy will be explored in more detail in the subsequent chapter. Health care staff acknowledged that patients must navigate a substantial volume of nutritional information but generally believed that patients, owing to available resources, possessed adequate knowledge about their dietary requirements.
8.3.2.6 Summary of the Mixed Methods Findings in the Psychosocial Risk Domain

The psychosocial domain presents an intriguing profile within the CADE-QII. It achieved the second-highest percentage of questions answered at a fully correct level, with an additional 13.2% of partially correct answers. However, this domain also garnered the second-highest percentage of incorrect or ‘I don’t know’ responses, totalling 18.5%.

Remarkably, both staff and patients acknowledged the profound emotional impact of experiencing a heart event. Regardless, neither group viewed mental health education as a priority during the hospital stay. Furthermore, the impact of CVD was subconsciously discussed throughout the focus groups and interviews. This qualitative aspect indirectly aligns with the quantitative findings, which suggest gaps in mental health knowledge. The psychosocial domain, thus, unveils an intricate interplay between knowledge and the undercurrents of emotional experiences that individuals grapple with in the aftermath of a heart event.

In summary, the examination of these five distinct domains has unveiled a rich environment of insights through the interplay of quantitative and qualitative data. Each domain presents its own unique profile, reflecting the complex nature of cardiovascular knowledge among participants. While quantitative analysis provides valuable quantitative measures, the qualitative data explores deeper the nuances of understanding, revealing the complexities and gaps in knowledge. The next section embarks on a comprehensive exploration of how these quantitative and qualitative findings align, diverge, and contribute to a holistic understanding of cardiovascular knowledge and its practical implications.
8.3.3 Stage 4: Comparing Results to Explore Confirmation and Divergence

Creswell and Plano Clark (2018) underscored the importance of a process that involves confirming, disconfirming, and expanding on results, as it can provide researchers with deeper insights and contribute to addressing mixed methods inquiries. Bazeley (2018) highlighted that effective juxta positioning within joint displays can help explore the differences between datasets, with the aim of uncovering commonalities and discrepancies. Guetterman et al. (2015) supported these perspectives by presenting a best practice framework for joint displays after reviewing 19 mixed method articles. Their review revealed that convergent joint displays were highly prevalent in published articles, often in the form of themes paired with statistics or side-by-side comparisons.

Regardless of the type of joint display design, exemplary publications placed significant emphasis on comparing and contrasting the data findings. The fourth stage in this research’s integration and analysis involved assessing where quantitative and qualitative data either confirmed or contradicted each other. A table display was generated to systematically examine instances of confirmation and disconfirmation across each of the cardiac knowledge domains. These findings were also linked to the qualitative themes to explore potential relationships.

8.3.3.1 Stage 4: Reporting Data Comparisons

A comprehensive overview of data confirmation and divergence is presented in Table 8.8. This table reports the findings pertaining to data comparisons and provides a concise explanation of the observed patterns and discrepancies. It serves
as a valuable reference point for understanding the intricate interplay between the various datasets and their implications within this study.

Table 8.8

Confirmation and Disconfirmation of the Quantitative and Qualitative Findings

<table>
<thead>
<tr>
<th>Domain of knowledge</th>
<th>Qual/Quant differences</th>
<th>Qual/Quant confirm</th>
<th>Expanded findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical condition</td>
<td>Patients confirm</td>
<td>CADE-QII results indicate the majority of patients have full or partially correct understanding (total 89.2%). This would confirm the patient discussions, where they reported limited knowledge before hospital, but reported improved knowledge following hospital education.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acquisition of knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Staff disagree</td>
<td>There is disagreement between staff perceptions of patient knowledge and the quantitative results. Staff suggested patients understanding was likely lower than the quantitative findings indicated.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Information overload</td>
<td>The CADE-QII indicated that most patients only had partially correct knowledge when answering the medication questions. The focus group and interview discourse confirmed these findings and indicated that both staff and patients felt that knowledge around medications was incomplete. It is noted that when the correct and partially correct responses are combined 90% of patients did have either correct or partially correct understanding about their medications.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Staff and patients confirm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domain of knowledge</td>
<td>Qual/Quant differences</td>
<td>Qual/Quant confirm</td>
<td>Expanded findings</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------</td>
<td>-------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Risk factors</td>
<td>Patients and staff disagree</td>
<td>Patients and staff confirm</td>
<td>The CADE-QII results indicated that overall 85% of participants had a correct or partially correct level of understanding in the risk factor domain. The focus group/interview discussions both support and disagree with these findings because there are contrasting perceptions between participant groups. The patient comments would also support this assessment as there was subconscious confusion evident within the patient’s discussions that did not always demonstrate full understanding.</td>
</tr>
<tr>
<td></td>
<td>Acquisition of knowledge</td>
<td>Acquisition of knowledge</td>
<td></td>
</tr>
<tr>
<td>Patients subconscious statements disagree</td>
<td>Acquisition of knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact on mental health</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise</td>
<td>Patients disagree</td>
<td>Patients and staff confirm</td>
<td>The CADE-QII results for two of the questions which focused on managing risk factors (rather than just knowing what they were) indicated that most patients answered incorrectly (question 4) or partially correct (question 5). The qualitative findings supported this result, indicating that some participants felt that there was a need for more education around managing risk factors in everyday practice.</td>
</tr>
<tr>
<td></td>
<td>Acquisition of knowledge</td>
<td>Acquisition of knowledge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Impact on mental health</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unmet educational needs/questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Staff confirm</td>
<td>Staff discussion concurred with the CADE-QII results and they indicated patients were given good guidelines towards exercise resumption and that patients generally had good knowledge in this domain.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acquisition of knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domain of knowledge</td>
<td>Qual/Quant differences</td>
<td>Qual/Quant confirm</td>
<td>Expanded findings</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------</td>
<td>--------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Nutrition</td>
<td>Patients confirm</td>
<td></td>
<td>However, they did acknowledge that the programmes needed to be individualised for best outcomes.</td>
</tr>
<tr>
<td></td>
<td>Acquisition of knowledge</td>
<td></td>
<td>The CADE-QII results indicated that although 50% of people had correct knowledge about nutrition, this domain had the highest percentage of incorrect answers. These findings aligned with the patient discussions, which indicated a sense of confusion, which was due to the conflicting resources and overwhelming amount of information available.</td>
</tr>
<tr>
<td></td>
<td>Information overload</td>
<td></td>
<td>Staff interviews did not entirely align with the CADE-QII results. Staff indicated they believed patients know what to eat as there are a large amount of available resources. However, these discussions also acknowledge that the overwhelming amount of information can be difficult to navigate.</td>
</tr>
<tr>
<td></td>
<td>Unmet educational needs/questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychosocial Risk</td>
<td>Patients and staff confirm</td>
<td></td>
<td>The CADE-QII results indicated that participants had some good understanding of the psychosocial risk associated with heart health. This domain had the second highest percentage of correct answers (68.2%). However, this domain also resulted in the second highest percentage of incorrect answers (18.5%), which may indicate although patients had a good understanding of psychosocial risk there was still an element of confusion. In general, the qualitative data suggested patient knowledge in this domain is not an area of concern for both staff and patients. However, there was discussion throughout the focus groups that reflected the mental health impact of the disease and</td>
</tr>
<tr>
<td></td>
<td>Acquisition of knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Impact on mental health</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In the analysis of the five cardiac knowledge domains, a spectrum of confirmation and disconfirmation emerged. When analysing the data, particularly in relation to qualitative themes such as knowledge acquisition, information overload, mental health impact, and unmet educational needs/questions, no straightforward patterns towards confirmation or disconfirmation relationships emerged within the cardiac domains. Instead, patterns of confirmation and disconfirmation materialised between the quantitative and qualitative findings.

Confirmation and disconfirmation were observed in relation to quantitative findings when compared with patient perceptions only. Similarly, when assessing the alignment of quantitative findings with only staff perceptions, both confirmation and disconfirmation emerged. Furthermore, confirmation and disconfirmation were identified in cases where both staff and patient perceptions were jointly considered. It is noteworthy that across all cardiac knowledge domains, barring the psychosocial domain, elements of both confirmation and disconfirmation coexisted within the findings.

Overall, the insights gleaned from the discussions in focus groups and interviews, when compared with the questionnaire knowledge scores, exhibited a general congruence. However, notable instances of disconfirmation also came to the fore. First, the staff data indicated that their perceptions regarding patients’
understanding of their medical conditions were less optimistic than what the CADE-QII scores suggested. Second, patient discussions hinted at potential gaps in comprehension related to cardiac risk factors. Third, despite the CADE-QII scores portraying a high level of comprehension regarding exercise, patients expressed unmet needs and emotional distress in this specific domain. Lastly, while staff’s qualitative assessments suggested that patients possessed a reasonable grasp of nutrition, this narrative did not align with the quantitative data, which indicated substantial gaps in knowledge.

These disparities underscore the intricate interplay between quantitative and qualitative findings, shedding light on the multifaceted nature of cardiovascular knowledge and the perceptions held by both patients and staff. These insights will be further synthesised in the subsequent section, where the meta-inferences and final reporting of the mixed analysis will be presented.

8.3.4 Stage 5: Analytical Lens

The meta-inferences are drawn from an amalgamation of the initial inferences presented in the first set of joint displays and the results of the confirmation/disconfirmation analysis. Prior to finalising overarching themes, meta-inferences were reconsidered and refined alongside key quantitative and qualitative findings to ensure harmonious synthesis.

8.3.4.1 Stage 5: Reporting Overall Findings of the Mixed Analysis

Having illustrated how joint displays were instrumental in supporting data integration and analysis, this section explores their utilisation as a visual means of
presenting the findings. Guetterman et al. (2021) have noted that joint displays, while continually evolving, are increasingly regarded as a pivotal method for reporting the outcomes of MMR. The major types of joint displays used to present mixed methods integration and results include: side by side joint displays, statistics by themes or themes by statistics joint displays, interview questions joint display, participant section joint display, and instrument development joint display (Guetterman et al., 2021). Side by side joint displays were used to present the findings in the current study. This approach provided a representation of the merging of the quantitative and qualitative results to facilitate comparisons and drawing of mixed methods meta-inferences and are presented across Tables 8.9-8.13.
### Table 8.9

**Joint display – Reporting the Mixed Findings Between the Quantitative Knowledge Scores and the Qualitative Perceptions of the Cardiac Patients’ Levels of Knowledge Within the Medical Condition Domain**

#### Quantitative results

Aotearoa New Zealand CADE-QII overall score 63.04 out of total score of 93

#### Qualitative results

### Themes

<table>
<thead>
<tr>
<th>Medical Condition Knowledge</th>
<th>Qualitative results</th>
<th>Supporting quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acquisition of Knowledge</strong></td>
<td>Patients perceived that knowledge was limited before hospital, but improved post discharge.</td>
<td>And I’m the person in the Heart Foundation ads that’s sitting on the seat who didn’t know they were having a heart attack. (3P)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I didn’t know I was having a heart attack even though, I knew things weren’t right. It was something that just told me I needed to call an ambulance because it just felt like indigestion more than anything. And my arms were heavy and, tingling at the finger tips and I thought no this isn’t right. (4P)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I’ve learned quite a lot already over that time you know um you chat just add a little bit more to your knowledge as you go long... Hospital largely, reinforced that, rather than gave me new information. (6P)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Information that I was given, was really, really good, even the medication information. (3P)</td>
</tr>
<tr>
<td>Information overload</td>
<td>Both patients and staff discussed the impact of information overload during the hospital visit</td>
<td>I don’t know if I really took a lot in but they gave me a lot of information and it was only after I left hospital that I had a lot of time to myself that I actually read right through it and I read through it probably a couple of times just to try and understand. (7P)</td>
</tr>
</tbody>
</table>

### Mixed methods meta inferences

**Confirmation:** CADE-QII Scores confirmed patients’ perceptions that after hospital discharge patients had good levels of understanding about their medical condition.

CADE-QII scores confirmed staff and patients’ perceptions that most patients did not demonstrate full understanding about medications.

**Discordance:** The staff’s perceptions were that patients probably have limited knowledge about their medical conditions. This did not align with CADE-QII scores

**Expansion:** Mixed analysis indicated that although the majority of patients did not fully understand their medications, most patients did have some level of understanding.

<table>
<thead>
<tr>
<th>Domain questions</th>
<th>Individual item out of 3 M±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>15.52±2.68</td>
</tr>
<tr>
<td>1</td>
<td>2.49±.894</td>
</tr>
<tr>
<td>2</td>
<td>2.03±.632</td>
</tr>
<tr>
<td>3</td>
<td>2.24±.551</td>
</tr>
<tr>
<td>4</td>
<td>2.40±.968</td>
</tr>
<tr>
<td>5</td>
<td>1.98±1.029</td>
</tr>
<tr>
<td>6</td>
<td>2.50±.632</td>
</tr>
<tr>
<td>7</td>
<td>1.90±1.097</td>
</tr>
<tr>
<td>Unmet educational need/questions</td>
<td>Both patients and staff identified that patients were often still left asking: why did this happen?</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>I think what happens is you’re getting a hell of a lot of information and it’s just that you’ve got to sit down, and quiet time, and sort of have a look at it you know. (1P)</td>
<td>I think my main kind of concern about education that we give people is just the volume of it, there’s so much of it. So much to take on board there’s so much going on for people when they come into hospital that it is really overwhelming. (9S)</td>
</tr>
<tr>
<td>The things that I was most interested in I suppose were the, specifics of my situation at the time. You know they didn’t talk about or sort of explained what had happened, or talk about the prospect and long-term treatment. (7P)</td>
<td>I wanted to know, what’s happened to me and the biology and what’s going to happen going forward in the biology... bit that scared me and most of the family is I was pretty much doing the exercise and diet bit already because I’m diabetic. And why, all of a sudden do I have a heart attack? (2P)</td>
</tr>
<tr>
<td>Everyone’s desperate to have a cause because once they’ve got a cause they can fix that cause and whamo they’re safe. When should I do this? Can he really do that? Is it alright if... The main questions. Why did this happen to me? Some of them get a nice clear answer. (2S)</td>
<td></td>
</tr>
</tbody>
</table>
### Table 8.10

**Joint Display – Reporting the Mixed Findings Between the Quantitative Knowledge Scores and the Qualitative Perceptions of the Cardiac Patients’ Levels of Knowledge Within the Risk Management Domain**

#### Quantitative results

Aotearoa New Zealand CADE-QII overall score 63.04 out of total score of 93

<table>
<thead>
<tr>
<th>Domain questions</th>
<th>Individual item out of 3</th>
<th>Mean±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td>11.16±1.58</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>2.10±1.032</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>2.23±.486</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>2.75±0.480</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>2.29±.904</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>1.80±.850</td>
</tr>
</tbody>
</table>

#### Qualitative results

**Themes**

**Main points**

**Supporting quotes**

**Acquisition of Knowledge**

Patients and staff report that patients have good knowledge about what are the risk factors for CVD

- I knew about diet, I knew about exercise. (6P)
- Things like smoking and drinking. Wrong diet. And if something is very high in carbohydrates. (4P)
- I don’t smoke cigarettes and things so you won’t have the nicotine blocking your walls and I try to avoid the stress factor. (5P)
- My history is my grandfather was 45, my father 41, my uncle’s 39 and another uncle, the other one 54, all dead of heart attacks. (1P)
- I just think that, people grow up in New Zealand and we, we all get the messages. About lose, keep your weight down, exercise you know, in a healthy way so people know that stuff. It’s not like it’s a surprise. But I think, there’s a kind of gap in actually seeing, really the true benefit. (9S)
- I think they know quite a lot about that because that’s been drummed into especially if you’re talking ischemic heart disease, so everyone knows you should exercise and eat less and lose weight. (6S)

**Confirmation:**

CADE-QII Scores support the staff and patients’ perceptions that patients know the risk factors of CVD.

**Discordance:**

Patients’ discussion indicated confusion regarding some aspects of CVD risk factors. This did not match the CADE-QII scores, where 85% of participants had some level of knowledge.

**Expansion:**

Mixed analysis suggests that although most patients have some level of knowledge about the risk factors of CVD, there may be a gap between knowledge and practical ability to manage risk.

**Mixed methods meta inferences**

- **Confirmation:** CADE-QII Scores support the staff and patients’ perceptions that patients know the risk factors of CVD.
- **Discordance:** Patients’ discussion indicated confusion regarding some aspects of CVD risk factors. This did not match the CADE-QII scores, where 85% of participants had some level of knowledge.
- **Expansion:** Mixed analysis suggests that although most patients have some level of knowledge about the risk factors of CVD, there may be a gap between knowledge and practical ability to manage risk.
<table>
<thead>
<tr>
<th>Impact on mental health Unmet educational need/questions</th>
<th>Patients and Staff report the psychological impact of mental health</th>
</tr>
</thead>
<tbody>
<tr>
<td>You never think you’re going to get sick because you’re so fit, you don’t smoke, you don’t drink and you know all that thing… you know Māori men they just eat anything on the trot and just think they can burn it off. (5P) Some people were in denial and some people were beating themselves up and feeling quite guilty about lifestyle factors like, smoking and being overweight. (8S) Some people that haven’t got risk factors that have got coronary heart disease and they’re saying well how did this happen? Got no family history, I’ve never had this issue, I’m not overweight, I’m fit, never smoked. (1S)</td>
<td></td>
</tr>
</tbody>
</table>
### Table 8.11

**Joint Display – Reporting the Mixed Findings Between the Quantitative Knowledge Scores and the Qualitative Perceptions of the Cardiac Patients’ Levels of Knowledge Within the Exercise Domain**

<table>
<thead>
<tr>
<th>Quantitative results</th>
<th>Qualitative results</th>
<th>Mixed methods meta inferences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aotearoa New Zealand CADE-QII overall score</strong> 63.04 out of total score of 93 (31 items)</td>
<td><strong>Themes</strong></td>
<td><strong>Main points</strong></td>
</tr>
<tr>
<td><strong>Acquisition of Knowledge</strong></td>
<td>Patients expressed confusion about exercise resumption despite the provision of information.</td>
<td>In one of the documents that the physio gave, there’s this scale of 1 to 10 of ‘effortness’ if I can use that word, and you need to aim for 3 to 6 or don’t go beyond 6 or something like that. I’m going back to the analytical mind, how do you put that perspective into real terms? (2P)</td>
</tr>
<tr>
<td></td>
<td>Staff agreed that information about exercise resumption needed to be individualised; but, despite this, they felt patients had good plans and knowledge</td>
<td>I had an issue with that too, what does this section mean? (7P)</td>
</tr>
<tr>
<td><strong>Impact on mental health</strong></td>
<td>Patients and staff identified that there was a level of anxiety associated with returning to exercise</td>
<td>Then being quite active and hiking previously my striding out is quite astronomical it’s almost a run. But yeah, how is that fitting in terms of what they’re expecting and what I should be able to do. (2P)</td>
</tr>
<tr>
<td><strong>Domain questions</strong></td>
<td><strong>Total</strong></td>
<td><strong>Impact on mental health</strong></td>
</tr>
<tr>
<td><strong>Individual item out of 3</strong></td>
<td>15.41±3.06</td>
<td>I think after 6 weeks then you do a little warm up and you really do long stride and have a cool down… But it all, all seems to be based on, if you get out of breath, that’s the limit you’ve got to use. Yeah, it’s a scary marker. Should one really be getting out of breath to that point where you’re out of breath? (2P)</td>
</tr>
<tr>
<td><strong>M±SD</strong></td>
<td>2.09±.479</td>
<td>Often you do have patients coming back to clinic saying I was too scared to do any exercise. I wasn’t sure if I was allowed to or not. (11S)</td>
</tr>
<tr>
<td></td>
<td>1.91±1.105</td>
<td>I think they’re still a bit scared probably. I think you know, the heart attack patients probably do benefit from the rehab classes for reassurance. I think people are probably, particularly if you’ve had a heart attack or any heart</td>
</tr>
<tr>
<td></td>
<td>2.57±.875</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.89±.983</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.68±.877</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.86±.422</td>
<td></td>
</tr>
</tbody>
</table>

360
<table>
<thead>
<tr>
<th>Unmet educational need/questions</th>
<th>Patients and staff reported the gap between the patient’s ability to implement knowledge into practice.</th>
</tr>
</thead>
<tbody>
<tr>
<td>problem, people are worried they’re going to drop dead. (6S)</td>
<td>I’m not sure whether I should be going to exercise classes or, or not so. I’m a bit unsure about that one what I should be doing there. But one of the, the next session I’ve got is on exercises so that maybe that will answers some of my questions. (7P) It probably is about what they can do for themselves and maybe like I say most people have a general view of what they should be eating and what exercise they should be doing but maybe not specifics and they’ll get home and be thinking. (11S)</td>
</tr>
</tbody>
</table>
Table 8.12

*Joint Display – Reporting the Mixed Findings Between the Quantitative Knowledge Scores and the Qualitative Perceptions of the Cardiac Patients’ Levels of Knowledge Within the Nutrition Domain*

**Quantitative results**  
Aotearoa New Zealand CADE-QII overall score  
63.04 out of total score of 93 (31 items)

<table>
<thead>
<tr>
<th>Domain questions</th>
<th>Individual item out of 3 M±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>16.14±2.72</td>
</tr>
<tr>
<td>1</td>
<td>2.94±.541</td>
</tr>
<tr>
<td>2</td>
<td>2.38±1.174</td>
</tr>
<tr>
<td>3</td>
<td>2.43±.940</td>
</tr>
<tr>
<td>4</td>
<td>1.96±.815</td>
</tr>
<tr>
<td>5</td>
<td>2.90±.401</td>
</tr>
</tbody>
</table>

**Qualitative results**

<table>
<thead>
<tr>
<th>Themes</th>
<th>Main points</th>
<th>Supporting quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition of Knowledge</td>
<td>Patients reported confusion toward nutrition</td>
<td>Half your plate should be vegetables. (7P)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I was doing a lot of that beforehand but my cholesterol was still high so, it’s hard to know you know, what else I could do diet wise. (4P)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>They went through it all, all the things that they were asking me. Did I do any of these and I said no, no, no. I still went through my diet. They said oh no that’s fairly good. Although I guess there are always some improvements you can make to your diet. (7P)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Having a dietician that can sort of go through all the different sorts of foods that would help, you know. (4P)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Staff felt patients generally knew about diet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I think they have a reasonably good understanding, there’s so much information out there, there’s so many different diets being promoted and I think in the end, everyone just knows they should just be, you know, doing something. (6S)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I think they know they shouldn’t be eating fatty chips and takeaways and, you know, cakes and all those sorts of things. Some are more really focussed on the fat side of things. I’m not sure if they know saturated fat, unsaturated fat. (5S)</td>
</tr>
</tbody>
</table>

**Mixed methods meta inferences**

**Confirmation:**  
CADE-QII results indicate this is an area where there are gaps in knowledge, and this is confirmed in the patients’ perceptions.

**Discordance:**  
Staff felt despite the large amount of resources patients have to navigate, they generally had good dietary knowledge.

**Expansion:**  
The CADE-QII results are lower in this domain and the qualitative data may suggest that lack of clear guidelines and conflicting resources may be contributing to these findings.
It’s a desperately hard space to navigate. But it’s the easiest thing for people to address in the home. But sometimes it’s the most challenging thing. (2S)

They get defensive about the diet… Like we’re going to tell them off about it which we would never do. (9S)

They get defensive yeah. *We have a perfectly good diet!* You know, so they can get quite defensive about it… But it is something that’s quite tangible, the diet. (10S)

Seems to be almost something that’s almost easier for them to tackle than anything else. (13S)
### Quantitative results

**Aotearoa New Zealand CADE-QII overall score**
- 63.04 out of total score of 93

### Qualitative Results

**Themes**
- Acquisition of Knowledge
- Patients and staff report limited provision of psychosocial education during hospital admission

**Main points**
- They didn’t talk about that in hospital other than some particular little things like you might find you’re a bit forgetful for a few days or even longer. Or you might find there are personality mood swings without talking about what those might be like. So, your poor partner is meant to cope with these somehow while they’re stressed out themselves. And just some vague statements like that. (6P)
- I didn’t have any. (4P)
- And I didn’t have any. (3P)
- So, I think that kind of aspect of people’s care their mental health isn’t really well catered for. We need a lot more support in hospital so people who have difficulty dealing with grief around their own illnesses or their things going on with their family. (9S)
- Oh, not much I suspect. I address that in the phase 2 rehab class that I teach, every 6 weeks, or have done for a number of years. I tried to normalise the, sort of psychological shock, the sort of frightenness the sacredness, the feeling down about it. (2S)

**Supporting quotes**
- Yes, I say with a little bit of hesitation because I think it’s, would probably put a bit more stress on to the mind, this is what you’re going to be or can be expecting. (2P)
- I was reasonably happy with what I had. Ah the fact that you’re raising it as an issue today makes me start to think perhaps I should have had more. Perhaps I should be more self-aware or something now. (6P)
- I think if you went in cold and said do you think this will have an impact on you psychologically? I don’t know whether they would expect that. (10S)
- I think if you ask them as they’re leaving, what do you know, is there anything else you’d like to know, a lot of people would say, no, no, that’s it. But those sorts of things about am I going to die they wouldn’t voice that, they wouldn’t say to you. (10S)

### Mixed methods meta inferences

**Confirmation:**
- CADE-QII scores and participant discussion would indicate that gaps in knowledge is not an area of concern in this domain.

**Expansion:**
- Mixed analysis identified that there is a mental health impact as a result of CVD, at both the conscious and subconscious level.

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**Table 8.13**

**Joint Display – Reporting the Mixed Findings Between the Quantitative Knowledge Scores and the Qualitative Perceptions of the Cardiac Patients’ Levels of Knowledge Within the Psychosocial Domain**

<table>
<thead>
<tr>
<th>Domain questions</th>
<th>Individual item out of 3</th>
<th>Patients and staff did not feel hospital was necessarily the place or time for psychosocial education</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td><strong>11.0±2.53</strong></td>
<td>Yes, I say with a little bit of hesitation because I think it’s, would probably put a bit more stress on to the mind, this is what you’re going to be or can be expecting. (2P)</td>
</tr>
<tr>
<td>1</td>
<td>2.66±.880</td>
<td>I was reasonably happy with what I had. Ah the fact that you’re raising it as an issue today makes me start to think perhaps I should have had more. Perhaps I should be more self-aware or something now. (6P)</td>
</tr>
<tr>
<td>2</td>
<td>1.75±1.101</td>
<td>I think if you went in cold and said do you think this will have an impact on you psychologically? I don’t know whether they would expect that. (10S)</td>
</tr>
<tr>
<td>3</td>
<td>2.10±.515</td>
<td>I think if you ask them as they’re leaving, what do you know, is there anything else you’d like to know, a lot of people would say, no, no, that’s it. But those sorts of things about am I going to die they wouldn’t voice that, they wouldn’t say to you. (10S)</td>
</tr>
<tr>
<td>4</td>
<td>2.43±.814</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>2.12±.935</td>
<td></td>
</tr>
</tbody>
</table>
### Impact on mental health

**Patients and Staff discuss the mental health impact of CVD**

<table>
<thead>
<tr>
<th>Impact on mental health</th>
<th>It just brought my stress levels up... Can’t happen to me, it shouldn’t happen to me. (SP)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Didn’t want to accept it… It was the stress factor for me because I didn’t believe that I could be in this predicament and I was angry. (SP)</td>
</tr>
<tr>
<td></td>
<td>Yeah! She [my wife] does say, she reckoned it changed my personality. (1P)</td>
</tr>
<tr>
<td></td>
<td>But then you might see that same person 3 weeks later in clinic and they’re in tatters emotionally and not sleeping and they’re weeping and upright and stuff and we are very fortunate now, thank god we have our um clinical psychologist. (8S)</td>
</tr>
<tr>
<td></td>
<td>Yeah, the ones that I talk to or the whānau’s rung me because they’ve gone through that process about mood, the patient… It’s often other family members that bring it up. (4S)</td>
</tr>
</tbody>
</table>
After providing a comprehensive presentation of the overall findings derived from the MMR through the utilisation of joint displays (as presented above in Tables 8.9-8.13), the last phase within the primary data analysis integration process is stage 6: advanced interpretation.

8.3.5 Stage 6: Advanced Interpretation

Stage 6 is where the nuances and implications of findings are presented to gain a more profound understanding of the complex interplay between the quantitative and qualitative data. This stage marks the culmination of the integrated analysis. A comprehensive discussion of these themes will be presented in the next chapter of this thesis. The discussion presents the mixed methods themes: 1) acquisition of knowledge; 2) information overload and the impact of misinformation; and 3) the knowledge, cardiac education, and mental health relationship.

8.4 New Learnings from the Mixed Methods Analysis

8.4.1 Acquisition of Knowledge

The comprehensive mixed analysis has unveiled several noteworthy insights. First, it appears that the overall comprehension level of patients towards heart health is likely higher than both the staff and patients’ own perceptions. This finding suggests a potential underestimation of patients’ knowledge about their medical conditions. Second, patients have expressed concerns about resuming exercise post-discharge, despite CADE-QII scores indicating a strong foundation of knowledge in this area. This discrepancy implies that the issue may not be entrenched in a lack of knowledge but, rather, in a matter of confidence. Furthermore, there is a likelihood that patients’ understanding of nutrition is less robust than what staff have perceived.

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This discrepancy could be attributed to the abundance of available nutritional information, which may contribute to confusion among patients.

Lastly, despite both knowledge scores and qualitative data indicating potential gaps in mental health knowledge, neither staff nor patients view this as a priority area during hospital education. This finding raises questions about the perceived importance of addressing mental health concerns in the context of CVD. These new insights collectively underscore the intricate and multifaceted nature of cardiovascular knowledge and perceptions among patients and staff, shedding light on areas where perceptions may not align with the actual level of understanding.

The findings raise crucial questions about the acquisition of knowledge in the context of heart health. Firstly, what level of understanding is requisite for patients, and does every patient need to attain full comprehension? Secondly, how should the expectations for understanding be delineated? Should knowledge aim to achieve a patient's desired quality of life and health outcomes, or should it primarily focus on enabling safe self-management at home? The ambiguity within available information may contribute to deficiencies in nutritional knowledge, diminished exercise confidence, and could potentially impact the mental health of patients and their families. These complexities will be further explored in the subsequent chapter.

8.4.2 Over Communication and Miscommunication of Information

A prominent theme that emerged throughout the mixed analysis was the overwhelming nature of acute cardiac patient education. Both patients and staff expressed concerns about the sheer volume of information provided to patients, particularly during their hospital stay. This influx of information was often described as confusing and overwhelming, leaving patients struggling to absorb it, even after
discharge. This sentiment was reflected in the CADE-QII scores, which indicated lower levels of fully correct and partially correct responses, especially in the nutrition domain.

Patient and staff discussions consistently highlighted the challenges patients faced in navigating this abundance of information, which likely contributed to the confusion. Staff members also acknowledged that the “sheer volume” of information provided to patients in the hospital setting might be a contributing factor to what they perceived as limited patient knowledge about medical conditions. Patients, however, reported that the vast amount of information they received in the hospital often became digestible only sometime after post-discharge.

Furthermore, there were indications that current educational practices may inadvertently provide patients with misinformation. For instance, when asked about the importance of medications, like aspirin and clopidogrel, the majority of patients responded at a partially correct level, often characterising these drugs as blood thinners without delving into their more detailed roles. This response pattern possibly reflects the terminology used by clinicians in practice. A similar issue arose in one of the nutrition questions, where most participants selected the option suggesting that adults should consume five servings of vegetables a day. However, this response aligns with outdated guidelines. This complex interplay between the volume, timing, and accuracy of information delivery underscores the need for more effective strategies to communicate essential health information to patients, ensuring that it is both comprehensible and aligned with the most up-to-date guidelines and practices.
8.4.3 Knowledge and Mental Health Relationship

Although CADE-QII knowledge scores indicated a good understanding within the psychosocial domain, there were still notable gaps in mental health knowledge, as evidenced by the domain having the second-highest percentage of incorrect or ‘I don’ know’ responses. Both patients and staff reported a limited provision of mental health education during the inpatient stay, and neither group perceived this as a priority in acute hospital education.

However, an intriguing aspect emerged through qualitative and mixed analyses: the profound impact of CVD on mental health, which was consistently discussed by both staff and patients. Despite not recognising mental health education as a priority, discussions frequently touched on the emotional and psychological effects of a heart event. This disconnect between the perceived importance of mental health education and its evident significance in the patients’ and staff experiences highlights an area where patient needs and health care practices may not fully align.

The exercise knowledge domain reported the highest percentage of CADE-QII fully correct and partially correct responses. Nevertheless, patients expressed feelings of confusion and anxiety, particularly regarding areas like resuming exercise and managing nutrition. This suggests that the challenges patients face in these domains might not necessarily stem from a lack of knowledge; rather, from confidence issues and the potential impact on mental health. This interplay between knowledge, confidence, and mental health underscores the need for a holistic approach to cardiac care that addresses factual knowledge and psychological well-being and self-assurance in managing heart health.
8.5 Conclusion

This research was underpinned by a philosophical position that viewed knowledge as neither solely an observable construct nor solely an individual’s perception. Instead, it proposed that a comprehensive understanding of knowledge could be achieved by collecting and analysing both objective and subjective data and subsequently integrating both streams. The integration of CADE-QII results with insights from focus groups and interviews has yielded a more profound comprehension of what patients understand about their medical conditions, medications, risk factors, exercise, nutrition, and psychosocial health. In isolation, the quantitative data might suggest that patients possess near-complete knowledge, while qualitative data could imply concerning gaps in patient understanding, particularly in relation to their medical conditions and medications. However, the mixed methods integration has introduced a third lens, revealing findings that would have remained hidden in a single-method research approach.

Key mixed findings have highlighted disparities between knowledge scores and perceptions, particularly in areas such as patients’ knowledge of their medical conditions, medications, risk factors, exercise resumption, and nutrition. Additionally, it has underscored the importance of addressing the mental health impact of CVD, even though psychosocial risk may not be perceived as an immediate educational need in the hospital setting. The analysis has also emphasised the gap between providing education and patients’ ability to translate their knowledge into practical action. These mixed methods findings hold implications for educational practices and support the need to reconsider how programs are delivered. The following chapter will provide a comprehensive discussion of the overall findings.
Chapter 9: Discussion

9.1 Introduction

This chapter provides a comprehensive analysis of the research outcomes, structured to reflect the mixed methods design employed in this study. The exploration begins with the presentation of the quantitative findings, shedding light on their relationship with the research questions and objectives. Subsequently, the discussion transitions into the qualitative examination, providing a deeper understanding of the participants’ insights regarding patients’ levels of knowledge of their heart health.

Furthermore, this chapter embarks on an in-depth discussion of the integrated analysis of the quantitative and qualitative findings. These findings will be juxtaposed with international results relevant to cardiac rehabilitation, patient education and knowledge. This chapter provides a holistic discussion of the research findings, ensuring a thorough understanding of the complex landscape of heart health knowledge among patients.

9.2 Key Quantitative Findings: A Comprehensive Discussion

Cardiac rehabilitation has become an integral component of treatment plans for individuals with CVD, and its inclusion is considered standard practice in the clinical setting (Dibben et al., 2023; Kabboul et al., 2018; Shields et al., 2018). The aim of the quantitative data analysis in this study was to investigate the understandings of Aotearoa New Zealand patients regarding their heart health following a new cardiac diagnosis. This was achieved by using the CADE-QII.

Additionally, the quantitative analysis aimed to explore the demographic characteristics that could potentially influence patients’ knowledge scores. Findings
from this analysis will play a critical role in informing the development of tailored education interventions specific to the Aotearoa New Zealand context. By identifying the areas of knowledge that require improvement, and gaining insight into the demographic factors that may influence patients understanding, targeted interventions can be developed to enhance patients’ knowledge and promote effective self-management of their heart disease.

It is important to note cardiac rehabilitation services often face challenges in recruiting and retaining participants (Clark et al., 2012; Dalal et al., 2015; Kwan & Balady, 2012; Redfern et al., 2022). As a result, the information provided during the hospital stay may be the primary exposure they have to specialised education in cardiology. Therefore, it is crucial this information be highly effective within the limited timeframe available. To achieve this standard, education should be individualised to meet the unique needs of each patient. Understanding what patients already know, allows health care professionals to identify any gaps and promote safe self-management practices. The quantitative data from this study provides a comprehensive overview for the first time of the situation in Aotearoa New Zealand. It offers valuable insights for considering any improvements to cardiac rehabilitation and education practices.

9.2.1 Comparing Aotearoa New Zealand Knowledge Scores in the Context of International Results: Implications and Insights

The study participants achieved a mean CADE-QII score of 63.04±13.38, which corresponds to a group mean of 68% out of 93 points. When comparing these results with international findings, Aotearoa New Zealand scores fell in the middle range (Anderson-Doyley, 2020; Chen et al., 2018; G. L. de Melo Ghisi, Grace, Thomas, Evans et al., 2015; de Melo Ghisi, Grace, Thomas & Oh., 2015; Santos et
al., 2019; Williamson et al., 2021). These previous studies from different countries all reported their CADE-QII scores, which I took and converted into group percentages for comparison with the Aotearoa New Zealand findings. They include a Canadian study with a score of 74% (Williamson et al., 2021), another 2 Canadian studies with scores of 69% (de Melo Ghisi, Grace, Thomas, Evans et al., 2015; de Melo Ghisi, Grace, Thomas & Oh., 2015), a South American study with a score of 65% (Santos et al., 2019), an American study with a score of 62% (Anderson-Doyley, 2020), and a Chinese study with a score of 54.4% (Chen et al., 2018). The Aotearoa New Zealand findings most closely compare to the three Canadian studies.

These findings suggest that Aotearoa New Zealand’s heart health knowledge levels, as measured by the CADE-QII score, are comparable to international standards, particularly aligning closely with Canadian studies. This underscores the significance of continuous efforts to improve cardiac education and patient awareness within the local healthcare context, while fostering opportunities to share insights between different regions and countries.

Building upon the CADE-QII knowledge scores obtained from different countries, it is noteworthy to examine the respective CVD mortality rates in 2019 per 100,000 population are reported as: Canada (107.92), Aotearoa New Zealand (137.93), United States (157.01), Brazil (175.66), and China (276.94) (Global Burden of Disease Collaborative Network, 2023). Mortality rates for these countries are reflected in the same order as their CADE-QII scores above. These data came from a collaboration between researchers at the University of Oxford, specifically the Oxford Martin Programme on Global Development, and a team at Global Change Data Lab – a non-profit organisation and a registered charity in the educational sector based in the United Kingdom (Our World in Data, n.d.).
partnership is focused on curating and maintaining comprehensive online records of data related to significant global issues. Among their work, they have produced results in collaboration with the Institute for Health Metrics and Evaluation, specifically the Global Burden of Disease Collaborative Network. This network includes data comparisons from 1990 and 2019 on CVD mortality rates across various countries (Global Burden of Disease Collaborative Network, 2023). These figures provide valuable context to consider inferences between knowledge scores and CVD outcomes in different regions.

By incorporating this meticulously collected and internationally sourced data as part of the analysis, valuable insight is gained from a more robust and nuanced perspective on the relationship between knowledge scores and CVD outcomes across different regions. This contextualisation allows an opportunity to draw more informed inferences and explore potential avenues for further research, ultimately contributing to a broader understanding of the complex interplay between heart health knowledge and CVD outcomes on a global scale.

Expanding on the noteworthy inverse relationships observed between CADE-QII knowledge scores and CVD mortality rates, it becomes increasingly relevant to consider the potential implications of this connection. Countries with higher knowledge scores tend to have lower CVD mortality rates, while countries with lower knowledge scores had higher rates. It is important to note these findings are not definitive and they do not imply any causal relationship. However, they do raise the possibility of a potential association between knowledge about heart health and CVD outcomes. Conducting more in-depth research in this area could provide a deeper understanding of the relationship between knowledge levels and CVD health outcomes.
These comparisons highlight that the Aotearoa New Zealand knowledge scores obtained in the current study are consistent with those reported in other international studies. The findings provide valuable insight into the level of understanding among patients in the Aotearoa New Zealand context, and emphasise the need for targeted interventions to enhance patients’ knowledge and self-management of cardiac conditions.

Further examination of the demographic factors and specific cardiac subject areas provided further information to guide the development of targeted educational approaches. By identifying areas that show gaps in the knowledge of the population, and what demographic factors may influence understanding, interventions can be tailored to address the specific needs of patients in Aotearoa New Zealand.

9.2.2 Comparing Aotearoa New Zealand Demographic Factors and Knowledge Scores in the Context of International Results: Implications and Insights

Data were systematically collected across various demographic categories to explore the potential relationships with knowledge scores. The demographic categories included: gender, language, ethnicity, age, employment status, highest level of education, income, region of residence, attending DHB (the organisational structure at the time of data collection), heart procedures, other health issues, smoking, time since provision of education, and number of hours of education attended. It is important to note uneven representation within the categories precludes making absolute generalisations. However, the data have revealed noteworthy trends that can be compared to international studies and serve as a foundation for further discussion and exploration in some of the categories.
9.2.2.1 Educational Attainment

Analysis of the findings revealed a statistically significant p-value of 0.05 within the demographic category of prior educational attainment, indicating a positive correlation between the amount of time spent in education and higher knowledge scores. Educational attainment refers to the formal education (i.e., schooling, certificates, degrees etc.) that an individual has successfully completed. These results align with the international findings, where similar trends have been observed (Akten et al., 2021; Assiri, 2003; Chen et al., 2018; de Melo Ghisi, Britto, et al., 2015; de Melo Ghisi, CHaves, Loures et al., 2018; de Melo Ghisi et al., 2010; de Melo Ghisi & Oh, 2022; de Melo Ghisi et al., 2013a; de Melo Ghisi et al., 2013b; de Melo Ghisi et al., 2016; Freitas Pinheiro et al., 2014; Huynh et al., 2020; Omovvat et al., 2022; Santos et al., 2018; Santos et al., 2019; Shen et al., 2017; Williamson et al., 2021; Yang et al., 2021).

The international studies also reported that higher levels of prior education were associated with higher knowledge scores, whereas lower levels of education were linked to lower scores. This consistency in the relationship between educational background and knowledge scores across different studies reinforces the importance of educational attainment in influencing patients’ understanding of CVD.

Participating in cardiac rehabilitation has shown to offer significant benefits, underscoring the importance of promoting engagement among at risk population groups. In a prospective observational study conducted by Gaalema et al. (2022), the association between educational attainment (as a measure of socioeconomic status) and cardiac rehabilitation adherence and health outcomes were examined. The study included 1,407 patients enrolled in a cardiac rehabilitation programme in the United States over a 2-year period. Findings demonstrated that educational attainment was a
significant predictor of the number of cardiac rehabilitation sessions attended, and exhibited a relationship with various CVD risk factors including smoking, physical activity, body mass, and depressive symptoms (Gaalema et al., 2022). These results emphasise the importance of identifying at risk populations and designing targeted programmes to enhance attendance and promote positive behavioural change for better health outcomes.

### 9.2.2.2 DHBs and Employment Status/Household Income

In this study, three additional demographic factors indicated a borderline significant relationship with knowledge scores: DHB (p0.08), employment status (p0.052), and smoking history (p0.052). The analysis suggests a negative correlation between knowledge scores and a specific District Health Board (DHB). However, due to the disparity in the groups represented within the DHB categories, conclusions need to be made with caution. The DHB that had the lowest knowledge scores represents an area of diverse ethnicities, lower socioeconomic status, and, at the time of data collection, it had high admissions for COVID-19 compared to other regions.

Employment and income status exhibit a positive correlation with knowledge scores, compared to status of retirement, aligning with findings from international literature where these factors have consistently shown to be associated with higher knowledge scores (Akten et al., 2021; de Melo Ghisi, Chaves, Loures et al., 2018; de Melo Ghisi et al., 2010; de Melo Ghisi & Oh, 2022; de Melo Ghisi et al., 2013a; de Melo Ghisi et al., 2013b; Freitas Pinheiro et al., 2014; McKinley et al., 2009; Santos et al., 2018; Santos et al., 2019). Employment is recognised as a significant social determinate of health with both positive and negative influences on an individual’s health equity (WHO, 2023).
This study showed a negative correlation between lower income and knowledge scores, which aligns with existing literature on the association between socioeconomic status and health outcomes. Low income has been historically associated with poor outcomes and increase risk of death from ischemic heart events (Benzeval & Judge, 2001; Kaplan & Keil, 1993). Furthermore, a community health survey conducted in Saskatchewan by Statistics Canada, involving 27,090 participants, revealed that income was strongly and independently associated with heart disease (Lemstra et al., 2015); particularly in relation to the development of high blood pressure (a major risk factor for developing CVD) and behavioural risk factors like smoking and physical inactivity. Overall, these findings underscore the importance of considering socioeconomic factors and their potential impact on knowledge and heart health outcomes.

9.2.2.3 History of Tobacco Smoking

In the current study, a borderline significant relationship was observed between a history of tobacco smoking and lower knowledge scores, indicating a negative correlation between tobacco smoking and knowledge levels. Demographic data related to vaping were not collected in this study, primarily because of the rapidly evolving nature of literature and evidence regarding CVD outcomes and vaping. The one-way ANOVA significant relationship presented between the variables where participants who identified as current smokers had lower mean knowledge scores of 52.67±19.14, compared to those who reported themselves as never being smokers, who had an average knowledge score of 65.31±12.72. Notably, this was above the study’s cohort average score of 63.04±13.38. No significant relationship was found between current smokers and participants who were past
Identifying individuals with a smoking history is essential when determining which patients have the greatest educational needs during the immediate inpatient period. These considerations will facilitate healthcare providers to determine the priorities for both education and funding.

Smoking is a health behaviour that is highly targeted in the international guidelines for cardiac rehabilitation due to the strong evidence linking it to CVD development and progression (British Association for Cardiovascular Prevention and Rehabilitation, 2023; Liew et al., 2021; National Institute for Health and Care Excellence, 2020; Stone et al., 2021; Woodruffe et al., 2015). By incorporating targeted educational interventions for patients with a history of smoking, healthcare providers can play a significant role in promoting behavioural change and supporting patients in their journey towards better heart health.

In complementary efforts, this aligns with the objectives of “Smoke free Aotearoa 2025”, a government initiative in Aotearoa New Zealand. This is driven by the goal of significantly reducing smoking prevalence throughout the country, with the ultimate aim of transforming Aotearoa New Zealand into a smoke-free country by the year 2025 (Manatū Hauora-Ministry of Health, 2023). This initiative was introduced to address the serious health and societal challenges linked to smoking, including a heightened incidence of smoking-related illnesses, escalating health care cost, and the adverse impact of smoking on vulnerable groups within the population (Manatū Hauora-Ministry of Health, 2023). Since the introduction of this initiative in 2010 there has been a steady fall in rates of tobacco smoking among adults, which represents an estimated decline in adult smokers from 670,000 in 2011/12 to 558,000 in 2018/19 (Hardingham et al., 2020).
9.2.2.4 Age

Although, some of the other demographics did not show statistically significant or borderline significant results, there were still some intriguing findings that warrant further exploration. Age was one such demographic. Participants aged 70 years or older achieved lower CADE-QII scores compared to those under 70 years. This observation aligns with numerous international studies indicating higher scores among younger populations, emphasising a consistent negative correlation between advancing age and knowledge scores. (Assiri, 2003; de Melo Ghisi, Chaves, Loures et al., 2018; de Melo Ghisi et al., 2016; Shen et al., 2017). Interestingly these studies report age-related disparities in heart health knowledge but do not investigate the underlying reasons. In a recent study by Kim (2023), various factors influencing the health literacy of older adults were identified, encompassing predisposing factors such as age, gender and marital status, as well as supporting factors such as prior education level and subjective perception of health condition. Exploring the specific mechanisms through which advance age contributes to diminished heart health knowledge acquisition represents an avenue in need of future research in this field.

The implication of this finding is important when considering that advancing age is a non-modifiable risk factor of CVD (Brown et al., 2023). In light of this finding, the elderly population emerges as another at-risk group requiring particular attention when it comes to delivery of personalised inpatient education programmes. Addressing the specific educational needs of older patients can help bridge the knowledge gap and improve self-management, ultimately contributing to better health outcomes for this vulnerable population.
9.2.2.5 Gender

Numerous international studies have found gender differences. Being a male was associated with higher heart health knowledge (Akten et al., 2021; de Melo Ghisi et al., 2013b; Huynh et al., 2020), and the results of the current study align with this trend. Although the differences in mean CADE-QII scores for the female (59.82±15.21) and male (64.31±12.49) participants were not statistically significant, the notable variation underscores the positive correlation between gender and heart health knowledge, with males tending to exhibit higher knowledge levels. Interestingly, a meta-analysis involving 297,719 eligible individuals for cardiac rehabilitation reported a 36% lower attendance in programmes observed in women compared to men (Samayoa et al., 2014). This discrepancy in attendance can be attributed to various factors such as the demands of family responsibilities, lower educational levels, multiple comorbidities, non-native language proficiency, and a lack of social support faced by women (Supervía et al., 2017). These barriers underscore an important need for effective inpatient education tailored to the requirements of women, with a focus on prioritising health needs. By doing so, health care professionals can enhance a sense of relatability and relevance to the patients’ own circumstances; thereby increasing their motivation to attend and engage in cardiac rehabilitation programmes.

In summary, this study systematically collected data across various demographic categories to explore potential relationships with heart health knowledge in the context of Aotearoa New Zealand. The findings have emphasised the importance of a number of socioeconomic factors that influence patients understanding of CVD. Furthermore, this work has highlighted the need for targeted programmes to enhance attendance and promote behavioural change for at-risk
population groups. These findings stress the importance of effective inpatient education tailored to individual needs, with a focus on prioritising health needs. By addressing these factors, health care professionals play a role in creating a supportive and relatable environment that encourages patients to actively participate in their cardiac rehabilitation journey.

9.2.3 Comparing Aotearoa New Zealand Heart Health Subject Knowledge in the Context of International Results: Implications and Insights

The final approach to the quantitative analysis contributed valuable data adding to a comprehensive understanding of patients’ knowledge levels regarding their heart health in Aotearoa New Zealand. These data provided insights into specific aspects of cardiovascular health, with a particular focus on patients’ understanding across the following cardiac domains of medical condition (including medications), risk factors, exercise, nutrition, and psychosocial risk. The aim of this analysis was to consider areas where patients had limited knowledge and reflect on the implications for future educational provision based on these findings. By addressing the gaps in understanding, health care professionals can tailor education to enhance understanding and self-management of heart health.

9.2.3.1 Exercise

Exercise emerged as a knowledge area with the highest level of understanding which is consistent with findings from several international studies (Anderson-Doyley, 2020; Chen et al., 2018; de Melo Ghisi, Britto, et al., 2015; de Melo Ghisi, Grace, Thomas, Evans et al., 2015; de Melo Ghisi, Grace, Thomas & Oh., 2015; de Melo Ghisi et al., 2013b; de Melo Ghisi et al., 2016; Santos et al., 2019; Williamson et al., 2021; Yang et al., 2021). Only 9% of the responses related
to the exercise questions were answered incorrectly, reflecting a strong understanding among the participants in this domain.

These results are not surprising considering the historical evolution of cardiac rehabilitation, which has fundamentally centred around exercise therapy (Bethell, 2000; Braunwald, 1998; Naughton et al., 1966). Furthermore, exercise remains an integral component of international guidelines for cardiac rehabilitation (Amsterdam Ezra et al., 2014; British Association for Cardiovascular Prevention and Rehabilitation, 2023; Heidenreich et al., 2022; Liew et al., 2021; National Institute for Health and Care Excellence, 2020; O'Gara et al., 2013; Scottish Intercollegiate Guidelines Network, 2017; Stone et al., 2021; Woodruffe et al., 2015). However, it is important to note that high knowledge scores do not automatically imply confidence in self-management of a health condition. Understanding the principles and benefits of exercise is one aspect. The integration of the quantitative and qualitative data will provide an opportunity to explore further the relationship between knowledge and perceptions towards the ability to self-manage one’s health condition.

9.2.3.2 Psychosocial Risk

The domain of psychosocial risk had the second highest percentage of correct answers, as well as the second highest percentage of incorrect answers, suggesting a complex and diverse understanding among patients in this area. The lower scores are consistent with international findings which have also reported a deficit in knowledge pertaining to psychosocial risk (Akten et al., 2021; Anderson-Dooley, 2020; Arrieta-Bartolomé et al., 2022; de Melo Ghisi, Chaves, Loures et al., 2018; de Melo Ghisi & Oh, 2022; de Melo Ghisi, Grace, Thomas, Evans et al., 2015; Liu et al., 2022; Omovvat et al., 2022; Shi et al., 2022). On the one hand, the high scores
indicate that some patients have a good level of understanding about the psychosocial risk related to heart health. These findings may also suggest these patients received sufficient education on this topic during their hospital stay. On the other hand, the high percentage of incorrect answers indicates a significant proportion of participants lacked a comprehensive understanding of psychosocial risk. This could be due to various factors such as the complexity of the topic, the hospital setting as a learning environment, or limited educational interventions focusing on psychosocial risk. Some patients may have gaps or developed misunderstandings in their knowledge, which can influence their ability to effectively manage their well-being.

A negative impact on mental health is a frequent occurrence following an acute cardiac event, such as a MI or CABG (Colquhoun et al., 2013; Murphy et al., 2016). Depression and anxiety can affect a substantial proportion of individuals with up to one in five experiencing depression and as many as one in three facing severe anxiety after such an event (Murphy et al., 2019). Patients who experience anxiety and depression are at higher risk of subsequent events and premature mortality, particularly if these symptoms persist or emerge after discharge (Tully et al., 2013; Worcester et al., 2019).

Factors associated with an elevated risk of experiencing anxiety and depression after an acute heart event include a previous mental health history, self-identifying as having poor health, being under the age of 55 years, being a smoker, facing financial strain, and belonging to a low socioeconomic status group (Murphy et al., 2019). Other factors, to a lesser extent, include obesity, social isolation, and a history of diabetes (Murphy et al., 2019). These factors underline the vital role of mental health in the overall well-being and recovery of patients with cardiac disease.
Findings highlight the importance of addressing psychosocial risk factors in educational programmes for cardiac patients. By providing targeted and comprehensive education of this topic, health care professionals can bridge gaps in knowledge and empower patients to better manage these factors as part of their overall health management. Understanding risk can play a vital role in managing behavioural changes and psychological well-being; ultimately, contributing to better health outcomes.

9.2.3.3 Nutrition

The study uncovered a significant gap in participants’ knowledge when it comes to nutrition, with a notable 22.4% of responses being incorrect. Additionally, 27.3% of responses demonstrated only partial knowledge in this area. These findings are cause for concern because nutrition plays a crucial role in safeguarding heart health and overall well-being. In essence, this highlights a noteworthy deficiency in understanding the importance of nutrition in promoting cardiovascular health.

Several factors could be attributed to these gaps in knowledge within the area of nutrition. First, the presence of confusing messages in the media may be contributing to participants’ misconceptions (Mozaffarian, 2016). Media outlets often exhibit conflicting or mixed information regarding nutrition and health, making it challenging for the average person to discern accurate information (Clark et al., 2019). Second, information overload could play a significant role in participants’ insufficient understandings. The abundance of nutrition related information from various sources can be overwhelming for individuals (Ramondt & Ramírez, 2019). Feeling inundated with conflicting or contradictory information may negatively impact on an individual’s ability to comprehend and cognitively make sense of all
the data; ultimately, resulting in avoidance which can have implications for implementing effective behavioural change (Jensen et al., 2011).

Finally, the guidelines in Aotearoa New Zealand regarding fruit and vegetable consumption could be further confounding participants knowledge. Traditionally, advice from Manatū Hauora-Ministry of Health (2014) reflected that individuals should consume three servings of vegetables and two servings of fruit per day. More recently, the Aotearoa New Zealand guidelines have changed to provide broad ‘eating statements’, suggesting that a person should consume a variety of nutritional foods every day, including ‘plenty’ of fruits and vegetables (Manatū Hauora-Ministry of Health, 2020). Embedded in this lengthy 164-page document are the new recommendations that align with other global guidance, indicating that adults should eat ‘at least’ five servings of vegetables and two servings of fruit every day (Heart and Stroke Foundation - Canada, 2017; Manatū Hauora-Ministry of Health, 2020).

Despite these updated guidelines, current study results indicated that the majority of participants are still adhering to the old recommendations. This discrepancy between current guidelines and patients’ knowledge presents a risk of misunderstanding, which has the potential to influence dietary choices. It is a recommendation, stemming from this research, that these issues should be addressed with public awareness campaigns and inpatient education that include up-to-date guidelines that will work towards promoting better dietary decisions, leading to improved dietary habits and overall health outcomes.
9.2.3.4 Risk Factors

The findings from this cohort indicated that knowledge about risk factors was not one of the strongest domains with only 15.1% of the questions related to risk factors correctly answered, putting it second to nutrition regarding understanding. This finding is somewhat surprising when compared to international studies that frequently reported a high level of awareness regarding risk factors (Anderson-Doyley, 2020; Arrieta-Bartolomé et al., 2022; de Melo Ghisi, Chaves, Loures et al., 2018; de Melo Ghisi et al., 2010; de Melo Ghisi & Oh, 2022; de Melo Ghisi et al., 2013a; de Melo Ghisi et al., 2020; Freitas Pinheiro et al., 2014; Liu et al., 2022; Salzwedel et al., 2019; Zhou et al., 2017). These results highlights the importance of investigating local trends and not making generalisations from other findings. Exploring this information can provide valuable insights for future interventions and educational efforts aimed at improving knowledge in this domain.

9.2.3.5 Medical Condition and Medications

The evaluation of participants’ cardiac knowledge also included assessing their understanding of their medical condition and medications. Regarding the medical condition, 57.6% of the questions were answered with fully correct knowledge, placing it in the middle of the five cardiac domains assessed. These findings align with the mixed outcomes reported in the international literature and which are summarised in the literature review (Chapter 2). The variability in understanding levels regarding medical condition is not unexpected given the diverse range of factors that can influence patients’ comprehensions and knowledge.

In examining the specific questions related to medication knowledge, the results showed that only 41.9% of participants provided fully correct answers, while an additional 48.5% demonstrated some degree of understanding by offering partially
correct responses, resulting in a combined total of 90.4% in this domain. Medications play a pivotal role in managing heart health, and the advancements in medication management have contributed significantly to the reduction in CVD rates (Chew et al., 2016). These changes raise the question of whether the benchmark for acceptable medication knowledge should indeed be full comprehension or if partial knowledge suffices.

The answer to the aforementioned question may hinge on whether achieving comprehensive understanding of the pharmacology is necessary, or if the more critical objective is for patients to safely manage their medications independently at home. It could be argued that when patients possess a full understanding, they are more likely to appreciate the significance of their medications and less inclined to downplay their importance or discontinue them due to perceived side effects without first seeking advice. In this context, the depth of knowledge about medications may correlate with more responsible and informed medication management, potentially resulting in better health outcomes.

Recognising the pivotal role medications play in managing CVD is paramount, as underscored by international guidelines. These guidelines emphasise the importance of providing comprehensive education to enable patients to effectively manage their medication regimens and adhere to prescribed treatments, though a significant barrier to achieving full comprehension in this context may lie in the way information is conveyed to patients. To demonstrate a thorough understanding in the CADE-QII, patients were required to correctly identify that drugs like Aspirin and Clopidogrel are not merely ‘blood thinners’. While the term blood thinners is commonly used, it does not accurately describe the action of these drugs. Referring to them as such is a misnomer, as these medications do not alter the
thickness or viscosity of blood. Instead, they exert their effects by acting on the liver to reduce certain clotting factors or on platelets to modify the blood’s clotting ability. Adding to the complexity, health care professionals often use the term ‘blood thinners’ themselves in their educational communication, compounding the issue of partial understanding among patients.

In summary, these findings underscore the importance of both medical condition and medication knowledge in the context of CVD management. While patients demonstrated a relatively better understanding of their medical conditions, there is room for improvement, especially in medication knowledge. Effective communication and education are essential to bridge these knowledge gaps, and health care professionals should be mindful of the terminology they use to convey information to patients. Ultimately, there is the need for comprehensive patient education to empower individuals to take an active role in effectively managing their heart health.

9.2.4 Summary of the Quantitative Discussion

The quantitative findings from this study have provided a comprehensive review of the cardiac knowledge among a cohort in Aotearoa New Zealand relative to international studies. The results show that Aotearoa New Zealand scores are comparable to international scores, indicating a positive trend. However, this discussion has also revealed a correlation between knowledge scores and a country’s overall CVD rates which suggests that patient knowledge should be a major consideration for health policymakers. Therefore, targeted programmes and initiatives focused on improving individual knowledge about heart health should be prioritised to further reduce the country’s overall CVD rates. Additionally, efforts to
encourage attendance and retention in a cardiac rehabilitation programme should be of importance. Now may be the time to reconceptualise educational delivery and consider, in this post pandemic era, how people want to engage with learning to improve their cardiac health.

The analysis of the demographic factors has identified at-risk groups within the cohort. Patients with lower educational attainment, retirees, and current smokers had lower knowledge scores. Furthermore, advancing age, female gender, and having a lower income were also associated with lower scores. These findings provide valuable information for cardiac educators to personalise and target interventions accordingly. All individuals who have experienced a cardiac event would benefit from a knowledge assessment, particularly those belonging to at-risk groups. Tailoring education to their specific needs can help individuals better understand the information and recognise the benefits of engaging with further educational and learning opportunities.

The study found that the participants had lower levels of understanding towards nutrition and psychosocial risk, while demonstrating high levels of knowledge about exercise principles and practices. Although there was sound understanding of the medical condition and risk factors, there were gaps evident in ‘complete’ medication knowledge. These findings emphasise the need for a comprehensive and patient-centred approach to inpatient education. Addressing knowledge gaps in nutrition, psychosocial risk, and medication, while sustaining exercise education, can enhance patient understanding and empower them to make informed decisions and actively participate in their cardiovascular care.
9.3 Key Qualitative Findings: A Comprehensive Discussion

The qualitative findings sought to investigate cardiac patients’ and health care professionals’ insights towards the patients’ levels of understanding. The objective was to examine what patients and health care professionals perceive is understood by patients after engaging with the acute hospital services, as well as their insights on the assessment of understanding. Analysis of the qualitative data identified several key themes: the acquisition of knowledge, specifically within the cardiac domains of knowledge; the process of checking understanding; the impact on mental health; the overwhelming amount of information provided; and the unanswered questions and the unmet educational needs expressed by the participants.

9.3.1 The Acquisition of Knowledge

This stage of the research explored patients’ and health professionals’ perspectives regarding patients’ levels of knowledge through focus groups and interviews. The subsequent thematic analysis shed light on aspects of patient comprehension within the cardiac knowledge domains. While some consensus was evident, occasional discrepancies emerged between the opinions expressed by patient participants, staff participants, and between the patient verses staff discussions. This divergence highlights the importance of considering the perceptions of both staff and patients, as assumptions cannot be made regarding each group’s familiarity of the experiences of the other group.

9.3.1.1 Medical Condition

The qualitative data considered the perceptions of understanding regarding the medical condition (including pathophysiology and medication understanding). Regarding knowledge about the medical condition, a general consensus emerged
between the patient and staff groups that patients often had limited knowledge about heart health upon presentation to hospital. However, there was disagreement between these groups regarding the extent to which this knowledge developed after diagnoses. The findings conveyed patients reporting that they had good levels of understanding upon discharge, whereas staff expressed a different viewpoint and reported patients did not have the required level of understanding.

These divergent findings were consistent with the results of a systematic review conducted for the thesis. Among the studies, seven reported that patients had good knowledge about their medical conditions (Akten et al., 2021; Anderson-Doyley, 2020; Chen et al., 2018; de Melo Ghisi, Grace, Thomas, Evans et al., 2015; de Melo Ghisi, Grace, Thomas & Oh., 2015; Santos et al., 2018; Zhang et al., 2017), while 12 reported that this was an area associated with lower levels of understanding (de Melo Ghisi, Britto, et al., 2015; de Melo Ghisi et al., 2010; de Melo Ghisi, Fernandez, et al., 2021; de Melo Ghisi, Grace, et al., 2021; de Melo Ghisi & Oh, 2021; de Melo Ghisi et al., 2013a; de Melo Ghisi et al., 2013b; de Melo Ghisi et al., 2020; de Melo Ghisi et al., 2016; Freitas Pinheiro et al., 2014; Salzwedel et al., 2019; Yang et al., 2021).

Throughout the qualitative data, a prominent factor reported to be a negative influence on the acquisition of condition knowledge was the overwhelming number of changes patients experience during hospitalisation for a new diagnosis. In particular, this was apparent in the discussions with both patients and staff regarding the extensive amount of new understanding that is required regarding medications. Medication regimes play a major role in the treatment of CVD, and patients newly diagnosed with a condition often need to initiate multiple new medications. When further exploring the impact of condition knowledge in relation to medication
management, Jankowska-Polańska et al. (2016) conducted a study of 233 patients with arterial hypertension to investigate condition knowledge, management, and medication adherence. The findings revealed that knowledge levels significantly contributed to medication adherence, emphasising that identifying gaps is crucial for effective health education.

Diverse perceptions between patients and staff regarding patients’ understandings of their medical condition and medications has potential implications. When patients believe they have a good understanding and staff do not share the same perception, it may highlight the need for improved communication strategies and educational delivery. The difference in perceptions may impact on health outcomes and adherence to treatment plans. If patients do not fully understand their medical conditions, it could lead to misunderstandings, non-compliance with medications and lifestyle recommendations, and suboptimal self-management. Essentially, identifying and bridging the gaps in condition knowledge can promote patient centred care and improve overall well-being.

9.3.1.2 Risk Factors

In addition to exploring medication knowledge, the focus groups and interviews also examined patients’ understandings of risk factors. While the discussion revealed some gaps in risk knowledge, particularly regarding the risks associated with other health conditions such as diabetes and hypercholesteremia, all participants generally agreed that patients were well informed of the majority of risk and lifestyle factors that contribute to heart disease. These results reflect the findings from the literature review in Chapter 2, where risk factor awareness was one of the areas associated with higher levels of knowledge (Anderson-Doyley, 2020; Arrieta-
The time patients wait to seek medical treatment for ACS, such as heart attacks and unstable angina, increases the risk of death and complications (Guerchicoff et al., 2014). Shedding light on the relationship between knowledge of risk factors and treatment seeking behaviours, a cross-sectional study conducted by Garrido et al. (2020), examined 120 participants who had survived an ACS event. The study found that only 5% of patients with a high knowledge of risk factors waited more than 1 hour to seek treatment. In contrast, among patients with low knowledge scores, 22% waited more than 1 hour before pursuing medical care. These findings suggest that the higher the knowledge of risk and lifestyle factors, the more promptly the response to seek medical attention for ACS.

9.3.1.3 Exercise Resumption

Understanding in relation to the topic of exercise or exercise resumption evoked strong emotions among patient participants across the focus groups. Interestingly, this differed from the consensus among the staff discussions, where there was general agreement that patients were discharged with clear exercise plans. Across the patient groups, some participants expressed confusion towards exercise resumptions, while others reported feelings of anxiety. The participants’ perceptions of exercise knowledge from the focus groups, did not align with the findings from many of the studies included in the literature review (Chapter 2) (Anderson-Dooley, 2020; Chen et al., 2018; de Melo Ghisi, Britto, et al., 2015; de Melo Ghisi, Grace,
Thomas, Evans et al., 2015; de Melo Ghisi, Grace, Thomas & Oh., 2015; de Melo Ghisi et al., 2013b; de Melo Ghisi et al., 2016; Santos et al., 2019; Williamson et al., 2021; Yang et al., 2021). These studies consistently demonstrated that exercise resumption knowledge was generally high amongst patients with CVD.

The disparity between the findings from the focus groups and the existing literature suggests that the individual experiences and perceptions regarding exercise knowledge and resumptions can be varied. The evaluation of knowledge in many of the aforementioned studies relied on quantitative measures such as knowledge test for assessing understanding, leaving limited opportunity to explore the patient’s subjective perceptions and which factors may influence their ability to maintain moderate levels of activity. To gain a comprehensive understanding of the exercise related perceptions and behaviours, it is crucial to consider the patients’ subjective viewpoints and other factors that may influence engagement in physical activity.

While many publications report the benefits of exercise post a heart event (Fiuza-Luces et al., 2018; Nystoriak & Bhatnagar, 2018; Tian & Meng, 2019), there are less that have explored the factors that influence physical activity levels in patients with CVD. To address this gap, Murray et al. (2013) conducted a systematic review of 22 qualitative observational studies to clarify the patients’ perceptions that shape the maintenance of healthy lifestyles and sustained behavioural change. It is important to note that the majority of studies focused on participants already engaged in cardiac rehabilitation programmes. Through an analysis of interrelationships among various influences such as social support, beliefs, and other psychological factors, several key themes emerged as influential factors on behaviour. The primary themes identified were ‘social support’, ‘education and knowledge’, and ‘beliefs and emotions’ (Murray et al., 2013). These themes shed light on the significant role that
social networks, access to education and information, and personal beliefs and emotions play in sustaining healthy lifestyle behaviours, including exercise, in individuals with CVD.

Building on the work of Murray et al., Coull and Pugh (2021) conducted a study to explore the attitudes towards physical activity of 18 MI survivors in the United Kingdom. Through semi-structured interviews, the researchers aimed to investigate the perceived barriers, motivators, and facilitators for maintaining long term physical activity in these individuals. The results revealed four key factors that influenced perceptions towards exercise: the health event itself which serves as a teachable moment; the significant role the affective response towards physical activity plays, with enjoyment contrasting with the creation of fear; the participants’ themselves self-perceptions, attitudes, and self-efficacy towards their ability to engage in exercise; and, finally, the availability of exercise facilities and social supports (Coull & Pugh, 2021).

The study by Coull and Pugh (2021) highlighted that when there is a lack of clear physical activity guidelines and unclear or confusing advice regarding the frequency and intensity of exercise, feelings of vulnerability and fear increase. Participants in the current study reported similar experiences, emphasising the importance of patients being provided with clear and concise guidelines on discharge. By ensuring information is understood, healthcare educators can address any confusion or ambiguity to help alleviate concerns and promote enhanced engagement in physical activity.
9.3.1.4 Nutrition

The topic of nutrition revealed diverging perspectives between the staff and patients. While staff acknowledged the vast amount of information that patients needed to navigate, they believed patients generally possessed knowledge about healthy eating. However, discussions within the patient focus groups revealed dietary confusion and a desire for more education. These findings suggest a disconnect between the staff’s perceptions of patients’ knowledge and the reality expressed by the patients themselves. While staff members may have assumed patients had sufficient access to resources, the patients highlighted the challenges faced by individuals when trying to translate this information into practical and effective dietary choices.

Extensive literature has long reported the connection between dietary management and its impact on CVD (Chareonrungrueangchai et al., 2020; Johnson & Vickery, 1990; Klonizakis et al., 2021; Plous et al., 1995; Szczepańska et al., 2022). Throughout the years, advice regarding specific nutrients or food sources that may have cardioprotective properties or be harmful in development of the disease has emerged in the literature (Sivasankaran, 2010; Watson et al., 2019). This advice has encompassed various trends, including, but not limited to, incorporating items such as dark chocolate, nutrient supplements, and red wine; while discouraging the consumption of foods high in saturated fats and dairy products (Arranz et al., 2013; Sivasankaran, 2010; Wu & Hsieh, 2011). More recently, there has been a shift towards recommending a holistic approach to nutrition, emphasising a comprehensive dietary pattern rather than focusing on including or excluding certain foods. Diets such as the Mediterranean diet or ‘general guidelines’ to healthy eating...
have become widely recommended (Heart Foundation, 2023b; Minelli & Montinari, 2019; Williams et al., 2013).

For patients, this evolving landscape of recommendations may have led to confusion. The changing advice about nutrients, along with the emphases on overall dietary patterns, may have left patients with uncertainty about what constitutes a healthy diet. Participants in the current study have expressed the need for further education and clarification in order to navigate the complex and sometimes contradictory advice and information available about cardioprotective nutrition.

Furthermore, participants discussed the emotional and psychological impacts associated with diet and its management for CVD. Both the staff and patients discussed the sense of ‘guilt’ and ‘frustration’ with adhering to dietary recommendations. It is noted that certain patients found it a challenge to modify their diet for numerous factors, including confusion toward dietary recommendations, personal food preferences, the shared responsibilities for meal preparation within the household, and financial constraints. These challenges, along with perceived dietary restrictions, may result in feelings of deprivation and sadness. Attitudes and beliefs towards nutrition for patients with CVD can encompass a variety of mixed feelings, which can result in confusion and a desire for guidance. Understanding and addressing these factors are essential in providing patient centred nutritional education which supports patients with CVD.

9.3.1.5 Psychosocial Risk

The analysis of the ‘acquisition of knowledge’ also explored the subject of psychosocial risk. Specifically, examining experiences with receiving education and perceptions regarding the impact of information delivery. In relation to mental
health, the influence of CVD emerged as a distinct theme in the qualitative findings (to be discussed further in this chapter). The focus group and interview discussions revealed that psychosocial risk is not comprehensively addressed during the inpatient setting. Some patients recall receiving limited or no information while in hospital about the impact heart disease could have on their mental well-being. Staff emphasised that hospitalisation is a journey fraught with a range of emotions that patients must navigate. Both participant groups, patients and staff, expressed the view that the inpatient period already involves numerous challenges and activities, suggesting that highlighting the psychosocial risk associated with a new diagnosis may be better postponed until after discharge. Furthermore, both patients and staff conveyed a sense of hesitancy toward extensively covering this information during the inpatient period, fearing it would heighten levels of anxiety towards the unknown.

It is reported that 20-40% of patients with CVD experience symptoms of depression, which can result in an increased risk of worsening disease and reduced quality of life (Hare et al., 2014). As reported in Chapter 2, cardiac rehabilitation enrolment numbers remain low globally; and for a significant portion of CVD patients, inpatient education may be all they experience. As such, psychosocial risk education during the inpatient time is essential, and is supported across several international guidelines to be a key component in a cardiac rehabilitation programme (Amsterdam Ezra et al., 2014; British Association for Cardiovascular Prevention and Rehabilitation, 2023; Heidenreich et al., 2022; Liew et al., 2021; National Institute for Health and Care Excellence, 2020; O’Gara et al., 2013; Scottish Intercollegiate Guidelines Network, 2017; Stone et al., 2021; Woodruffe et al., 2015). A way of addressing potential psychosocial risk could be through introducing patients to the
concept of psychological and behavioural therapies such as cognitive behaviour therapy (CBT) as part of inpatient education. This therapeutic approach can help to address the psychological and behavioural factors that contribute to the development and progression of CVD as it aims to improve patients’ overall well-being.

Therapeutic approaches, such as CBT, focus on recognising the interconnections between thoughts, emotions, and behaviours (Reavell et al., 2018). The objective is to identify the maladaptive thoughts and behaviours that may contribute to CVD risk. CBT utilises a range of strategies to modify factors that can trigger and worsen CVD symptoms and risk. Consequently, this therapy has the potential to enhance emotional and behavioural responses, promoting greater adherence with medication regimes, adoption of healthier life-styles, risk reduction strategies, and engagement in cardiac rehabilitation programmes (Hofmann et al., 2014; Sardinha et al., 2011).

A systematic review and meta-analysis conducted by Reavell et al. (2018) examined the effectiveness of CBT for anxiety and depression in patients with CVD, across 12 randomised control trials. Results of the review indicated that depression and anxiety scores were considerably lower for patients who received CBT compared to the control groups. Furthermore, the findings revealed positive changes in mental health. The quality of life was significantly higher in the CBT groups compared to the control groups. Based on the synthesis of the data, it is concluded that CBT appears to be an effective strategy in reducing depression and anxiety in patients with CVD. These findings suggest that the inclusion of behavioural modification therapy, such as CBT, may play a critical role in enhancing self-management strategies and overall well-being for individuals with CVD (Reavell et al., 2018).
9.3.1.6 Summary of the Acquisition of Knowledge

These qualitative findings shed light on the perceptions towards the acquisition of knowledge for cardiac patients. The key findings exposed several important aspects. First, it became evident that patients’ knowledge about their medical condition is likely to be low and there are notable differences in opinions between staff and patients in this area. Second, patients demonstrate good understanding of the risk factors associated with their condition but there appears to be a gap between knowing these factors and the likely ability to implement strategies to reduce risk.

Third, a discrepancy emerged between patients and staff regarding the understanding of exercise resumption, suggesting a potential issue related to anxiety and confidence. Fourth, while staff generally believed that patients have sufficient understanding about nutrition, patients expressed a desire for more education and guidance in this aspect. Finally, both patients and staff did not view psychosocial risk education as a priority during the inpatient period. However, it is important not to overlook the significance of addressing this risk and providing appropriate education in this area.

In summary, the qualitative findings pertaining to the acquisition of knowledge highlighted the need for individualised educational interventions and effective communication between staff and patients. These are essential for bridging any unaddressed gaps in knowledge, providing support for risk reduction strategies, addressing anxiety and confidence issues, providing effective education, and ensuring that unmet educational needs are not neglected. By addressing these requirements, healthcare providers will better meet the needs of individuals with CVD and support their overall health and well-being.
9.3.2 Checking Understanding and Information Overload

To search deeper into the aspect of the research question regarding cardiac patients’ and health care professionals’ understandings of the patients’ levels of knowledge, an additional objective was to explore how they believe understanding is assessed. This was to shed light on the perceived methods and criteria used by health care professionals to evaluate a patient’s level of understanding following the delivery of inpatient education. By examining these perceptions, the study sought to gain an understanding of the assessment process including how health care professionals and patients perceive assessment of understanding is executed, and the value they attribute to it. This exploration provides a more nuanced understanding of the dynamics surrounding the assessment of knowledge within this clinical context, and provides valuable insight for improving educational approaches for individuals with CVD.

9.3.2.1 Staff

The staff perceptions varied regarding the incorporation of routine knowledge assessments into practice. The majority of staff acknowledged the importance of evaluating health and general literacy before initiating education, but their approaches to assessing patients’ levels of understanding differed. Some staff relied on asking the patients if they had any further questions to gauge their understanding. While this approach promotes patient engagement and encourages them to seek clarification on any information they are unclear about, it does rely on the patient first recognising that they have not understood the information provided and often patients lack this insight (Engel et al., 2009). Alternatively, other staff used a teach back/tell back/feedback loop method. This approach involves having the patient
explain the information they have received and provides the health care professional with the opportunity to assess comprehension (Yen & Leasure, 2019). Both approaches actively engage patients in the learning process and allow an opportunity to identify areas that require further clarification or reinforcement.

In relation to the utilisation of the teach back methods in health education, a systematic review conducted by Yen and Leasure (2019) explored how teach back influences self-management of chronic disease and health outcomes. The results revealed that teach back was associated with positive patient satisfaction, reduced post discharge readmissions, positively influenced disease related knowledge, and enhanced health related quality of life (Yen & Leasure, 2019). The findings of the review provide support for the effectiveness of incorporating teach back as a component of educational practice and demonstrated this assessment method has the potential to positively influence patient outcomes across a number of clinical settings.

The different approaches to assessing patients’ levels of understanding within the context of CVD education suggests a lack of standardisation or a universally adopted approach in this area. The absence of a consistent approach to assessment methods may underscore the complex nature of patient education and suggests an inherent requirement for individualised education. However, this situation presents a dilemma parallel to the ‘chicken and egg’ paradox. In the absence of incorporating an assessment of understanding, it becomes challenging to effectively individualise educational delivery to meet the needs of the patients with CVD.
9.3.2.2 Patients

In relation to having knowledge assessed, patients shared varied experiences within the hospital setting. Some patients expressed that health care professionals tried to ensure their understanding by inquiring if they had any further questions. Additionally, one patient reported that although this assessment may not have occurred during the hospital stay, staff did assess their understanding after discharge. Discussions between the patients also brought attention to the timing of knowledge assessments. Several of the patients reported limited opportunity to comprehend information while in hospital, and it was not until after discharge, once they had a time to recover, they were able to process the provided information.

9.3.2.3 Information Overload

Information overload presented as a significant theme in both the patient and staff focus groups and interviews. With the increasing global prevalence of noncommunicable diseases (WHO, 2022), self-management has become a crucial aspect for many individuals (Obamiro & Lee, 2019). Consequently, now, more than ever before, patients require the knowledge and capacity to effectively self-manage their health conditions. However, while it is important for patients to receive adequate education to self-manage, patients are exposed to overwhelming amounts of health information.

Information overload occurs when the volume of information provided within a certain timeframe exceeds an individual’s processing capacity (Eppler & Mengis, 2004). Information overload can lead to the inability to attentively absorb and accurately process information, potentially resulting in a reluctance to seek further information (Obamiro & Lee, 2019). The consequences of information overload in
the context of chronic disease include negative health outcomes and a decline in health related quality of life (El Sherif et al., 2018).

Both staff and patients acknowledge the extensive amount of information provided in the hospital setting, and recognised that patients may not have the mental capacity to absorb or understand this information at that time. Staff identified a strategy for mitigating this barrier—they conduct education sessions in the presence of family/whānau, thereby promoting better retention and comprehension at a family/whānau level by educating the people closest to the patient. While the provision of patient education is crucial, it should be provided in a manner that accounts for the cognitive limitations caused by the hospital environment and information overload.

9.3.2.4 Reconceptualising Inpatient Educational Delivery

The views reported by the participants in the focus groups and interviews are consistent with the findings from research conducted by Townshend et al. (2023) and support the notion that patient retention of health information after hospital discharge is an area of concern. The aim of Townshend et al.’s research was to understand how well patients retained important health information after hospital discharge. The study involved 53 patients, and the recall of information was assessed within 24 and 48 hours after discharge. Although 90% of patients reported confidence in their disease related knowledge, results indicated that on average only 54% of patients were able to recall key information pertaining to their diagnosis, inpatient treatment, post discharge instructions, and medication management (Townshend et al., 2023). These findings highlight the potential gap between patients’ perceived confidence in their knowledge and their actual retention of critical information, which raises an
important question about optimal timing for patient education, particularly in the context of the low attendance rates in cardiac rehabilitation.

In light of these insights, it is crucial to consider the most effective time to provide education. The intra and immediate post-hospitalisation period, while being a critical time for educational delivery to ensure patients are safe for discharge, may not be the ideal time to deliver large amounts of information or for conducting comprehensive assessments of absolute understanding. Patients may have limited capacity to absorb information during this time of their recovery, and their levels of understanding may not accurately reflect their comprehension. While clinical staff are already aware of these challenges, as highlighted in the focus group and interview discussions, this situation poses a dilemma for the design of educational delivery. Patients require information to safely and effectively self-manage after discharge, but re-conceptualising the nature of delivery may be required. The timing of educational delivery and the standardisation of knowledge assessments should be integral components of a pedagogical approach when designing effective cardiac rehabilitation programmes.

It may be opportunistic to conduct a rapid assessment of the patient’s knowledge during the inpatient period. This assessment would help identify gaps in knowledge that pose safety concerns, enabling targeted interventions before discharge. It would serve as the foundation for an individualised educational programme tailored to meet the patient’s needs. Initiating this plan within 7 to 10 days post discharge would promote understanding and work towards enhancing engagement with cardiac rehabilitation, as patients would be able to see how it directly relates to their situation.
By incorporating baseline knowledge assessments at an appropriate time, health care professionals can maximise the impact of educational interventions, optimising patient comprehension and retention of information. While some rehabilitation departments across Aotearoa New Zealand employ a variation of this approach, there is no standardised practice in place. A lack of standardisation can result in inconsistency and variability in the delivery of educational interventions, potentially hindering desired outcomes. Standardisation will promote a consistent approach across different healthcare settings, improve the patients’ abilities to self-manage, and increase the likelihood of successful cardiac rehabilitation outcomes.

9.3.3 The Impact on Mental Health

CVD affects physical health and has significant implications for mental health and well-being (Mulle & Vaccarino, 2013; Peterson, 2020). While the earlier analysis of the ‘acquisition of knowledge’ highlighted that neither patients nor staff considered education on psychosocial risk a priority during the immediate hospitalisation, general discussions revealed the overt and subconscious impact CVD has on mental health. The relationship between CVD and mental health is complex and bidirectional, with each having an influence on the other; and prioritisation of mental health may reduce CVD risk and improve condition related well-being (Kwapong et al., 2023).

Being presented with a diagnosis of CVD can lead to increased psychosocial distress, which can include symptoms of anxiety and depression (De Hert et al., 2018). A new diagnosis can have profound effects on an individual living with chronic illness and can trigger a range of emotional responses. Living with chronic disease heightens concerns about mortality and morbidity, can require unwanted life-
style changes, and can impose potential limitations caused by a disease. Living with chronic illnesses are likely to contribute to the development or exacerbation of mental health issues (Patel & Mancuso, 2023).

Additionally, the physiological factors involved in CVD, such as inflammation and oxidative stress (Dubois-Deruy et al., 2020), have also been implemented in the development of various mental health disorders including anxiety, depression, schizophrenia, and bipolar disorders (Salim, 2014). These shared mechanisms suggest a complex relationship between cardiovascular health and mental health, with physical factors contributing to the development of both conditions.

Not only does a history of CVD increase the risk of developing mental illness, there is substantial evidence suggesting mental health conditions contribute to the development and progression of CVD (De Hert et al., 2018). There is a higher prevalence of mental health disease amongst patients with CVD compared to the general population (Correll et al., 2017). Furthermore, the presence of mental health conditions can influence behaviours and lifestyle choices that further increase the risk associated with CVD. These behaviours include physical inactivity, poor nutrition, smoking, and non-adherence to medications, lifestyle, and treatment plans. It creates a complex relationship, where each condition negatively impacts the other.

Complicating the relationship between mood disorders and CVD is the fact that many of the medications use in the treatment of these conditions can have a bi-directional effect, negatively impacting the other condition (Amare et al., 2017). Thus the need for a comprehensive approach to management that addresses both the physical and mental health needs of individuals with CVD. By recognising the bi-
directional relationship, health care providers can develop treatment and educational plans that meet the holistic needs of the individual.

While global recommendations and guidelines underscore the significance of an integrated approach to cardiac rehabilitation and education that addresses both the physical and mental health needs of individuals with CVD (Amsterdam Ezra et al., 2014; British Association for Cardiovascular Prevention and Rehabilitation, 2023; Heidenreich et al., 2022; Liew et al., 2021; National Institute for Health and Care Excellence, 2020; O'Gara et al., 2013; Scottish Intercollegiate Guidelines Network, 2017; Stone et al., 2021; Woodruffe et al., 2015), the practical implementation of a fully functioning multidisciplinary team to support this integrated approach is often impeded by funding constraints. Consequently, addressing these funding limitations becomes crucial to ensure that individuals with CVD receive the comprehensive and holistic care they require to improve their health outcomes and quality of life.

An effective strategy may be to combine an integrated approach with education that explores behavioural intervention, such as CBT, as discussed earlier. CBT equips patients with coping strategies which empowers them to adopt healthy behaviours that reduce the impact of mental illness and CVD. The role of education during the inpatient period for individuals with CVD is crucial in laying the foundations for self-management and facilitating a successful transition to the post discharge phase. It provides awareness of the psychosocial risk associated with CVD and offers an opportunity to normalise these experiences, reducing stigma. By including this education, patients are empowered to proactively address their mental health needs, seek support, and develop coping strategies that contribute to their overall well-being.
By integrating mental health education into inpatient cardiac rehabilitation information, health care professionals are addressing the interconnectedness of mental health and CVD. Such an approach can enhance self-management, promote overall well-being, and improve patient outcomes. However, it is essential to address funding barriers to ensure that comprehensive and multidisciplinary support for patients is available.

9.3.4 Unmet Educational Needs

The findings from this study revealed that upon leaving hospital patients still had unanswered questions. A common question that remained lingering in their mind was ‘why me?’ Both staff and patients expressed this as the most prominent unanswered question and reflects the challenges individuals face when trying to comprehend their new diagnoses and come to terms with living with a chronic illness. These unanswered questions speak to the emotional and psychological needs of individuals faced with a new health issue and demonstrates a desire for making sense of the situation. The study participants highlighted that understanding the factors contributing to their illness provided a sense of control, aided in developing acceptance of the situation, and laid the foundations for their recovery journey.

Klitzman (2023) endeavoured to explore the underlying meaning behind why patients commonly ask ‘why me?’ By synthesising the results of various qualitative studies that explore participants views, experiences, challenges, and decisions when confronting serious medical issues, the author sought to understand the complex psychological processes behind this question. The findings concluded that asking ‘why me?’ holds a multitude of meanings (Klitzman, 2023). While patients often recognise the question as rhetorical, commonly they are seeking understanding
towards the underlying cause of their disease. Other patients may question why they are being singled out and ponder why this is happening to them instead of someone else. The author also reported that this question is reflective of an individual’s social context and the input of family, friends, or others. Furthermore, the act of asking ‘why me?’ can be a way the individual processes the journey of illness, and can be shaped by a range of emotional factors including disappointment, anger, despair, depression, or can even be a result of a sense of guilt (Klitzman, 2023).

The question reflects the complex emotional landscape individuals navigate when confronted by serious medical conditions. Klitzman’s work underscores that when an individual poses this question, assuming that they are merely seeking an understanding of the cause of their illness may only scratch the surface of what the individual is genuinely asking. Hence, the importance of addressing the emotional, physical, and educational needs of patients coming to terms with a serious illness.

Furthermore, in relation to unanswered questions, the study findings revealed a significant discrepancy between the patients’ and staff’s opinions regarding the clarity of post discharge treatment and management. Patients expressed a lack of clarity, which resulted in anxiety regarding important aspects such as timing, location, and the contact person for follow-up care after discharge. This differed from the staff’s perceptions that patients were provided with clear instructions about their next steps after leaving hospital.

Discrepancies in perceptions were also reported in previous research conducted by Horwitz et al. (2013). The authors conducted a prospective observational study of 395 patients aged 65 years and older, who had been discharged after a hospitalisation for ACS, heart failure, or pneumonia. The aim was to evaluate transitional care, including discharge practices, patient understanding of
diagnosis and follow-up appointments, and patient perceptions and satisfaction with discharge care. Results concluded a discrepancy between patients’ self-reported understanding and their actual comprehension after discharge. While 95.6% of patients reported that they understood their diagnoses and treatment, only 59.6% were actually able to accurately repeat this information. Furthermore, for patients who had a scheduled follow-up appointment, only 43.9% were able to fully recall the details of these arrangements (Horwitz et al., 2013). These findings reflect those discussed earlier (see Section 9.3.2), from Townshend et al.’s (2023) study that found despite high patient confidence, only 54% could recall critical health information after hospital discharge.

These findings highlight the importance of recognising and addressing the gaps between patients’ perceived understanding and their actual comprehension. Effective communication and education programmes are crucial in ensuring patients have a clear understanding of their diagnosis, treatment, and follow-up care. Having a standardised practice towards assessing patients’ understanding, providing written material, reinforcing key information, and developing individualised cardiac rehabilitation plans may help bridge any gaps and improve patient outcomes.

**9.3.5 Summary of the Qualitative Discussion**

In this discussion of the findings from the qualitative component of the study, patients’ and cardiac health care professionals’ understandings of what patients know after engagement with acute cardiac hospital services were explored. This stage of the study aimed to investigate what patients and health care professionals consider is understood by patients and how understanding is assessed.
The findings were organised into several themes. The first theme, ‘acquisition of knowledge’, examined the patients’ and staffs’ perceptions of knowledge across various domains related to cardiac health. In terms of medical condition, patients reported feeling well-informed upon discharge, while staff had a different viewpoint. Regarding risk factors, participants generally agreed that patients were well informed, although some gaps in knowledge was identified. The topic of exercise evoked strong emotions among patients, with some expressing confusion and anxiety. This is in contrast to the staff who perceived patients were discharged with clear exercise plans. Similar disparities were observed in the area of nutrition, where staff believed patients had good knowledge, while patients expressed confusion and a desire for more education. Additionally, psychosocial risk was not comprehensively addressed during the hospital inpatient setting, as both patients and staff considered this a low priority at that time.

The next themes, ‘checking patients’ understanding and information overload’, examined the varied approaches staff use to assess patients’ levels of understanding. In this discussion, patients reported varied experiences with having their knowledge assessed, and highlighted that this process may be best completed after discharge, because the ability to comprehend during the hospital period was limited. The third theme, ‘the impact on mental health’, highlighted the bi-directional impact of mental illness and CVD. The final theme explored the unanswered questions patients were left with, particularly the common question of ‘why me?’. It reflects the patients’ need for understanding and a desire to gain a sense of control. Furthermore, there was a notable discrepancy between staff and patients regarding the clarity of discharge treatment and management, with patients expressing a level of confusion and staff believing clear instructions were provided.
These findings underscore the need for individualised and targeted education in the inpatient period, which incorporates checking understanding, addressing any gaps in knowledge, and addressing mental health concerns. Clear communication and support are essential for bridging the gap between patients’ and staffs’ perceptions and actual understanding to ensure optimal patient outcomes and well-being.

9.4 Key Findings from the Mixed Integration: A comprehensive Discussion

The integration of the quantitative and qualitative data in this study offers a comprehensive examination of the heart health knowledge among a cohort of patients with CVD in Aotearoa New Zealand. Individually, the quantitative and qualitative data provided valuable insights into participants’ knowledge levels and perceptions of knowledge. However, by integrating these two types of data, more detailed and nuanced understanding of heart health knowledge is achieved.

The primary purpose of integration was to fulfil the fifth objective of the study; analyse and identify, through the integration of data, variations between knowledge scores and participants’ assumptions of patients’ understandings. Through integration the research takes a holistic approach to understanding what patients truly comprehend about their heart health, considering both objective measures and subjective perceptions. The analysis of the integration presented the findings across three themes: acquisition of knowledge; the impact of information overload and miscommunications; and the relationship between knowledge, cardiac education, and mental health.
9.4.1 Acquisition of Knowledge

Acquisition of knowledge reflects the process by which individuals gain new information, understanding and skills, or build upon what is already known (Al-Emran & Teo, 2020). In the context of the current study, it investigates what patients know about their heart health and explores what this means for health outcomes and self-management. Assessing the acquisition of knowledge is essential for the development and evaluation of effective cardiac health education programmes. Knowing the level of knowledge among patients helps educators identify knowledge gaps and tailor educational materials to address specific needs. It is important to recognise that understanding is a multifaceted concept, and the nature of knowledge, including how it is acquired, is not a linear process. By integrating quantitative and qualitative data, this study provides a comprehensive exploration of patients’ understanding towards their medical condition, risk factors, exercise, nutrition, and psychosocial risk.

The analysis of the integrated data in this study revealed areas of agreement and disparities between assessed knowledge scores and the perceptions of participants regarding patients’ understandings of heart health. While some aspects showed consistency between the objective knowledge scores and participants’ self-perceptions, other areas demonstrated notable gaps or discrepancies.

9.4.1.1 Areas of Alignment

Specifically, patients’ views about their medical condition and nutrition knowledge aligned with the findings from the objective knowledge scores which indicates that patients’ self-perceptions in these areas agree with their actual knowledge scores. Additionally, discussions during the staff focus groups and interviews reported the difficulties patients had with understanding medications,
which also aligned with the findings from the CADE-QII results. Staff perceptions differed with patients regarding patients’ understanding of exercise. Staff perceived patients had good understanding about exercise resumption which aligned with the results from the knowledge scores. These findings suggest that, in some instances, participants’ perceptions aligned with the actual knowledge scores. These areas of agreement can be utilised as a foundation for reinforcing and enhancing existing knowledge and education, particularly during the fast-paced immediate inpatient period.

9.4.1.2 Areas of Discrepancy

Likewise, the analysis brought attention to discrepancies between knowledge scores and participants’ perceptions of patients’ heart health comprehension. Specifically, the CADE-QII scores suggested that patients’ knowledge towards their medical conditions were likely to be higher than the staff believed. However, it also revealed that patients’ knowledge of risk factors and nutrition may not be as high as the staff had perceived. Additionally, patients articulated concerns about their knowledge regarding exercise resumption, whereas the objective scores indicated a high level of understanding in this area. The discrepancies within the domains of risk factors and exercise suggest the existence of a knowledge and confidence to exercise gap.

This gap may occur when individuals process the knowledge, but lack the confidence or self-efficiency to apply that knowledge. In the context of cardiac health, it may manifest as a patient having knowledge about the importance of exercise and risk reduction, but being uncertain or anxious how to resume exercise safely, or make the necessary behavioural lifestyle changes. The National Heart
Foundation of New Zealand (2023) reported that many people worry about the safety of exercising after a heart attack. Patient centred education incorporating strategies, such as goal setting and practical demonstrations, can be utilised to bridge this gap. By addressing the knowledge and confidence to exercise, healthcare providers can empower patients to take an active role in more effectively managing their CVD.

**9.4.1.3 New Learnings About the Acquisition of Knowledge**

It is important to note that there is no discernible pattern indicating whether staff or patients’ perceptions are more likely to align, or not, with objective knowledge scores. Therefore, a patient-centred and comprehensive approach to education remains essential and by conducting a knowledge assessment at the commencement of this process, health care professionals can establish a solid foundation from which to derive tailored and meaningful educational strategies. Such assessments will help identify individual knowledge gaps, misconceptions, and areas of strength, allowing educators to address specific and urgent needs in the inpatient setting and build upon existing knowledge.

The integrated analysis raises a crucial question about the acquisition of knowledge: How much knowledge is considered sufficient? In this study, approximately 60% of all questions were answered fully correct, while an additional 25% had partially correct answers, leaving only 15% of questions demonstrating no or incorrect understanding. This result prompts an exploration into what constitutes an acceptable level of understanding for patients.

To determine an acceptable level of understanding, multiple factors should be considered by health professionals. First and foremost, do patients possess the knowledge required to safely manage their health post-discharge? This includes
immediate knowledge about their medical condition, treatment plans, and follow-up, medications, and potential warning signs of complications and the course of action should these occur. Equipping patients with this essential information is crucial for their effective self-management, safety, and well-being.

Cardiac education is ideally culturally and contextually situated. Individual patient goals, preferences, cultural needs, and their social context all play a significant role in determining what are acceptable levels of understanding. Recognising and respecting the patients’ beliefs, values, and social support systems will ensure that the educational content is relevant and relatable to the life of the patient. This emphasis on cultural needs is central in the Aotearoa New Zealand guidelines (Liew et al., 2021) and using this approach places the patient at the centre. Therefore, measurable health outcomes are not the main drivers for health service delivery, but the patient’s individual needs become central. Ultimately, an acceptable level of understanding transcends knowledge scores and benchmarks. It revolves around empowering patients to effectively manage their health condition to support their own needs and preferences. It fosters a sense of confidence to self-manage and to make informed decisions toward overall physical health and mental well-being.

9.4.2 Information Overload and the Impact on Misunderstanding

In the course of the focus group and interview discussions, both staff and patient participants expressed their concerns about the overwhelming abundance of information within the inpatient setting. Consequently, patients are faced with the daunting task of navigating copious amounts of data, especially concerning new medications and vast amounts of nutritional resources. Although information overload can manifest in various aspects of cardiac health, it is particularly
noteworthy that both patients and staff highlighted nutrition and medication as areas of specific concern. Significantly, these areas are also the topics where the objective knowledge scores indicated room for improvement.

The surge in available health resources over the last few decades has contributed to the phenomenon of information overload for patients (Khaleel et al., 2020). Furthermore, certain predictors for information overload such as low prior education levels, limited health literacy, and socioeconomic status (Khaleel et al., 2020) coincide with risk factors for CVD and act as barriers to cardiac rehabilitation attendance. Despite health care professionals’ best intentions, they might unintentionally contribute to information overload, leading to negative emotional health consequences for patients including anxiety, stress, and antagonism (Swar et al., 2017).

A cross-sectional study by Liu and Kuo (2016) explored the relationship between information overload and patients’ intent to engage with educational materials for self-care management. The results, derived from interviews of 106 newly diagnosed patients with CAD, suggest a negative correlation between perceived information overload and the intention to read self-management resources. In addition to these findings, another study highlighted a further negative outcome of information overload within the clinical setting wherein the situation risks impairing communication between patients and healthcare providers (Costello, 2016). In Costello’s (2016) study, patients reported feeling too overwhelmed to ask questions at the time of consultation, and to mitigate this situation patients in the study resorted to self-directed online searching to fill in any knowledge gaps.

The implications of information overload for inpatient education are significant and should be carefully addressed to ensure optimal patient
understanding, engagement, and overall well-being. The consequence of not addressing information overload carries the risk of creating an overwhelming environment where patients struggle to comprehend and retain essential information. Moreover, patients burdened by information overload may be less inclined to engage with educational materials during their inpatient stay, impeding their access to crucial information. Such limitations in engagement may compromise their ability to safely self-manage after discharge and they may fail to identify with the benefits of attending further cardiac rehabilitation.

A sense of feeling overwhelmed may drive patients to self-directed online searches to fill knowledge gaps, which presents the risk of accessing unreliable or conflicting information, resulting in further confusion and misinformation. Health care professionals should aim to present information in a digestible and phased manner, catering to individual needs and preferences. By tailoring education to meet the patient’s unique requirements, health care providers enhance the patient experience and contribute to improved cardiac health during and after the inpatient setting.

9.4.3 The Knowledge, Cardiac Education, and Mental Health Relationship

The final theme that emerged from analysing the integrated data revolved around the complex relationship between knowledge, cardiac health education, and mental health. Both staff and patients acknowledged that mental health or psychosocial risk education was not a priority during the inpatient stay. In general, they expressed concerns that focusing on such information at that time might lead to increased anxiety and distress about potential mental health issues or psychosocial risks that could be experienced later on. Participants considered this topic was best
covered in outpatient cardiac rehabilitation programmes. However, the knowledge scores related to psychosocial risk indicated that a significant number of participants lacked a clear understanding in this area. This suggests despite some correct answers, there exists a substantial knowledge gap or misunderstanding in this area among a considerable portion of patients.

The implication of these findings is that while mental health or psychosocial risk education may not be prioritised in the inpatient setting due to the concern of increasing anxiety, there is still a need for targeted education in this area because of the bidirectional relationship between CVD and mental well-being (Kwapong et al., 2023). The conflicting knowledge scores and participants’ perceptions highlight the importance of addressing knowledge gaps to ensure patients have adequate understanding.

Several international guidelines recommend including psychological interventions as part of a cardiac rehabilitation programme within their documents (Akten et al., 2021; de Melo Ghisi, Chaves, Loures et al., 2018; de Melo Ghisi et al., 2010; de Melo Ghisi & Oh, 2022; de Melo Ghisi et al., 2013a; de Melo Ghisi et al., 2013b; Freitas Pinheiro et al., 2014; McKinley et al., 2009; Santos et al., 2018; Santos et al., 2019). The European Society of Cardiology 2019 guidelines for the diagnosis and management of chronic coronary syndromes (Knuuti et al., 2019), established psychological interventions as a class one (‘recommended or indicated’) life-style management recommendation and endorse screening for depression and anxiety for patients with CVD. While education and interventions for psychological risk may not be best positioned during the inpatient period, screening during this time should be a priority (Tully & Higgins, 2014). The inclusion of rapid screening tools could be incorporated into an overall knowledge assessment to identify
immediate at-risk individuals, enabling the development of tailored education for their specific needs.

The staff in the current study acknowledged the substantial psychological impact of heart disease. However, while the significance of CVD and mental well-being is recognised, formalised systematic screening for psychological distress is likely to be under-performed during the hospital stay (Helmark et al., 2022; Tesio et al., 2017). An observational study using data from a National Audit of Cardiac Rehabilitation in the United Kingdom between January 2016 and December 2019, aimed to review the efficacy of screening for anxiety and depression among 138,018 participants in cardiac rehabilitation. The study revealed that only 59.8% of the population underwent screening, and several factors were associated with the likelihood of conducting these assessments: younger age, higher body mass index, residing in socially deprived areas, non-white ethnicity, currently smoking, reduced levels of physical activity, previous medical history, and cardiac intervention (Helmark et al., 2022).

**9.4.3.1 Reconceptualising Mental Well-being Screening for Acute Cardiac Inpatients**

To mitigate the potential risk posed by new CVD events to mental well-being, the utilisation of a hospital anxiety and depression scale during the inpatient period could support healthcare providers in identifying patients who require mental health assistance. The Hospital Anxiety and Depression Scale (HADS) is a widely used screening tool for assessing psychological distress in non-psychiatric patient populations (Zigmond & Snaith, 1983). It has been extensively utilised in the cardiac rehabilitation setting, and has been found to be reliable and valid for patients with cardiac disease (Bjelland et al., 2002; Pogosova et al., 2015) However, it is essential
to recognise that HADS is not effective in distinguishing between anxiety and depression (Cosco et al., 2012; Norton et al., 2013). Although it could be a valuable tool when administered during the inpatient period to quickly assess emotional distress in patients with CVD, it should not be relied upon as a diagnostic tool for determining specific mental health conditions.

Integrating the HADS, or a similar screening tool, into routine practice during the inpatient period empowers healthcare providers to promptly identify patients who may require more immediate mental health support. This proactive approach to mental health screening facilitates more timely education interventions and allows for the identification of at-risk patients who may not recognise a need for further cardiac rehabilitation education and support. By incorporating a rapid emotional distress assessment as part of the overall educational needs assessment, this patient centred care strategy effectively addresses mental health needs in conjunction with physical cardiac treatment. Consequently, it is likely to lead to improved outcomes and an enhanced quality of life for patients.

9.4.5 Summary of the Integrated Discussion

The mixed methods integration has provided valuable insights and identified three key themes: 1) acquisition of knowledge; 2) information overload and impact of misunderstanding; and 3) the relationship between knowledge, cardiac health education and mental health. Regarding the acquisition of knowledge, differences between perceptions of understanding and knowledge scores were observed, particularly in the domains of nutrition, risk factor knowledge, exercise knowledge and medical conditions. The complex relationship between participants’ perceptions and actual knowledge scores highlights the importance for more population-based
research. The question of how much knowledge is enough should be driven by the individual culture, personal and social needs of the person, while ensuring safety for discharge home.

The theme of information overload and its impact on misunderstanding indicates that information overload is a significant issue and of particular concern in the areas of nutrition and medications, also associated with lower knowledge scores. This finding may suggest that excessive information may hinder understanding. Moreover, the connection between knowledge, cardiac health education, and mental health highlights a disparity between perceptions and knowledge scores. Both patients and staff indicated a lack of emphasis on mental health education is needed during the inpatient setting, while the CADE-QII results demonstrated a significant number of incorrect responses to the psychosocial risk questions. Given the bidirectional relationship between mental well-being and CVD, the focus during the inpatient stay for psychosocial risk should be on screening rather than educational delivery.

Overall, the analysis of the mixed methods integration allowed for the identification of links that may not have been evident through a single methodological approach to the research question. These findings emphasise the need for targeted educational interventions, consideration of individual cultural needs and a focused screening for mental health concerns during the inpatient stay. By addressing these key points, healthcare providers can enhance patient-centred care, promote better understanding and ultimately improve patient outcomes and well-being.
9.5 Conclusion

This chapter has provided a comprehensive discussion of the results obtained from the quantitative, qualitative, and mixed analysis. The findings have been presented with a focus on the acquisition of knowledge; information overload; the unmet needs of patients; and the relationship between knowledge, cardiac education, and mental well-being. The next chapter explores how these findings align with the theoretical frameworks of the HBM and CCM, along with the philosophical positions of dialecticalpluralism and pragmatism. These discussions provided a theoretical context from which to interpret the results.
Chapter 10: Interpretations in Context with Theoretical Frameworks and Philosophies

10.1 Introduction

Incorporating theoretical frameworks such as the HBM and the CCM, alongside philosophical perspectives of dialectical pluralism and pragmatism, when interpreting the meaning of the study’s findings, offers a multifaceted lens through which to view the results. These frameworks provide valuable insights into the possible meanings behind the results. While dialectical pluralism encourages embracing diverse viewpoints and fosters communication, pragmatism underscores the need for practical, real-world solutions. By intertwining these theories and philosophies, an holistic understanding of the complexities of heart health knowledge is gained and provides guidance towards actionable recommendations for improving patient outcomes and well-being.

10.2 Health Belief Model

In Chapter 2, the HBM was introduced as a theoretical framework guiding the research. The HBM is a behavioural science theory that focuses on factors influencing behavioural change in individuals (Green et al., 2020). According to this model, the likelihood of an individual adopting preventative or therapeutic recommendations is influenced by their perceptions of several key factors. These factors include their perceived susceptibility to a health condition, their perceptions towards the seriousness of the disease, their belief in the benefit of the recommended treatments or preventative measures compared to the perceived barriers, and the confidence in their ability to successfully carry out recommended actions (Shojaei et
This model is deemed suitable for the context of cardiac rehabilitation due to the need for behavioural modification after a new diagnosis.

In the context of the HBM, the findings from this research provide valuable insight into how individuals perceive and respond to health-related information and education, particularly in relation to cardiovascular physical health and mental well-being. In regards to the differences observed between the participants’ perceptions of the acquisition of knowledge and the CADE QII knowledge scores, the findings align with several of the HBM’s cognitive constructs.

The qualitative data indicated that patients’ knowledge about their condition was initially low, but patients perceived it had improved by discharge. This improvement could be attributed to two important constructs within the HBM. Patients had experienced a new diagnosis or health condition, which may influence their perceptions towards the severity of their medical condition. Understanding the potential seriousness of their condition can motivate patients to seek information and actively engage in learning. Similarly, patients may have realised their susceptibility to adverse outcomes. These cognitive constructs could result in the patient’s desire to improve their medical condition related knowledge.

However, the staff’s belief that the patient’s knowledge remained low, may suggest a discrepancy between healthcare providers and patients. This could be reflective of the healthcare providers’ experiences with the disease severity and their perceptions toward the need for knowledge to manage the conditions. The quantitative data would lean towards supporting the patients. If the quantitative data supports the patients’ perceptions of improved knowledge, it may indicate that the patients’ beliefs about the severity and susceptibility of their condition positively influenced their actual knowledge acquisition.
Both staff and patients perceived medication knowledge as low, and the quantitative data supported these perceptions. This finding could be attributed to patients perceiving that barriers, such as complex medication regimes, outweigh the benefits of having knowledge understanding in this area; resulting in a lack of motivation to actively seek or acquire such knowledge. Addressing these barriers and emphasising the benefits of medication knowledge can potentially motivate more active engagement in learning about medications, leading to improved medication adherence and overall health outcomes.

Patients’ perceptions of their exercise knowledge being low may reflect a lack of self-efficacy in adapting and subsequently being able to maintain exercise routines. This signifies the patient participants’ confidence in their ability to know how to safely resume exercise after a heart event. Conversely both the staff perceptions towards patients’ exercise knowledge and the CADE QII scores demonstrate self-efficacy in this area. This finding suggests that objectively patients had better exercise knowledge than they perceived and there could be several reasons for the discrepancy between the patients’ and staff perceptions/CADE QII scores. Patients may underestimate their understanding and not realise they have the skills and knowledge to exercise effectively. Furthermore, they may lack confidence to apply their knowledge to practice, and support from healthcare providers may be advantageous in building this confidence.

The qualitative data revealed that both staff and patients did not consider psychosocial risk education a priority while an inpatient, suggesting that this may not be perceived as a severe or immediate concern requiring significant focus during the hospital stay. Lack of perceived urgency could be due to other immediate hospital priorities, a potential lack of awareness regarding the impact of psychosocial risk on
mental well-being, and time constraints limiting comprehensive discussions. However, the quantitative results indicated deficits in both psychosocial risk and nutrition knowledge. These results may indicate a lack of perceived need for action. As a result, a passive approach to education in the inpatient setting could be observed, potentially contributing to the knowledge deficits identified through the CADE QII assessment.

When addressing knowledge deficits and promoting education across the cardiac domains during the inpatient stay, healthcare providers can empower patients to make informed decisions about their health which could lead to behavioural modification and improved long-term health outcomes. The HBM emphasises the importance of perceived benefits and barriers in influencing health behaviours. The provision of education and information can increase patients’ understanding of the benefits of making informed decisions about their health.

The theme of information overload and misunderstanding also aligns with the HBM cognitive constructs; particularly, perceived benefits and barriers. Patients may recognise the importance of acquiring knowledge about their heart condition but overwhelming provision of education in the inpatient setting may actually be creating a barrier to acquiring health related knowledge. Too much information presented all at once can be challenging for patients to process, and the resulting information overload may reduce the perceived benefits of behavioural change.

Furthermore, the overwhelming amount of information may negatively influence an individual’s perceptions of their self-efficacy in implementing behavioural change. When patients feel they cannot fully grasp the information or navigate their complex condition, they may doubt their ability to make effective behavioural changes. This doubt may be addressed by assessing the patient’s
baseline knowledge, so that education can be prioritised to meet the patient’s needs, engage behavioural change, and sustain long-term outcomes.

The final theme from the integrated analysis concerned the relationship between knowledge, education, and mental health, and also related to the HBM construct of ‘cue to action’; more specifically, what prompts an individual to seek education about mental health risk and screening. Clue to action can act as triggers for behavioural change. In this study, triggers may have played a role in participants determining whether mental health education and risk assessment are a priority during the inpatient stay.

Despite the conflicting quantitative scores, the qualitative data suggest that the perceived severity and susceptibility of psychosocial risk did not outweigh the need for a focus on this during the inpatient stay. Thus, other factors such as immediate health concerns, other educational priorities, and a lack of time and resources could lead to a lower perceived need for psychological risk education and screening during this initial time. By understanding the dynamics within the findings from this study and the HBM, healthcare providers can design more effective and tailored educational interventions which promote better understanding, increased engagement with health information, and addresses the heart health concerns of the population.

10.3 Chronic Care Model

In the context of the CCM, also presented in Chapter 2, the findings from the mixed methods integration offer valuable implications for improving the effectiveness of education for patients with chronic conditions, such as CVD. The CCM is a model of care that focuses on improving chronic disease management
(Stone et al., 2021); in part, through reconceptualising the delivery of healthcare systems to actively empower patients to participate in their care. The patient’s knowledge of their health condition and ability to self-manage is central to this model.

The CCM emphasises the role of self-management in empowering patients to take an active role. Knowledge acquisition is a crucial aspect in enabling this process, particularly for patients with chronic conditions, including CVD. To make informed decisions, adhere to treatment plans, and effectively self-manage, patients with CVD require a level of knowledge and understanding about their condition. The differences between the perceived knowledge and the CADE QII scores underscore the need for an individualised approach when delivering cardiac education. Every patient’s knowledge level and learning needs are unique and tailoring education based on their requirements can lead to better engagement and participation.

Assessing patients’ knowledge levels during the inpatient period will serve as a foundation for developing meaningful education plans. Understanding their baseline knowledge gaps enables health care professionals to focus on areas of greatest need, even within time constraints. If education is tailored, it may foster an environment towards participation in more comprehensive outpatient cardiac rehabilitation programmes. The integration of the CCM into cardiac rehabilitation emphasises that acquisition of knowledge and self-management align, accentuating a patient-centred approach underpinned by individualised education.

Providing patients with manageable and relevant information about nutrition, medications, and other aspects of cardiac health is essential. Within the lens of CCM, supporting patients with chronic conditions to make decisions is fundamental and information overload leading to misunderstanding undermines this principle.
Supporting patients with manageable resources may avoid overload and an initial assessment of understanding will allow the healthcare team to focus on the individual’s needs. In avoiding information overload, patients are best positioned to make informed decisions about their health and well-being.

The integrated findings emphasised the relationship between knowledge, cardiac education, and mental well-being; and highlighted the importance of mental health screening to support the effective and timely delivery of services. As mental health is interconnected with CVD, to meet the needs of patients with chronic conditions healthcare systems should incorporate a rapid screening process as part of an initial educational needs assessment. Early identification and management of mental health concerns could have a positive impact on the patient’s overall well-being, treatment adherence, and long-term health outcomes.

Overall, the CCM provides an effective framework to consider the implications of the study findings. The CCM emphasises the importance of comprehensive, patient-centred care that addresses both the physical and mental health needs of the individual. When considering the best ways to deliver cardiac rehabilitation education, a focus on self-management support and decision-making support, which includes re-evaluating how the health system is designed and identifying what community resources are available, is crucial. Additionally, utilising health information technology can enhance patient-centred education and support. Incorporating the principles of CCM is likely to lead to improved patient outcomes, better patient experiences, and, ultimately, enhance the quality of life for individuals with chronic conditions.
10.4 Dialectical Pluralism

The quantitative findings indicate that the Aotearoa New Zealand’s cardiac knowledge scores align with international results, and a correlation with other countries’ overall CVD patients’ levels of knowledge has emerged. Even so, this finding does not suggest that knowledge is static but varies across different contexts, influenced by factors such as cultural, social, and contextual elements. The current study has emphasised the need for targeted interventions tailored to individual needs and cultural backgrounds, aligning with the dialectical pluralism ontology, which recognises the interconnectedness of these factors.

Moreover, the analysis of demographic factors highlights at-risk groups within the cohort, further emphasising the importance of personalised interventions. Within a position of dialectical pluralism there is recognition of the dynamic nature of knowledge and the need to consider various factors when addressing knowledge gaps. The findings regarding disparities in knowledge across different domains, such as nutrition, exercise, and medications, highlight the complexity of knowledge acquisition and retention; and acknowledges the dynamic and evolving nature of knowledge within the context of heart health.

The theme of information overload and its impact on misunderstanding underscores the need to find a balance between providing information and ensuring comprehension. It accentuates the need to consider the dialectical relationship between information delivery and understanding. Interpreting the study findings within the context of dialectical pluralism highlights the importance of engaging with opposing views and multiple perspectives to clarify critical conflicts and promote a more comprehensive understanding.
Mitchell’s (1982) description of dialectical pluralism as a form of communication that seeks to transform, converse, or clarify the phenomena under investigation within critical conflicts, aligns with the study findings. The research identifies disparities between the quantitative and qualitative findings, highlighting the existence of critical conflicts in the notion of understanding of knowledge. Dialectical pluralism suggests that instead of merely tolerating these opposing views, there should be an active effort to engage in communication that leads to transformation and clarification. In positioning this study within dialectical pluralism, the meaning of these conflicts has been considered.

Dialectical pluralism’s emphasis on the concurrent use of paradigms within the research process resonates with the mixed methods approach used in the study. By combining quantitative and qualitative methods, the value of multiple perspectives and paradigms is acknowledged and allows for a more holistic understanding of the complex issues surrounding patients’ levels of heart health knowledge. In the context of the study findings, dialectical pluralism encourages engagement in comprehensive dialogues to bridge the gap between patient and staff understandings and the CADE QII knowledge scores. It promotes a deeper exploration of the conflicts and disparities in understanding, ultimately leading to more effective communication and improved patient outcomes. Interpreting the findings through the lens of dialectical pluralism highlights the need for transformative communication and the concurrent use of paradigms to promote a more comprehensive understanding of cardiac rehabilitation education. Dialectical pluralism encouraged active engagement with opposing views and multiple perspectives, aligning with the study approach to MMR.
10.5 Pragmatism

The quantitative findings, which reveal comparable cardiac knowledge scores between Aotearoa New Zealand and international studies, align with a pragmatic position which focuses on practical outcomes. These results indicate a positive trend while underscoring the practical imperative to address knowledge gaps. Health policymakers should prioritise targeted educational programmes aimed at enhancing individual knowledge of heart health. Furthermore, the analysis of demographic factors that identifies at-risk groups aligns with a pragmatic perspective that emphasises addressing real world challenges. Tailoring education to the specific needs of these groups represents a practical step toward improving patient understanding and engagement.

The study findings regarding varying levels of understanding across different domains underscore the practical significance of adopting a comprehensive and patient centred approach to inpatient education. This alignment corresponds with a pragmatism focus on practical approaches that yield tangible benefits. In the qualitative discussion, the diverse approaches employed to assess patients’ levels of understanding and waiting to address mental health education until after discharge, also resonates with a pragmatism philosophy which emphasises real world, immediate problems. In contrast, the comprehensive analysis of the integrated data, underscored the need for targeted educational interventions that cater to the immediate needs of patients and highlighted the importance of screening for mental health concerns. Once again, emphasis on practical actions is aimed at enhancing patient-centred care and promoting better understanding.

In summary, interpreting these findings through a pragmatic philosophical lens accentuates the practical steps, interventions, and solutions required to enhance
cardiac education, fostering patient understanding, and, ultimately, leading to improved patient outcomes and well-being. Pragmatism focuses on real-world consequences and the practical actions to be discussed in the next chapter will align seamlessly with the recommendations derived from these key findings.

10.6 Conclusion

Interpreting the study findings within the context of theoretical frameworks, such as the HBM and the CCM, has enriched the insights gained in several ways. The HBM has allowed for a deeper understanding of how patients perceive and evaluate their own cardiac health, shedding light on the factors influencing their knowledge and behaviours. Meanwhile, the CCM has provided a position from which to consider how to support patients’ needs in managing CVD.

Additionally, the incorporation of philosophical perspectives, such as dialectical pluralism, has broadened the insights gained by emphasising the importance of embracing multiple paradigms and perspectives. This approach has facilitated a more nuanced exploration of the complex interactions between patients, health care professionals, and the healthcare system. It has highlighted the need to engage in transformative dialogues and communication to clarify diverse perspectives and improve patient-centred care.

Pragmatism has brought a practical dimension to the interpretation of findings. It has underscored the significance of translating theoretical insights into actionable steps that can lead to tangible improvements in cardiac healthcare. Pragmatism focuses on addressing real world challenges and immediate problems, and has been instrumental in considering recommendations and interventions that can enhance patient outcomes and well-being. The integration of theoretical frameworks, like HBM and CCM, along with philosophical perspectives, such as
dialectical pluralism and pragmatism, has added depth and breadth to the insights gained from this study. It has enabled a more holistic understanding of cardiac rehabilitation education.

Chapters 10 and 11 present the concluding discussion regarding the implications of the study results, and provide valuable insight for future educational design and delivery. The subsequent conclusion will consider the consequences for both practice and research, and will present a suggested future model for RAPID inpatient knowledge and psychosocial risk assessment.
Chapter 11: Implications for Practice

11.1 Introduction

This chapter signifies a noteworthy development in the landscape of cardiac health research, specifically within the Aotearoa New Zealand context. It considers the implications for practice from the research findings which shed light on patients’ knowledge levels regarding their cardiac health within this unique setting. Additionally, this chapter introduces a future model and approach for acute inpatient cardiac rehabilitation education and psychosocial screening. The framework advocates for a timely evaluation of knowledge and psychosocial well-being among recently diagnosed acute cardiac patients, with the potential to enhance cardiac care practices in Aotearoa New Zealand and on a broader scale.

11.2 Implications for Practice

This research explored what patients understand about their heart health following a new cardiac diagnosis, and what are cardiac patients’ and health care professionals’ understandings towards patients’ levels of knowledge. This was the first research of its kind to be completed in Aotearoa New Zealand. It has significant implications for local practice and the findings can make a valuable contribution to cardiac health and education.

The inpatient period is relatively brief, often involving intensive treatments, and can be an overwhelming time for an individual. Therefore, education needs to be well-directed and tailored to meet the specific needs of the individual. The significance of identifying areas of limited knowledge acquisition in the population cannot be overstated.
Previously, health care professionals in Aotearoa New Zealand have relied on clinical experience, guidelines/recommendations, and international studies to consider areas where education should be focused to meet the patients’ needs. The current research has examined patients’ perceptions and knowledge scores within the unique context of Aotearoa New Zealand. The findings provide context-specific data that health care professionals can utilise to guide the development of targeted and comprehensive patient education programmes. By addressing the knowledge gaps identified in this study, such tailored educational programmes can aim to promote better self-management and patient outcomes for individuals in Aotearoa New Zealand.

This research has explored the relationship between several demographic factors and knowledge scores. The findings from these data, alongside the findings from international studies, will support health care professionals when considering where targeted education should be focused. The findings also support the need for health care professionals to consider factors such as educational background, socioeconomic or employment status, smoking, age, gender, and ethnicity when determining patients at risk of having lower levels of understanding about their CVD. Ensuring that materials and education are culturally sensitive and linguistically appropriate, such as using simple language, avoiding medical jargon, and actively engaging patients, will foster an environment that promotes better comprehension.

To achieve a comprehensive understanding of patients’ knowledge, the most reliable approach is to directly inquire about their comprehension. The first recommendation of this study is the implementation of a standardised practise across Aotearoa New Zealand that assesses the baseline knowledge of patients, as this would best position health care professionals to tailor education to meet the most
immediate needs of the individual. Such a tailored approach would foster meaningful engagement with the patients and their family/whānau, ultimately enhancing the overall educational experience.

Furthermore, this research has significantly highlighted the absence of a routine practice or approach for evaluating patient psychosocial risk. Therefore, a second recommendation would see the introduction of a screening for psychosocial risk, so that immediate gaps can be identified. Addressing the psychosocial concerns through targeted education means patients are better positioned to take care of their own health and well-being. Education is more likely to resonate with them and promote future engagement in further learning opportunities, ultimately enhancing the confidence of patients with heart disease to efficiently self-manage their condition.

The third recommendation arising from this study underscores the importance of developing targeted public awareness campaigns and enhancing inpatient education programs to align with current nutritional guidelines, particularly pertaining to the daily food group consumption of fruits and vegetables. This recommendation remains pertinent, even in the context of evolving dietary guidelines, as the research findings underscore a prevalence of confusion in this area. To effectively address this issue, it is advisable to establish a collaborative working group comprising representatives from diverse cultural backgrounds and key stakeholders in the delivery of health promotion, such as the New Zealand Heart Foundation, Te Whatu Ora, and the Cardiac Society of Australia and New Zealand. The collaborative efforts of these groups are best positioned to facilitate the promotion of informed dietary decision-making, ultimately resulting in enhanced dietary habits, reduced anxiety, and improved overall health outcomes.
11.3 Model for a Future Approach Towards Acute Cardiac Rehabilitation

Inpatient Education and Psychosocial Screening

The delivery of effective inpatient education holds immense significance, particularly because for many patients it may be their only access to health care professionals with specialised knowledge and experience in managing cardiovascular health. Given the time-constrained nature of the inpatient stay, this period becomes a crucial opportunity to provide impactful education that influences a patient’s understanding and future engagement with cardiac rehabilitation education. To address these priorities, a ‘RAPID’ future model for assessing heart knowledge and screening psychosocial risk is proposed. This model aims to empower health care professionals to create rapid, targeted, prioritised, and individualised educational plans to meet the immediate needs of the patient. The term ‘RAPID’ within this context emphasises the model’s ability to be used quickly for the identification and resolution of educational needs.

Table 11.1

| Culturally sensitive approach | The model emphasises cultural sensitivity, ensuring inclusivity in the design stage, and promotes customised care for diverse and at-risk subpopulations. This would be achieved through consultation and ensuring cultural representation when developing the RAPID assessment tool. Staff education would focus on cultural safety and population needs to promote meaningful and effective educational design and delivery. |
| A national standardised baseline knowledge assessment tool | The model would begin with the implementation of a baseline knowledge assessment to identify the immediate |
inpatient educational needs. This information could be collected through the use of a tool such as the well-validated CADE-QII or CADE-SV. The intention is this process is a precursor to the implementation of a programme underpinned by the cardiac rehabilitation guidelines for Aotearoa New Zealand (Liew et al., 2021). This is to support effective cardiac rehabilitation delivery and not be considered an alternative approach.

| A national approach to early rapid screening for psychosocial risk in patients admitted following a new heart event | In light of the significant findings that have highlighted the relationship between knowledge, cardiac education, and mental health, a HADS screening component should be included in the Aotearoa New Zealand RAPID assessment tool. |
| Training for health care professionals | Staff education to facilitate effective implementation of knowledge assessments and screening. Training would include educational principles to support patient understanding of their heart health and the psychological aspects. |
| Ongoing periodic knowledge assessments | Having points of assessment will ensure continuous monitoring of the patient’s knowledge or acquired misinformation. These regular evaluations would be timed for the early discharge period and following the engagement in cardiac rehabilitation. It would provide an opportunity to identify evolving gaps and tailor education accordingly. |
| Development of tailored education | Based on assessment findings, educational plans would target patient’s needs, so that knowledge gaps are addressed and the delivery of information already known is not commandeering valuable time. |
| Data analysis and ongoing reporting | The collection and regular auditing of data will allow analysis to identify trends, population knowledge gaps, and areas for regular improvement. Comprehensive reports would inform evidence-based practice, quality improvement and strategic planning. |
| Continuous improvement and adaption | This model would embrace a culture of continuous improvement. The process |
By embracing this model, health care professionals could rapidly gain insight into their patients’ understanding and psychosocial needs during the immediate inpatient stay. This comprehensive approach promotes a rapid assessment of the individual’s needs, so that essential information can be the focus during the inpatient stay and avoids an environment of information overload. It offers the opportunity to improve patient outcomes, increase patient engagement, and elevate the overall quality of cardiac care.

11.4 Conclusion

This chapter marks a significant milestone in the domain of cardiac health research, offering valuable insights into the unique context of Aotearoa New Zealand. By examining the implications of the research findings, which interpret the depths of patient knowledge concerning their cardiac health in this distinctive setting, the research has taken a crucial step toward refining education practices. Furthermore, the introduction of a future model and approach for acute inpatient cardiac rehabilitation education and psychosocial screening embodies a commitment to advancing the field.

As this thesis transitions into the concluding chapter, the discussion will present a comprehensive synthesis of the findings and their implications. The next chapter will also present a set of recommendations derived from the research, acknowledging the strengths and limitations of the study. Additionally, the
discussion will reflect on how the approach to the research may differ with hindsight. Ultimately, the final discussion will reiterate how this research has effectively achieved its overarching aim, contributing to the ongoing evolution of cardiac education within the borders of Aotearoa New Zealand while also offering valuable insights for broader healthcare contexts.
Chapter 12: Conclusion

12.1 Introduction

In this concluding chapter, the focus returns to the fundamental research purpose that has guided this study and how it has been addressed. The analysis of quantitative, qualitative, and mixed integration findings reveals a complex and comprehensive answer to the questions. This chapter serves as a platform for a discussion of the implications of the research, considering its potential impact on the field of study and broader healthcare practices. The overarching practice and research recommendations serve as guiding principles for future scholarly work.

Additionally, this final chapter explores the strengths and weaknesses inherent in the research design and execution. Acknowledging lessons learnt and limitations encountered strengthens the foundations for future endeavours in this area. In this concluding chapter, the threads of the research are drawn together, weaving them into the fabric of final thoughts. As the thesis concludes, it provides contemplation, discussion, and the pursuit of knowledge that extends beyond these pages, contributing to a deeper understanding in the field of patients’ levels of understanding.

12.2 Restating the Research Purpose, Questions and Objective

The research has been driven by a dual fold purpose. First, it sought to investigate and assess the contemporary levels of comprehension among individuals recently diagnosed with cardiovascular disease in Aotearoa New Zealand regarding their heart health. This endeavour aimed to shed light on the prevailing understanding within this demographic, encompassing various dimensions of cardiac health and well-being.
Second, the research has been dedicated to conceptualising a future model for cardiac health education within acute care settings. A deliberate and thorough examination of the existing nationwide approaches to cardiac rehabilitation education within the Aotearoa New Zealand context was undertaken. The goal was to discern opportunities for enhancement; particularly with regards to addressing the specific knowledge needs of the local population related to heart health. The ultimate outcome was to propose a more tailored and effective framework for delivering cardiac healthcare within the acute cardiac context in Aotearoa New Zealand.

12.3 Summary of Key Findings

The foundation of this study lies in the MMR questions, which aimed to explore the complex phenomenon of patients’ heart health understanding. The research questions encompassed both objective and subjective aspects, aiming to investigate understanding at a deeper level. By integrating quantitative and qualitative elements, the research questions effectively embody the convergent mixed methods approach employed in this study. Summaries of the key findings are outlined in Figure 12.1.
Convergent Mixed Methods - Key Findings

Key Quantitative Findings
CADE-QII knowledge scores obtained were consistent with international studies using the same tool.

Demographic characteristics, such as lower educational attainment, specific employment status, current smoking habits, older age, and gender (women), were associated with lower heart health knowledge scores.

Patients exhibited varying levels of knowledge across different aspects of cardiac health, with strengths in exercise and psychosocial risk but gaps in nutrition, risk factors, medication understanding, and some aspects of psychosocial risk.

Knowledge gaps highlighted the need for tailored educational strategies to address specific knowledge deficits in Aotearoa New Zealand.

Key Qualitative Findings
Patients:
- Patients perceived they had good knowledge about risk factors and believed they developed an improved awareness of their condition after engaging with acute hospital services.
- Patients expressed challenges in understanding medication instructions, exercise guidelines, and expressed anxiety related to exercise.
- Patients reported a desire for more information about nutrition.
- Patients reported unanswered questions and feelings of uncertainty and emotional distress, especially related to the "why me?" question and the next steps in their treatment plans.

Staff:
- Staff felt that patients demonstrated good knowledge towards exercise resumption and, ultimately, nutrition.
- Staff believed that patients' knowledge about medical conditions and medication regimes remained low at discharge.

Both staff and patients:
- They reported a lack of formal assessment of understanding during the inpatient period and a lack of standardisation in approaches towards these assessments.
- Information overload was identified as a potential barrier to effective knowledge acquisition and retention.
- The study highlighted the bidirectional relationship between cardiovascular disease and mental health.

Mixed Methods Key Findings
Combining quantitative and qualitative data revealed disparities and alignments between knowledge scores and participants' perceptions of patients' understanding.

The mixed analysis emphasised the importance of individualised assessments tailored to unique situations. Information overload was associated with lower CADE-QII scores, indicating that an excessive amount of information may hinder knowledge retention and comprehension.

The relationship between knowledge, cardiac education, and mental well-being was reinforced, underlining the need for mental health screening and interventions during the inpatient period.

Overall, the mixed methods approach provided a comprehensive understanding of patients' heart health knowledge, emphasising the complexities and interactions between various factors.
The key findings from this study underscore the multifaceted nature of patients’ heart health knowledge in Aotearoa New Zealand’s acute cardiac education context. Overall, these findings call for individualised, comprehensive approaches to cardiac rehabilitation education that address specific knowledge deficits, fosters self-management, and improves overall cardiac health outcomes. As a result of these findings, a future model for inpatient acute education was proposed.

The proposed future model for rapid knowledge and psychosocial risk assessment, as discussed in Chapter 11, addresses the identified knowledge gaps and psychosocial concerns among newly diagnosed in patients with CVD. Integrating the quantitative and qualitative findings within this study has resulted in the conceptualisation of a model which aims to tailor education strategies to individual needs, ensuring that patients receive the right information at the right time; thereby, mitigating the risk of information overload. Additionally, the incorporation of mental health screening within this model underscores the holistic approach to cardiac education, recognising the crucial interplay between cardiac education and mental well-being. By implementing the ‘Model for RAPID knowledge and psychosocial risk assessment-in newly diagnosed in patients with CVD’, healthcare providers can more effectively assess, educate, and support newly diagnosed cardiac patients in Aotearoa New Zealand’s acute care context. The implementation and evaluation of this model would be a future research project.

12.4 Implications for Future Research/Significance of Contribution

This mixed methods study has several implications for future research, encompassing both the research processes and the significant findings. Its main advantage is the emphasis on the integration of both quantitative and qualitative data
when addressing complex research questions. Without a mixed method design, the individual quantitative and qualitative findings might have obscured the associations between them.

The philosophical frameworks of dialectical pluralism and pragmatism have significantly enhanced the findings of this study in relation to patients’ health knowledge. Dialectical pluralism, acknowledging the coexistence of diverse perspectives and truths, has enabled the research to embrace the multifaceted nature of health knowledge, accommodating various perspectives and experiences from both patients and staff. This approach enabled a more holistic understanding of patients’ health knowledge, encompassing the nuances that may have been unnoticed in a more rigid paradigm. Simultaneously, pragmatism ensured that the findings are not just theoretical but immediately useful in the real world. By adopting practical research methodologies and focusing on actionable insights, the study has provided healthcare professionals with a better understanding of patients’ heart health knowledge, enhancing the practicability and effectiveness of educational interventions for improved patient outcomes. The combination of these philosophies has produced a more comprehensive perspective on patients’ cardiac knowledge, contributing to more effective healthcare practices.

If only the cardiac patients’ and health care professionals’ perceptions were considered, analysis might have led to the conclusion that patients lacked knowledge about how to safely resume exercise; whereas the knowledge score indicated the opposite. Conversely, staff perceptions might have suggested that nutritional understanding was adequate, and both patients and staff might not consider psychosocial risk a priority for immediate attention, leaving it for outpatient follow-
up and cardiac rehabilitation. By employing a mixed approach, the research provides a deeper context behind the quantitative and qualitative findings.

The study allowed for an in-depth exploration of various aspects related to heart health, including the impact of the clinical setting on knowledge, information overload, and misinformation. It also enabled a detailed investigation of knowledge acquisition and assessment, as well as the influence of education on mental health. Through the combined approach the study gains a more nuanced understanding of the complexities surrounding patients’ knowledge and perceptions. To my knowledge, this is the first time that heart health knowledge has been explored through a MMR lens in Aotearoa New Zealand and the results add another layer to the global body of research that is exploring the patient’s understanding of their cardiac health.

Furthermore, the mixed methods approach offered me an opportunity to integrate datasets, enhancing the rigor of the study’s findings. The process also mitigates the limitation of small recruitment numbers because the integration of the findings considers the data in more than one way. An integrated combination of the strengths of the respective quantitative and qualitative approaches has presented a more robust and holistic picture of patients’ understanding of heart health and the factors that influence knowledge.

This is pioneering research; it is the first to explore understanding to this level in Aotearoa New Zealand. By focusing on the local setting, this study provides valuable insights into the knowledge of the local population. The findings offer health care professionals in Aotearoa New Zealand a comprehensive overview of the knowledge and perceptions of patients’ understanding related to cardiovascular health. This understanding can serve as a foundation for informed policy decision
making and educational design, aimed to enhance a more standardised approach to cardiac health education and improved patient outcomes.

12.5 Design Reflections

It is important to recognise the scope for additional research and changes that could have been made at the conclusion of a research project. While this research provides an overview of the knowledge and perceptions of heart health among the general population, there exists an opportunity for more in-depth investigations into specific subpopulations. A comprehensive exploration of these subgroups could aid in pinpointing knowledge gaps and addressing the educational requirements unique to these segments of the population; thereby, fostering a more culturally sensitive approach to meeting the needs of at-risk groups.

The research has focused on the acquisition of knowledge during the inpatient stay. Further research evaluating the effectiveness of outpatient cardiac rehabilitation programmes will provide complementary and enhanced understanding of the entire process of cardiac rehabilitation education. Furthermore, by evaluating the outcomes of these programmes, researchers can assess their effectiveness in relation to sustaining patients’ knowledge, promoting self-management, implementing behavioural change; along with evaluating the long-term health outcomes for patients with CVD.

12.6 Strengths and Limitations

12.6.1 Strengths

The primary strength of this study was the design which employed a fixed convergent mixed methods approach. The design allowed for a comprehensive and
rich analysis through the integration of both quantitative and qualitative data. Through this integration, the study had the unique advantage of exploring connections between perceptions and knowledge scores. It revealed insights that may have remained undiscovered through a single approach.

Another key strength was the completion of a comprehensive consultation process. By actively involving clinical professionals, the study ensured that the research findings are reflective of real practice and, more specifically, the Aotearoa New Zealand context. Involving clinical professionals was instrumental in determining sampling criteria and ensuring the data collection tools were relevant, fit for purpose, and feasible for the research participants. This process ensured that the data collected were meaningful and applicable to the study’s aims, enhancing the overall quality and accuracy of the research outcomes.

The collection of multi-national quantitative data was another strength of this study. By gathering data from various locations across Aotearoa New Zealand, the study provides an overview of cardiac knowledge that transcends regional boundaries. A multi-site approach allows for representation across the country as part of the analysis of the acquisition of cardiac knowledge. This approach enhances the relevance and applicability of the study findings, benefiting health care professionals involved in the design and delivery of cardiac rehabilitation education.

The utilisation of a previously validated and verified tool represents another strength. The reliability and validity of the tool had rigorously been tested in various international contexts, and established its usefulness in assessing cardiac health knowledge. Furthermore, the previous validation and verification processes lend support to the design as it demonstrates that the tool is well established and widely accepted by the scientific community.
Additionally, although this study had limited uptake of translations into multiple languages, it is noteworthy that these translations were meticulously prepared and validated. While not extensively employed in the study, the availability of these translations ensures that the tool can be readily adapted to engage diverse speaking communities; thus, expanding the tool’s applicability and relevance for future researchers. Furthermore, the thorough testing of the tool during the backwards and forwards translation processes, as well as piloting it in the Aotearoa New Zealand context, provides reassurance that the tool is well suited to support the study’s objectives.

While not exploring and validating the proposed model in this study is acknowledged, it is important to emphasise that the model of care itself remains a valuable asset for future research positioning. The decision to not implement and test the model was influenced by time and resource constraints rather than a fundamental limitation of the model’s potential. To effectively develop and implement a national RAPID inpatient knowledge and psychosocial risk assessment model, would require the establishment of a multidisciplinary team that encompasses diverse cultural perspectives. Such a team would be better equipped to comprehensively address the intricate nuances and complexities associated with cardiac education for a diverse patient population. Consequently, future research endeavours should aim to examine the impact of this innovative model on the delivery of education during the inpatient period, as well as its influence on patients’ knowledge outcomes. This approach ensures that the model’s potential strengths are appropriately harnessed for the benefit of future investigations and advancements in cardiac care.
12.6.2 Limitations

The study has several limitations which need to be considered when interpreting the findings. One significant limitation is the small number of responses to the quantitative questionnaire and the uptake of patient participants in the focus groups. This limitation may hinder the generalisability of the quantitative data for broader Aotearoa New Zealand populations, and may have restricted the depth and diversity of perceptions obtained during the focus groups. These numbers also reflect the contextual factors influencing the research as discussed in Chapter 1. However, it is important to note the mixed methods design process partially mitigates these limitations through the integration of data and analysis. This process offers a more comprehensive understanding of the topic through various lenses which can enhance the validity and richness of the findings.

My location outside the data collection sites introduced another limitation, as it necessitated relying on others to distribute survey packs which may have resulted in varied return rates across different sites, potentially impacting the representation and validity of data. Additionally, the context of the COVID-19 pandemic likely influenced response rates, adding complexity to the study’s data collection process. Data collection was extended due to slow response rates, which may have contributed to disengagement among data collection sites over time. Despite these challenges, diligent efforts were made to promote ongoing participation to obtain relevant data.

Another limitation stems from practical constraints, as the focus groups and interviews were only able to be conducted at one site. Consequently, diverse views and perceptions from other regions may not have been captured. Conducting further regional research would be beneficial to gain a more comprehensive understanding
of stakeholders’ perceptions towards the acquisition of knowledge across the country. Moreover, the limited uptake of culturally focused focus groups by participants who identified as Māori may have resulted in missed opportunities to explore valuable insights and experiences. It is a recommendation that research involving Māori participants be conducted by Māori researchers to foster a culturally safe and inclusive environment.

The homogenous group representation across various demographic categories, such as gender and ethnicity, present as another limitation of this study. Overrepresentation of certain categories may affect the overall generalisability of findings. Further research could benefit from targeted recruitment of specific populations to ensure more diverse and representative results. Lastly, the study’s anonymous questionnaire design, while practical and confidential, may have introduced limitations regarding the reliability of the results. Without direct supervision, it is challenging to ascertain the true extent of participant’s raw knowledge, as they might have accessed external resources like loved ones and the internet despite the instructions not to use them.

To enhance the precision of data collection, particularly in the case of diverse subpopulations such as ethnically varied communities, older individuals, and females, a more direct and personalised approach to data gathering may prove advantageous. In this alternative research design, the research team could engage in one-on-one interviews with potential participants to complete the survey. This methodology could yield richer insights into the perspectives of these valuable subpopulations and may align more closely with the cultural preferences of the Māori community. It is worth noting that my involvement at this level was constrained due to the necessity to navigate multiple rounds of ethics approval and
consultation processes. It is anticipated that this impediment may be alleviated with the amalgamation of individual health boards into a unified entity in Aotearoa New Zealand, a development which was implemented in mid-2023.

In summary, while the study offers valuable insights, it is crucial to acknowledge and consider any limitations during the research process. In doing so, future research is better positioned to be reflective of potential issues; and, moving forward, other researchers can strengthen their validity and application of their research in the context of this discussion.

12.7 Key Recommendations

Tables 11.1 and 11.2 outline the recommendations derived from the study, based on the findings and analysis of the outcomes. These recommendations consider both the delivery of acute cardiac inpatient education and the need for future research. They provide valuable suggestions to enhance the delivery of education, with the ultimate goal of enabling newly diagnosed cardiac patients to better self-manage their condition, leading to improved health outcomes and overall well-being.
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<td>1. <strong>Tailored education delivery</strong></td>
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<td>2. <strong>Standardised assessment of patients understanding</strong></td>
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<td>3. <strong>Integration of mental health screening</strong></td>
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<td>4. <strong>Information management and overload mitigation</strong></td>
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Create and disseminate targeted educational materials and tools, particularly for subpopulations with identified knowledge gaps, such as older individuals and women.

Promote interdisciplinary collaboration between health care professionals, researchers, and educators to bridge the gaps between research findings and clinical practice. Create opportunity for health care professionals and researchers to collaborate in MMR to both inform and enhance the delivery of services.

Establish processes for continuous quality improvement in cardiac education delivery by regularly reviewing programmes and patients’ understandings, based on the evolving needs of the patients. Encourage continuing research informed practice within healthcare education to drive ongoing improvements in patient care.

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<td><strong>Research Specific Recommendations</strong></td>
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| 1. **Replication and validation** | Encourage replication of the study to validate the findings with a larger patient population size to assess generalisability of the identified knowledge gaps and mental well-being concerns. Encourage replication of the qualitative focus groups and interviews outside the Canterbury region. |

| 2. **Longitudinal studies** | Conduct longitudinal studies to track changes in patients’ heart health knowledge and psychosocial well-being over time, allowing deeper understanding of the long-term impact of cardiac education and interventions. |

| 3. **Mixed methods integration** | Promote a continued use of MMR within healthcare to provide more comprehensive understanding and perspectives to this complex phenomenon in healthcare. |
4. **Cross-cultural research**

Expand research efforts to focus on diverse cultural contexts and populations to assess the culture factors that may influence cardiac health knowledge and psychosocial concerns.

5. **Patient reported outcomes**

Incorporate patient reported outcomes measures into future research to capture patients’ perspectives on their heart health and the impact of the education and interventions on their overall well-being.

6. **Mixed methods training**

Offer training and resources to researchers and health care professionals on conducting MMR to ensure broader adoption of this approach to address the complexities of healthcare effectively.

7. **Interdisciplinary research collaborations**

Foster interdisciplinary collaboration between researchers from diverse fields within healthcare, such as nurses, doctors, psychologist, public health providers and educators, to bring complementary perspectives and expertise to cardiac health education research.

8. **Research dissemination:**

Promote the dissemination of research findings into practice and policy by actively engaging with healthcare providers, policymakers, and stakeholders to ensure that research recommendations are applied to improve patients’ outcomes and well-being.

These practice and research specific recommendations, grounded in the research findings and mixed methods approach, aim to enhance the delivery of cardiac education to improve patient outcomes in the context of CVD self-management and care. Furthermore, they aim to advance the field of cardiac health education research by enhancing quality, breadth, and impact of future studies; ultimately, contributing to patient outcomes and healthcare practices. By doing so, substantive contributions can be made to patient outcomes and the broader landscape of healthcare practices.
12.8 Final Thoughts

In closing, this thesis has journeyed through the intricate landscape of cardiac health understanding among individuals recently diagnosed with CVD in Aotearoa New Zealand. The exploration has revealed a multifaceted landscape, informed by both quantitative rigor and qualitative depth; and, through the process of integration, has provided a comprehensive perspective on the state of heart health knowledge in the study population.

In conclusion, the aspiration is that the reader takes away the following key insight from this study: there is no one-size-fits-all solution to the complex puzzle of cardiac education and heart health understanding. Instead, the findings emphasise the need for a nuanced and patient-centred approach; one that accounts for individual circumstances and recognises the profound interplay between knowledge, mental well-being, and effective self-management.

This study envisions a future where acute inpatient cardiac rehabilitation education is not just a one-time event but the solid beginning of an ongoing journey of learning and support. This shift aims to instil in patients a profound appreciation for the potential benefits of participating in outpatient cardiac education programmes, as they discern the personal relevance of these opportunities for future learning to their unique circumstances. The vision further advocates for a future where culturally sensitive care, standardised assessment tools, early psychosocial risk screening, and tailored education strategies converge to empower patients and health care professionals alike.

Ultimately, this research could spark a transformation in the way cardiac rehabilitation is approached in the inpatient setting, a transformation that prioritises knowledge, holistic well-being, and adaptive strategies—all with the shared goal of
enhancing the heart health and overall quality of life for individuals facing the challenges of CVD in Aotearoa New Zealand and beyond.
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Appendix A: Summary of Literature Review Articles

<table>
<thead>
<tr>
<th>Author(s), Year, Region, Appraisal tool</th>
<th>Sample</th>
<th>Knowledge assessment tool</th>
<th>Mean knowledge score at baseline before CR and mean group percentage of overall score.</th>
<th>Conclusions</th>
</tr>
</thead>
</table>
| Assiri (2003) Middle East JBI CrSS*     | 98 persons with CAD. | 25-item questionnaire: developed for this study | 16.6±9 out of 25 | Factors associated with lower scores:  
- Age >60+  
- Lower literacy levels  
Factors associated with higher scores:  
- A stay in ICU  
- Factors associated with lower scores:  
- Time since education  
- Attending CR  
- History of stroke  
- Higher state of anxiety  
Factors associated with higher scores:  
- Attended cardiac rehabilitation in the past  
- Female  
- In paid employment  
- Higher levels of education  
- Having any private health insurance  
- Insured for the ambulance. |
| McKinley et al. (2009) Multi-country (USA and Australia) JBI RCT* | 3522 patients with CHD | REACT: adapted questionnaire. | 70.90% ±11.23 for mean Control group  
70.79% ±11.52 for mean Intervention group | 75% mean group percentage |
<table>
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<tr>
<th>Author/s, Year, Region, Appraisal tool</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>de Melo Ghisi et al. (2010)</strong></td>
<td>155 patients attending cardiac rehabilitation programs.</td>
<td>Coronary Artery Disease Education Questionnaire (CADE-Q): developed for this study</td>
<td>43.01±6.5 out of 57</td>
<td>Demographic characteristics that showed significant difference: specifics not reported</td>
<td>Highest knowledge areas:</td>
</tr>
<tr>
<td>South America JBI CrSS*</td>
<td></td>
<td>75% mean group percentage</td>
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<td>• Monthly household income</td>
<td>Area 2) risk factors and lifestyle;</td>
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<td>• Educational level</td>
<td>Lowest knowledge areas:</td>
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<td>Area 3) diagnostic, treatment and medicines</td>
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<td>Areas of knowledge in CADE-Q:</td>
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<td>1) physiopathology (patho), signals and symptoms</td>
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<td>2) risk factors and lifestyle;</td>
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<td>3) diagnostic, treatment and medicines</td>
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<td>4) physical exercise.</td>
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<td><strong>Eckman et al. (2012)</strong></td>
<td>170 Patients with CAD</td>
<td>12-item test assessing knowledge: developed for this study.</td>
<td>8.30 ±1.93 out of 12</td>
<td>Control group</td>
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<td>USA JBI RCT*</td>
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<td>7.98 ±1.95 out of 12</td>
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<td>Intervention group</td>
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<td>69.1% mean control group percentage</td>
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<td>66.5% mean intervention group percentage</td>
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<td>41.85 out of 57</td>
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<tr>
<td><strong>de Melo Ghisi et al. (2013a)</strong></td>
<td>200 Canadian CAD patients.</td>
<td>CADE-Q</td>
<td>Factors associated with lower scores:</td>
<td>Highest knowledge area:</td>
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<tr>
<td>Canada JBI CrSS*</td>
<td></td>
<td>41.85 out of 57</td>
<td>• Risk factors</td>
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<td></td>
<td>• Not reported</td>
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<td>Lowest knowledge:</td>
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<tr>
<td>de Melo Ghisi et al. (2013b) Brazil and Canada JBI CrSS*</td>
<td>300 Brazilian and 300 Canadian patients</td>
<td>CADE-Q</td>
<td><strong>73% mean group percentage</strong>&lt;br&gt;41.42 ± 9.3 out of 57 Total cohort&lt;br&gt;43.49 ± 9.4 out of 57 Canadian cohort&lt;br&gt;39.34 ± 9.1 out of 57 Brazilian cohort&lt;br&gt;73% Total mean cohort percentage&lt;br&gt;76% Canadian mean cohort percentage&lt;br&gt;69% Brazilian mean cohort percentage</td>
<td><strong>Factors associated with higher scores:</strong>&lt;br&gt;• Family income&lt;br&gt;• Higher educational levels&lt;br&gt;<strong>Factors associated with lower scores:</strong>&lt;br&gt;• Female&lt;br&gt;• Being retired&lt;br&gt;• Canadian occupation as ‘Home’&lt;br&gt;<strong>Factors associated with higher scores:</strong>&lt;br&gt;• Younger in age &lt;65&lt;br&gt;• Male gender&lt;br&gt;• Canadians with history of MI and Type 2 diabetes (T2D)&lt;br&gt;• Brazilian with Type 1 diabetes (T1D)&lt;br&gt;• Family income&lt;br&gt;• Higher educational levels&lt;br&gt;• Time in CR</td>
<td>• Diet management&lt;br&gt;• Cholesterol&lt;br&gt;• Physical exercise&lt;br&gt;• Physical exercise&lt;br&gt;• Patho and signs and symptoms of disease</td>
</tr>
<tr>
<td>Freitas Pinheiro et al. (2014) South America JBI CrSS*</td>
<td>40 Patients with CAD</td>
<td>CADE-Q: adapted for study</td>
<td>Participants’ total test score demonstrating: ‘Complete knowledge’ 24.4 ± 8.2 out of N=40 ‘Incomplete knowledge’ 10.5 ± 6.7 out of N=40 ‘Wrong knowledge’</td>
<td><strong>Factors associated with lower scores:</strong>&lt;br&gt;• Not reported&lt;br&gt;<strong>Factors associated with higher scores:</strong>&lt;br&gt;• Family income</td>
<td>• Risk and lifestyle&lt;br&gt;• Patho and signs and symptoms of disease&lt;br&gt;• Physical exercise</td>
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| de Melo Ghisi, Britto, et al. (2015)  | 214 patients with CAD | CADE-Q                    | 2.7 ± 2.9 out of N=40 'No knowledge'  
2.3 ± 1.6 out of N=40 'Complete knowledge' (60.9% of the cohort)  
'Incomplete knowledge' (26.1% of the cohort)  
'Wrong knowledge' (6.8% of the cohort)  
'No knowledge' (5.6% of the cohort)  
40.15 ± 7.53 out of 57 | **Factors associated with lower scores:**  
• Not reported  
**Factors associated with higher scores:**  
• Married  
• Higher English proficiency  
• Higher educational attainment  
• History of percutaneous coronary intervention | **Highest knowledge area:**  
• Risk and lifestyle  
• Physical exercise  
**Lowest knowledge:**  
• Patho and signs and symptoms of disease  
• Diagnostic tests, treatment and medications |
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</table>
| de Melo Ghisi, Grace, Thomas, Evans et al. (2015) Canada JBI CrSS* | 307 patients with CAD | Coronary Artery Disease Education Questionnaire II (CADE-Q-II): developed for this study. | 64.2 ± 18.1 out of 93 | Factors associated with lower scores:  
- Comorbid  
- Type I diabetes  
- Valvular heart disease  
- Cerebral vascular disease.  
- Educational attainment (but reported a misrepresentation between sample cohort numbers) | Highest knowledge area:  
- Exercise  
- Medical condition  
Lowest knowledge area:  
- Risk factors |
| de Melo Ghisi, Grace, Thomas & Oh. (2015) Canada JBI QE* | 306 patients with CAD consented to participate | CADE-QII | 64.72 ± 17.3 out of 93 Total cohort  
65.14 ± 17.65 out of 93 Control group  
64.25 ± 17.08 out of 93 Intervention group | Factors associated with higher scores:  
- Heart failure  
- Cardiomyopathy  
- Percutaneous coronary intervention | Areas of knowledge in CADE-Q II  
- Medical condition  
- Risk factors  
- Exercise  
- Nutrition  
- Psychosocial risk  
Highest knowledge area:  
- Exercise  
- Medical condition  
Lowest knowledge area:  
- Risk factors  
- Psychosocial risk |
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| de Melo Ghisi et al. (2016) Canada JBI CrSS* | 132 patients with CAD. | Coronary Artery Disease Education Questionnaire Short Version (CADE-Q SV): developed for this study | 16.50 ± 2.15 out of 20 | Factors associated with lower scores:  
  • Lower educational attainment  
  • Less CR attendance  
  • T1D (only 1 in cohort) | Highest knowledge area:  
  • Exercise  
  • Diet  
  Lowest knowledge area:  
  • Medical condition |
| Shen et al. (2017) Singapore JBI CrSS* | 1000 people with CVD | Questionnaire to assess the KAPs: developed for this study. | 86.5% ±8.1 mean group percentage | Factors associated with higher scores:  
  • Gender female  
  • Higher Educational attainment  
  • Higher attitude and practice scores  
  • Prior coronary artery disease. |  

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<tr>
<td><strong>Zhang et al. (2017)</strong>&lt;br&gt;China&lt;br&gt;JBI RCT*</td>
<td>199 patients with CAD</td>
<td>Perceived Knowledge Scale for Coronary Heart Disease (PKS-CHD).</td>
<td><strong>Highest knowledge area:</strong>&lt;br&gt;- Definition&lt;br&gt;- Manifestation&lt;br&gt;- Rehab Knowledge&lt;br&gt;<strong>Lowest knowledge area:</strong>&lt;br&gt;- Medications&lt;br&gt;- Examination&lt;br&gt;- Predisposing factors</td>
<td>Knowledge score percentages per subscale&lt;br&gt;- Definition 50%&lt;br&gt;- Manifestation 50%&lt;br&gt;- Rehabilitation Knowledge 48%&lt;br&gt;- Risk factors 45%&lt;br&gt;- Treatment 44%&lt;br&gt;- Predisposing factors 42%&lt;br&gt;- Examination 40%&lt;br&gt;- Medication 37%&lt;br&gt;44.00 ± 17.00 out of 93</td>
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<tr>
<td><strong>Zhou et al. (2017)</strong>&lt;br&gt;China&lt;br&gt;JBI CrSS*</td>
<td>500 Patient with CAD</td>
<td>Questionnaire covering 13 Knowledge domains: design for this study.</td>
<td><strong>Highest knowledge area:</strong>&lt;br&gt;- Risk factors&lt;br&gt;- Diet&lt;br&gt;- Emotional&lt;br&gt;- Re-examination management&lt;br&gt;<strong>Lowest knowledge area:</strong>&lt;br&gt;- Cardiac rehab awareness&lt;br&gt;- Medications optimisation&lt;br&gt;- Ideal resting heart rate</td>
<td>49% mean group percentage</td>
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<td>Chen et al. (2018) China JBI CrSS*</td>
<td>316 patients with CAD</td>
<td>CADE-Q II: adapted for this study.</td>
<td>45.74±18.94 out of 84</td>
<td>Factors associated with lower scores:  • Residing in countryside  • Rural health insurance  • Lower educational attainment  Factors associated with higher scores:  • Living in city  • History of multiple comorbidities</td>
<td>Highest knowledge area:  • Medical condition  • Exercise  Lowest knowledge area:  • Risk factors</td>
</tr>
<tr>
<td>de Melo Ghisi et al. Chaves, Loures, et al. (2018) South America JBI CrSS*</td>
<td>200 patients with CVD</td>
<td>CADE-Q SV: adapted for this study.</td>
<td>13.08 ± 2.61 out of 20</td>
<td>Factors associated with lower scores:  • Lower educational attainment  • No income or less than 1 minimum salary  Factors associated with higher scores:  • History of myocardial infarction or have arrhythmia  • Age &lt;65 years</td>
<td>Highest knowledge area:  • Risk factors  Lowest knowledge area:  • Psychosocial risk</td>
</tr>
<tr>
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| Santos et al. (2018) South America JBI CrSS* | 307 Patients with CAD | HIPER-Q instrument: designed for this study. | 26 ±10 out of 51 | Factors associated with lower scores:  
- Lower educational attainment  
- Lower family income | Highest knowledge area:  
- Disease  
- Concepts of pathophysiology  
Lowest knowledge area:  
- Signs and symptoms  
- Diagnostics |
| | | | 51% mean group percentage | Factors associated with higher scores:  
- Gender female  
- CVD comorbidities | |
| | | | | | |
| Santos et al. (2019) South America JBI CrSS* | 307 Patients with CAD | CADE-Q II: adapted for this study. | 53 ±14 out of 81 | Factors associated with higher scores:  
- Higher family income  
- Higher educational attainment | Highest knowledge area:  
- Exercise  
- Diet  
Lowest knowledge area:  
- Psychosocial risk  
- Risk factors |
| | | | 65% mean group percentage | | |
| Salzwedel et al. (2019) Europe JBI CrSS* | 401 patients with CAD | A quiz with 34 items: designed for this study. | 23.3 ± 5.3 out of 34 | Highest knowledge area out of 2 domains:  
- Knowledge, lifestyle  
Lowest knowledge area out of 2 domains:  
- Knowledge, medical | |
<p>| | | | 69% mean group percentage | | |</p>
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| Anderson-Doyley (2020) USA JBI CrSS* | 25 patients with acute coronary syndrome (ACS) | CADE-Q II | 58.04 ± 15.89 out of 93 | Factors associated with lower scores:  
- Gender / male  
- Race (reported as 'other than white') – however, only 1.6% cohort population | Highest knowledge area:  
- Medical condition  
- Exercise  
Lowest knowledge area:  
- Risk factors  
- Psychosocial risk |
| de Melo Ghisi et al. (2020) Canada JBI CrSS* | 252 patients with CVD | CADE-Q SV | 15.58 ± 2.42 out of 20 | Factors associated with higher scores not reported at baseline | Highest knowledge area:  
- Diet  
- Risk factors  
Lowest knowledge area:  
- Medical condition |
| Huynh et al. (2020) Asia JBI CrSS* | 117 patients with ACS. | CADE-Q SV: Vietnamese version adapted for this study. | | Factors associated with higher scores:  
- Gender / male  
- Higher educational attainment | |
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<tr>
<td>Williamson et al. (2021) Canada JBI CrSS*</td>
<td>90 Patients with CAD</td>
<td>CADE-Q II</td>
<td>68.48 ± 14.31 out of 93</td>
<td><strong>Factors associated with higher scores:</strong></td>
<td>• Higher educational attainment</td>
<td>Highest knowledge area: • Exercise Lowest knowledge area: • Diet • Risk factors</td>
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<td>74% mean group percentage</td>
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<tr>
<td>de Melo Ghisi, Fernandez, et al. (2021) South America JBI CrSS*</td>
<td>249 patients with CVD</td>
<td>CADE-Q SV: Spanish version adapted for this study.</td>
<td>13.6 ± 2.7 out of 20</td>
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<td>Highest knowledge area: • Diet Lowest knowledge area: • Medical condition</td>
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<td>68% mean group percentage</td>
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<td>de Melo Ghisi, Grace, et al. (2021) South America JBI CrSS*</td>
<td>49 Cardiac Rehabilitation patients (with coronary artery disease or multiple cardiovascular risk factors).</td>
<td>CADE-Q SV: Spanish version.</td>
<td>13.64 ± 2.42 out of 20</td>
<td><strong>Factors associated with higher scores:</strong></td>
<td>• History of percutaneous coronary intervention</td>
<td>Highest knowledge area: • Diet Lowest knowledge area: • Medical condition</td>
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<td>68% mean group percentage</td>
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<td>Akten et al. (2021) Turkey JBI CrSS*</td>
<td>324 patients with CAD CADRE Q SV: adapted for this study.</td>
<td>7.21±3.44 out of 12</td>
<td><strong>Factors associated with lower scores:</strong></td>
<td>• Identifying as a housewife • Reported low income • Living alone</td>
<td>Factors associated with higher scores:</td>
<td>Highest knowledge area reported as 2 domains: Diet, Stress and Medication Knowledge subscale 4.60 ± 2.21 Lowest knowledge area reported as 2 domains: Knowledge of Symptom, Exercise, and Depression Risk after a Heart Attack 2.60 ± 1.61</td>
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<td>60% mean group percentage</td>
<td>• Gender / male • Higher educational attainment • Reported to have co-morbidities • Has regular health check-ups</td>
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<td>Yang et al. (2021) China JBI CrSS*</td>
<td>240 Cardiac rehabilitation patients. CADRE Q SV: adapted into simplified Chinese for this study.</td>
<td>13.15 ± 4.70 out of 20</td>
<td><strong>Factors associated with lower scores:</strong></td>
<td>• Lives in countryside <strong>Factors associated with higher scores:</strong></td>
<td>Factors associated with higher scores:</td>
<td>Highest knowledge area: Diet Exercise Lowest knowledge area: Medical condition</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>68% mean group percentage</td>
<td>• Age &lt;65 years • Higher educational attainment • Multiple co-morbidities • Do not smoke</td>
<td></td>
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</tr>
<tr>
<td>Author/s, Year, Region, Appraisal tool</td>
<td>Sample</td>
<td>Knowledge assessment tool</td>
<td>Mean knowledge score at baseline before CR and mean group percentage of overall score.</td>
<td>Conclusions</td>
<td>CVD content knowledge areas</td>
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<tr>
<td>Omovvat et al. (2022) Middle East JBI CrSS*</td>
<td>240 patients with CAD Rehabilitation Centre in the city of Ahvaz, Iran.</td>
<td>CADE-Q SV: adapted into Persian for this study.</td>
<td></td>
<td>Factors associated with higher scores: Higher educational attainment, Psychosocial risk</td>
<td>Highest knowledge area: Diet, Lowest knowledge area: Psychosocial risk</td>
<td></td>
</tr>
<tr>
<td>de Melo Ghisi and Oh (2022) Canada JBI CrSS*</td>
<td>115 cardiac rehabilitation patients.</td>
<td>CADE-Q SV: adapted for this study.</td>
<td>15.7 ± 2.0 out of 20</td>
<td>Factors associated with higher scores: Higher educational attainment, Family income</td>
<td>Highest knowledge area: Risk factors, Diet, Lowest knowledge area: Medical condition, Psychosocial risk</td>
<td></td>
</tr>
<tr>
<td>Arrieta-Bartolomé et al. (2022) South America JBI CrSS*</td>
<td>81 patients with CAD</td>
<td>CADE-Q SV: Spanish version.</td>
<td>15.1 ± 2.8 out of 20</td>
<td></td>
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<tr>
<td>Shi et al. (2022) Australia JBI CrSS*</td>
<td>204 Chinese immigrants with CAD.</td>
<td>CADE-Q SV: simplified Chinese.</td>
<td>13.07 ± 4.57 out of 20</td>
<td>Factors associated with lower scores:</td>
<td>Highest knowledge area: Diet, Lowest knowledge area:</td>
<td></td>
</tr>
<tr>
<td>Author/s, Year, Region, Appraisal tool</td>
<td>Sample</td>
<td>Knowledge assessment tool</td>
<td>Mean knowledge score at baseline before CR and mean group percentage of overall score.</td>
<td>Conclusions Demographic factors</td>
<td>CVD content knowledge areas</td>
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<tr>
<td>Liu et al. (2022) China CrSS*</td>
<td>96 patients with CVD</td>
<td>CADE-Q SV: simplified Chinese.</td>
<td>11.66 ± 4.48 out of 20</td>
<td>65% mean group percentage</td>
<td>• Level of English proficiency • Psychosocial risk</td>
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<td></td>
<td>58% mean group percentage</td>
<td></td>
<td>Highest knowledge area: Risk factors • Lowest knowledge area: Psychosocial risk</td>
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</table>
## Appendix B: Study’s Details – Literature Review

<table>
<thead>
<tr>
<th>Author/s, Year</th>
<th>Database</th>
<th>Journal</th>
<th>Study Methods</th>
<th>Setting</th>
<th>Aims</th>
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<tbody>
<tr>
<td>McKinley et al. (2009)</td>
<td>Science Direct</td>
<td>International Journal of Nursing Studies</td>
<td>Randomised Control Trial</td>
<td>Study conducted across six centres: University of California, San Francisco, USA. University of California, Los Angeles, USA. University of Washington, USA. University of Kentucky, USA. University of Pennsylvania, USA. University of Technology, Sydney, Australia.</td>
<td>The first aim was to compare knowledge, attitudes and beliefs about ACS and ACS symptoms, and the appropriate response to symptoms, between intervention and non-intervention groups. Secondarily, to identify patient characteristics associated knowledge, attitudes and beliefs up to 12 months between the groups.</td>
</tr>
<tr>
<td>de Melo Ghisi et al. (2010)</td>
<td>PubMed</td>
<td>Patient Education and Counselling</td>
<td>Cross Sectional design</td>
<td>Florianópolis, State of Santa Catarine – Cardiac Rehab programmes</td>
<td>To develop and validate a knowledge assessment tool that will assess and describe coronary patients’ levels of knowledge.</td>
</tr>
<tr>
<td>Eckman et al. (2012)</td>
<td>Science Direct</td>
<td>Patient Education and Counseling</td>
<td>Randomised Control Trial</td>
<td>General Internal Medicine at the University of Cincinnati, USA.</td>
<td>The aim was to compare different educational delivery modalities and their impact on knowledge about CAD and important life-style changes.</td>
</tr>
<tr>
<td>Author/s, Year</td>
<td>Database</td>
<td>Journal</td>
<td>Study Methods</td>
<td>Setting</td>
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<tr>
<td>de Melo Ghisi et al. (2013a)</td>
<td>CINAL</td>
<td>European Journal of Preventive Cardiology</td>
<td>Cross Sectional Design</td>
<td>Toronto Rehabilitation Institute, Toronto, Canada.</td>
<td>The aim was to translate, cross-culturally adapt and validate from Portuguese to English the Coronary Artery Disease Education Questionnaire (CADE-Q).</td>
</tr>
<tr>
<td>de Melo Ghisi et al. (2013b)</td>
<td>PubMed</td>
<td>Arquivos Brasileiros de Cardiologia</td>
<td>Cross Sectional Design</td>
<td>Brazilian patients were recruited from 2 CR centres in Southern Brazil, whereas Canadian patients were recruited from 1 CR centre in Ontario.</td>
<td>The aim was to compare the levels of knowledge of patients with CAD enrolled in cardiac rehabilitation (CR) between Brazil and Canada.</td>
</tr>
<tr>
<td>Freitas Pinheiro et al. (2014)</td>
<td>CINAHL</td>
<td>Journal of Nursing UFPE / Revista de Enfermagem UFPE</td>
<td>Quantitative Descriptive Design</td>
<td>University hospital, Belo Horizonte, State of Minas Gerais.</td>
<td>Aim was to identify the knowledge levels of patients with angina pectoris or acute myocardial infarction regarding CAD.</td>
</tr>
<tr>
<td>de Melo Ghisi, Britto, et al. (2015)</td>
<td>Science Direct</td>
<td>Patient Education and Counseling</td>
<td>Prospective Observation Design</td>
<td>Attending CR in greater Toronto Area, Canada.</td>
<td>The aims of this study were (1) to assess cardiac patients’ disease-related knowledge at CR entry; (2) to investigate socio-demographic and clinical association of knowledge at CR entry; (3) to investigate whether CR completion is related to improvements in knowledge from CR entry to programme completion; and (4) to investigate behavioural factors of this post-CR knowledge.</td>
</tr>
<tr>
<td>Author/s, Year</td>
<td>Database</td>
<td>Journal</td>
<td>Study Methods</td>
<td>Setting</td>
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<tr>
<td>de Melo Ghisi, Grace, Thomas, Evans et al. (2015)</td>
<td>PubMed</td>
<td>Patient Education and Counseling</td>
<td>Cross Sectional Design</td>
<td>Toronto Rehabilitation Institute, Canada.</td>
<td>The aim of this study was to develop and psychometrically-validate a revised version of the CADE-Q (CADE-Q II).</td>
</tr>
<tr>
<td>de Melo Ghisi, Grace, Thomas &amp; Oh. (2015)</td>
<td>Science Direct</td>
<td>Patient Education and Counseling</td>
<td>Quasi-experimental Design</td>
<td>Recruited from the largest CR programme in Toronto, Canada</td>
<td>To (1) test the effect of a health action process approach (HAPA) theory-based education programme in cardiac rehabilitation (CR), compared to traditional education in relation to patient knowledge and HAPA constructs; and, (2) investigate the theoretical correlates of exercise behaviour among CR patients receiving theory-based education.</td>
</tr>
<tr>
<td>de Melo Ghisi et al. (2016)</td>
<td>PubMed</td>
<td>Patient Education and Counseling</td>
<td>Cross Sectional Design</td>
<td>Toronto Rehabilitation Institute, Canada.</td>
<td>To develop, pilot test and psychometrically validate a shorter version of the coronary artery disease education questionnaire (CADE-Q), called CADE-Q SV.</td>
</tr>
<tr>
<td>Shen et al. (2017)</td>
<td>Medline</td>
<td>Annals of the Academy of Medicine, Singapore</td>
<td>Cross sectional Survey Design</td>
<td>Patients attending cardiac outpatients in Singapore.</td>
<td>Aim to analyse the knowledge, attitudes and practices (KAPs) of patients towards cardiac diseases and pertinent factors that influence such behaviour, focusing on gender differences.</td>
</tr>
<tr>
<td>Author/s, Year</td>
<td>Database</td>
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<tr>
<td>Zhang et al. (2017)</td>
<td>CINAHL</td>
<td>International Journal of Nursing Studies</td>
<td>Randomised Control Trial</td>
<td>General hospital located in the centre of Tang Shan, a northern city in mainland China.</td>
<td>To examine the success of a nurse-led transitional care programme on clinical outcomes, health related knowledge, as well as the physical and mental health status among Chinese patients with CAD.</td>
</tr>
<tr>
<td>Zhou et al. (2017)</td>
<td>PubMed</td>
<td>International Journal of Nursing Studies</td>
<td>Cross sectional Design</td>
<td>Affiliated Hospital of Hebei University, Baoding First Central Hospital, and Chinese PLA 252 hospital.</td>
<td>Aim was to assess cardiac knowledge and rehabilitation awareness in patients with CAD.</td>
</tr>
<tr>
<td>Chen et al. (2018)</td>
<td>PubMed</td>
<td>Patients Prefer Adherence</td>
<td>Cross Sectional Design</td>
<td>Large tertiary general hospitals in Wuhan, China</td>
<td>The objective of this study was to translate and validate a Chinese version of the Coronary Artery Disease Education Questionnaire-II (CADE-Q II).</td>
</tr>
<tr>
<td>de Melo Ghisi, Chaves, Loures et al. (2018)</td>
<td>PubMed</td>
<td>Arquivos Brasileiros de Cardiologia</td>
<td>Cross sectional Design</td>
<td>Public hospital in Belo Horizonte, Minas Gerais, Brazil</td>
<td>The aim was to translate, culturally-adapt and psychometrically validate the Portuguese version of the Coronary Artery Disease Education Questionnaire Short Version (CADE-Q SV).</td>
</tr>
<tr>
<td>Author/s, Year</td>
<td>Database</td>
<td>Journal</td>
<td>Study Methods</td>
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<tr>
<td>Santos et al. (2018)</td>
<td>PubMed</td>
<td>Arquivos Brasileiros de Cardiologia</td>
<td>Cross Sectional Design</td>
<td>Clinic of Cardiology and Cardiopulmonary and Metabolic Rehabilitation (Cardiosport), the Center of Cardiology and Sports Medicine (Núcleo de Cardiologia e Medicina do Esporte, NCME) of the clinic, and the Santa Catarina Institute of Cardiology (ICSC)</td>
<td>The aim was to develop and validate a questionnaire to assess the knowledge of hypertensive patients in cardiac rehabilitation programs about their disease.</td>
</tr>
<tr>
<td>Salzwedel et al. (2019)</td>
<td>Medline</td>
<td>European Journal of Preventive Cardiology</td>
<td>Prospective Observational Design</td>
<td>Two in-patient rehabilitation centres in Germany</td>
<td>The aim was to review the impact of cognitive performance on the success of patient education as a core component of cardiac rehabilitation.</td>
</tr>
<tr>
<td>Santos et al. (2019)</td>
<td>PubMed</td>
<td>Arquivos Brasileiros de Cardiologia</td>
<td>Observational Cross-Sectional Design</td>
<td>Multi-centre study, involving research centres in the cities of Belo Horizonte and Florianopolis in Brazil.</td>
<td>The aim was to translate, culturally adapt and psychometrically validate the CADE-Q II into Brazilian Portuguese.</td>
</tr>
<tr>
<td>Anderson-Dooley (2020)</td>
<td>ProQuest Dissertations &amp; Theses</td>
<td></td>
<td>A non-experimental one-group pre-test and post-test design.</td>
<td>From a Family Practice clinic in the rural town of Cleveland, Texas</td>
<td>The aim of this study was to explore the effect of an educational intervention programme on CAD knowledge in men and women.</td>
</tr>
<tr>
<td>Author/s, Year</td>
<td>Database</td>
<td>Journal</td>
<td>Study Methods</td>
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<tr>
<td>de Melo Ghisi et al. (2020)</td>
<td>PubMed</td>
<td>Canadian Journal of Cardiology</td>
<td>Prospective Cross-sectional Longitudinal Design.</td>
<td>Recruited from 3 Cardiac Rehabilitation Centres across Canada.</td>
<td>The aim was to measure the effectiveness of an education intervention in improving CVD knowledge and health behaviours.</td>
</tr>
<tr>
<td>Huynh et al. (2020)</td>
<td>PubMed</td>
<td>Journal of Clinical Pharmacy &amp; Therapeutics</td>
<td>Cross-sectional Design</td>
<td>From a hospital in Ho Chi Minh City, Vietnam.</td>
<td>The aim was to translate, cross-culturally adapt and validate the Coronary Artery Disease Education Questionnaire—Short Version (CADE-Q SV) for use in Vietnam.</td>
</tr>
<tr>
<td>Williamson et al. (2021)</td>
<td>Science Direct</td>
<td>Patient Education and Counseling</td>
<td>Prospective Observational Design</td>
<td>Recruited from a cardiac rehabilitation in Calgary, Canada.</td>
<td>The aim was to assess the impact of the education programme ‘Taking charge of your heart health’, with focus on CAD-related knowledge, attitudes towards CR and exercise session attendance.</td>
</tr>
<tr>
<td>de Melo Ghisi, Fernandez, et al. (2021)</td>
<td>Science Direct</td>
<td>Journal of Heart and Lung</td>
<td>Cross Sectional Design</td>
<td>From cardiac rehabilitation programmes in three Spanish-speaking countries (Colombia, Costa Rica and Peru).</td>
<td>The aim was to validate the Spanish Coronary Artery Disease Education Questionnaire Short Version (CADE-Q SV).</td>
</tr>
<tr>
<td>Author/s, Year</td>
<td>Database</td>
<td>Journal</td>
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<tr>
<td>de Melo Ghisi, Grace, et al. (2021)</td>
<td>Science Direct</td>
<td>Patient Education and Counseling</td>
<td>Cross Sectional Design</td>
<td>Recruited from the three CR programs in Latin America. Mediagnostica Tecmedi S.A.S in Boyacá, Colombia; Hospital San Vicente de Paúl in Heredia, Costa Rica; and the National Cardiovascular Institute Carlos Alberto Peschiera Carrillo in Lima, Peru.</td>
<td>The aim was to translate, cross-culturally adapt and validate a comprehensive evidence- and theoretically based CR education intervention in Latin America.</td>
</tr>
<tr>
<td>Akten et al. (2021)</td>
<td>ProQuest</td>
<td>International Journal of Caring Sciences</td>
<td>Cross Sectional Descriptive Design</td>
<td>Hospitalised patients from Turkey</td>
<td>The aim was to assess the knowledge levels of patients with CAD regarding the risk factors and management.</td>
</tr>
<tr>
<td>Yang et al. (2021)</td>
<td>PubMed</td>
<td>Global Heart</td>
<td>Cross Sectional Design</td>
<td>A hospital in Chongqing, China.</td>
<td>The aim of this study was to translate, adapt and validate the Chinese version of the CADE-Q SV.</td>
</tr>
<tr>
<td>Author/s, Year</td>
<td>Database</td>
<td>Journal</td>
<td>Study Methods</td>
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<tr>
<td>Omovvat et al. (2022)</td>
<td>ProQuest</td>
<td>ARYA atherosclerosis</td>
<td>Cross Sectional Design</td>
<td>Patients hospitalised in the cardiac care unit (CCU) of Golestan Hospital and Imam Khomeini Hospital, or visiting the Cardiac Rehabilitation Centre in the city of Ahvaz, Iran.</td>
<td>The aim was to translate, adapt and validate the Coronary Artery Disease Education Questionnaire Short Version (CADE-Q SV) in the Persian context.</td>
</tr>
<tr>
<td>de Melo Ghisi and Oh (2022)</td>
<td>CINAHL</td>
<td>Canadian Journal of Nursing Research</td>
<td>Cross Sectional Design</td>
<td>From two Canadian provinces (Québec and New Brunswick).</td>
<td>The aim was to translate, culturally-adapt and psychometrically validate the French-Canadian version of the Coronary Artery Disease Education Questionnaire Short Version (CADE-Q SV).</td>
</tr>
<tr>
<td>Arrieta-Bartolomé et al. (2022)</td>
<td>Science Direct</td>
<td>Patient Education and Counseling</td>
<td>Prospective pre-test – post-test pilot study</td>
<td>Conducted in the CR unit of the Hospital General Universitario Gregorio Marañón (Madrid, Spain)</td>
<td>To evaluate the effectiveness of a comprehensive educational intervention in a hybrid model of cardiac rehabilitation in Spain during the COVID-19 pandemic.</td>
</tr>
<tr>
<td>Shi et al. (2022)</td>
<td>Science Direct</td>
<td>Heart, Lung and Circulation</td>
<td>Cross Sectional Design</td>
<td>Recruited from cardiologists’ rooms in New South Wales, Australia</td>
<td>Aim of this study was to assess CAD knowledge and associated factors in Chinese immigrants in Australia.</td>
</tr>
<tr>
<td>Author/s, Year</td>
<td>Database</td>
<td>Journal</td>
<td>Study Methods</td>
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<td>Aims</td>
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<tr>
<td>Liu et al. (2022)</td>
<td>ProQuest</td>
<td>Health Education Research</td>
<td>Prospective, controlled quantitative pilot study</td>
<td>From the cardiology department of this tertiary hospital in China.</td>
<td>The aim was to assess the suitability of Simplified Chinese CR education delivered via booklets and videos on WeChat asynchronously, and consider the impact on knowledge, risk factor awareness, health behavioural change and quality of life.</td>
</tr>
</tbody>
</table>
Appendix C: Convergent Mixed Methods Research Design

QUALITATIVE DATA COLLECTION (PHASE 1):
Focus groups/interviews:
Cathedral:
Patients focus groups x 2
Cardiac health care professionals focus groups x 2
Staff semi-structured interviews x 4.

QUALITATIVE DATA COLLECTION (PHASE 1):
Objectives 3 and 4 of the research inquiries

QUALITATIVE DATA ANALYSIS (PHASE 1):
Data analysis:
NVIVO
Systematic thematic analysis

QUALITATIVE DATA COLLECTION (PHASE 2):
Objectives 1 and 2 of the research inquiries

QUALITATIVE DATA ANALYSIS (PHASE 2):
Data Analysis:
Descriptive and Inferential Statistical Analysis
(CADE-QII scores, Demographic details, and international comparison,)

INTEGRATION OF QUALITATIVE AND QUANTITATIVE DATA:
Integrative Analysis: Objective 5 of the research inquiries.
Creswell & Plano Clark’s six components framework for convergent design.

QUANTITATIVE DATA COLLECTION (PHASE 2-part a):
Pilot questionnaire:
Patients from Cathedral - to pilot the CADE-QII questionnaire in the Aotearoa New Zealand context.

QUANTITATIVE DATA COLLECTION (PHASE 2-part b):
Questionnaire:
Nationwide major cardiac centers.
N=136

FUTURE MODEL Objective 6 of the research inquiries
AND FEEDBACK CONSULTATION

520
Appendix D: Human Ethics Committee Approval Letter

HUMAN ETHICS COMMITTEE
Secretary, Rebecca Robinson
Telephone: +64 3 365 4588, Extn 94588
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2019/120

29 October 2019

Kylie Short
Health Sciences
UNIVERSITY OF CANTERBURY

Dear Kylie

The Human Ethics Committee advises that your research proposal “Do Patients Understand Inpatient Cardiac Education? A New Zealand Mixed Methods Study” has been considered and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 17th October 2019.

Best wishes for your project.

Yours sincerely

[Signature]

Dr Dean Sutherland
Chair
University of Canterbury Human Ethics Committee
Tuesday 3 September 2019

Tēnā koe Kylie Short

RE: Working Title: Do patients understand inpatient cardiac education? A New Zealand study.

This letter is on behalf of the Ngāi Tahu Consultation and Engagement Group (NTCEG). I have considered your proposal and acknowledge it is a worthwhile and interesting project and you are clear about how you ought to take participants’ (cultural) needs into account if and when applicable.

Given the scope of your project, no issues have been identified and further consultation with Māori is not required.

Thank you for engaging with the Māori consultation process. This will strengthen your research proposal, support the University’s Strategy for Māori Development, and increase the likelihood of success with external engagement. It will also increase the likelihood that the outcomes of your research will be of benefit to Māori communities. We wish you all the best with your current project and look forward to hearing about future research plans.

The Ngāi Tahu Consultation and Engagement Group would appreciate a summary of your findings on completion of the current project. Please feel free to contact me if you have any questions.

Ngā mihi whakawhetai ki a koe

Henrietta Carroll (on behalf of the NTCEG)

Kaiarāhi Maori Research
Research & Innovation | Te Rōpū Rangahau
University of Canterbury | Te Whare Wānanga o Waitaha
Phone +64 3 369 0143, Private Bag 4800, Christchurch | Ōtautahi
henrietta.carroll@canterbury.ac.nz
http://www.research.canterbury.ac.nz
Appendix F: Health and Disability Ethics Committees (HDEC) Scoping Review Confirmation:

10 October 2019
Mrs Kylie Short
University of Canterbury
Kylie.short@pgc.canterbury.ac.nz

Dear Mrs Short,

Study title: Do patients understand inpatient cardiac education? A New Zealand study

Thank you for emailing HDEC a completed scope of review form on 11 September 2019. The Secretariat has assessed the information provided in your form and supporting documents against the Standard Operating Procedures.

Your study will not require submission to HDEC as, on the basis of the information you have submitted, it does not appear to be within the scope of HDEC review. This scope is described in section three of the Standard Operating Procedures for Health and Disability Ethics Committees.

Based on the information provided, your study is a minimal risk observational study.

An observational study requires HDEC review only if the study involves more than minimal risk (that is, potential participants could reasonably be expected to regard the probability and magnitude of possible harms resulting from their participation in the study to be greater than those encountered in those aspects of everyday life that relate to the study).

For the avoidance of doubt, an observational study always involves more than minimal risk if it involves one or more of the following:
- one or more participants who will not have given informed consent to participate,
- one or more participants who are vulnerable (that is, who have restricted capability to make independent decisions about their participation in the study), or
- standard treatment being withheld from one or more participants, or
- the storage, preservation or use of human tissue without consent, or
- the disclosure of health information without authorisation.

If you consider that our advice on your project being out of scope is in incorrect please contact us as soon as possible giving reasons for this.

This letter does not constitute ethical approval or endorsement for the activity described in your application, but may be used as evidence that HDEC review is not required for it.

Please note, your locality may have additional ethical review policies, please check with your locality. If your study involves a DHB, you must contact the DHB’s research office before you begin. If your study involves a university or polytechnic, you must contact its institutional ethics committee before you begin.

Please don’t hesitate to contact us for further information.
# Appendix G: Guide for Patient Focus Group Questions

**Provisional Research Project Title:** Do patients understand hospital cardiac education/information. A New Zealand Study

## Introductory Questions – 5 minutes

1. Let us start by introducing ourselves with your first name and where you are from.

## Opening Questions – 10 minutes

2. What was the reason you ended up/were admitted to hospital?
   - During your stay in hospital, did you receive information about how you could manage your heart health at home? Can you recall when this was?
   - Who did you get this education/information from?
   - Where are you continuing to get your information?

## Key Questions – I am now going to focus on what you may have taken away from the education you received in hospital with a number of further questions. What we would like to identify is what you felt you learnt about the following topics. – 60 minutes

3. Can you please share with the group your understanding of the cause of your heart issue? This may be different for each participant depending on your heart issue.

4. Would you share with the group what you know are the lifestyle factors that contribute to heart issues?
   - What are the risk factors that contribute to heart issues?
   - Where did you learn this information?

5. Can you please share what you know about your medications?

6. Can you please share what you know about what should be included in your diet to promote good heart health?

7. Can you please share what you know about what exercise you can do since leaving hospital?

8. Can you share what you know about the mental health effects of heart disease?

9. Do you feel anyone checked how much information you understood?
   - How did they explore this with you?

## Closing Questions – 15 minutes

10. Once you left the hospital, did you feel you had more questions about your heart health?
    - If so, can you remember what these were?

11. Did any issues come up that you did not have answers for?
    - Can you tell me about them?
    - Where did you go for answers?

12. What was important to you about the in-hospital education/information process?

13. Are there any final comments you would like to add?
Appendix H: Guide for Staff Focus Group and Interview Questions

**Provisional Research Project Title:** Do patients understand hospital cardiac education/information? A New Zealand Study

<table>
<thead>
<tr>
<th>Introductory Questions – 5 minutes</th>
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</thead>
<tbody>
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<table>
<thead>
<tr>
<th>Opening Questions – 10 minutes</th>
</tr>
</thead>
</table>
| 2 | • What cardiac rehabilitation education do you provide?  
|   | • Can you share with the group how long you have been providing cardiac rehab education to patients?  
|   | • Where do you think patients get most of their information?  
|   | • What is the CR programme that patients receive under your health service before they commence an out-of-hospital “phase 2” programme? |

<table>
<thead>
<tr>
<th>Key Questions – I am now going to focus on what knowledge/learnings you believe patients take away from the education they receive whilst they are in-patients. I specifically want to know how you have determined this. – 60 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
</tr>
</tbody>
</table>
| 4 | • Would you share with the group what you believe patients know about the lifestyle factors that cause heart disease?  
|   | • What do you think they know about the risk factors that contribute to heart disease? |
| 5 | • Can you please share what you think patients understand about their medications? |
| 6 | • Can you please share what you think patients understand about their diet in relation to promoting good heart health? |
| 7 | • Can you please share what you think patients know in relation to what and how much exercise they should do after leaving hospital? |
| 8 | • What do you think patients know about any mental health effects of cardiovascular disease and how to manage these? |
| 9 | • How do you assess patients’ understanding of the information you deliver? |

<table>
<thead>
<tr>
<th>Closing Questions – 15 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
</tr>
</tbody>
</table>
| 11 | • What issues do you think come up for patients once they are at home?  
|   | • Where do you think they go for answers? |
| 12 | • What do you think are the most important things patients want to know about in their education programme?  
|   | • How do feel you know this? |
| 13 | • Are there any final comments you would like to include? |
Appendix I: Consent Form and Confidentially Agreement

Do patients understand cardiac education? A New Zealand Study
Consent Form and confidentiality agreement for focus group / interview participation.

☐ I have been given a full explanation of this project and have had the opportunity to ask questions.
☐ I understand what is required of me if I agree to take part in the research.
☐ I understand that participation is voluntary, and I may withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information I have provided should this remain practically achievable.
☐ I understand that any information or opinions I provide will be kept confidential by the researcher [Kylie Short], the research assistant, supervisory team [Dr Alison Dixon and Dr Isabel Jamieson] and the professional transcriber. I also understand that any published or reported results will not identify the participants of the hospital. I understand that a thesis is a public document and will be available through the UC Library.
☐ I agree to maintain confidentiality of the information shared in this focus group.
☐ I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed once no longer required for an on-going database. It is anticipated that the topic of this PhD will be an aspect of the primary researcher’s ongoing research interests as an academic. Once the data is no longer required for an ongoing research database, it will be destroyed as previously outlined.
☐ I understand the risks associated with taking part and how they will be managed.
☐ I understand that I can contact the researcher [Kylie Short] or supervisor [Dr Alison Dixon, email alison.dixon@canterbury.ac.nz; telephone 02102746892 and Dr Isabel Jamieson, email isabel.jamieson@canterbury.ac.nz] for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz)
☐ I would like a summary of the results of the project.
☐ By signing below, I agree to participate in this research project.

Name: ___________________________ Signed: ___________________________ Date: ___________________________
Appendix J: Focus Group Information Packs

Do Patients understand Cardiac Education.
I would like to participate in the above study, and I am happy for you to contact me with further details.
Name: __________________________________________________
Contact: ________________________________________________
Email (Optional): __________________________________________
If you would like the lead researcher to contact, you can fill in this card. This card will be placed in a sealed box on the ward for only the lead researcher to access. You can also contact her directly. This card will be destroyed after the researcher has had the opportunity to contact you.

Kylie Short
Telephone: 021 09067491
kylie.short@pg.canterbury.ac.nz
Do patients understand cardiac education?
Tari: College of Education / School of Health Science  
Waea: 021 09067491  
Email: kylie.short@pg.canterbury.ac.nz  
Te Rā: 1st August 2020,  
HEC Ref. [HEC 2019/120]  

Kia ora,

Ko Kylie Short tōku ingoa, ā, he ākonga tohu kairangi ahau ki Te Kura Mātaoi Hauora ki Te Whare Wānanga o Waitaha. He tapuhi whai rēhita ahau, ā, neke atu i te 20 tau te nui o ōku wheako. Kei te tuhi atu ahau ki a koe kia kuhu mai koe ki taku mahi rangahau. “He aha ngā māramatanga o ngā tūrōro i ngā akoranga mātai manawa ki te hōhipera?” He mahi rangahau ki Aotearoa.

I roto i te tūranga ngaio o te tiaki tangata, e mōhio ana tātou ki te hiranga o ngā whakamārama whai muri i te whakamātātou manawa, ka mutu, kei te mōhio kōrero hōtōtō mātou he kōrero whiwhiwhi, he kōrero whakarāngirua, he kōrero uaua anō hoki. E tūmanakotia ana mā taku rangahau ka kītea ngā mōhiotanga o ngā tūrōro mai i ngā whakamāramatanga i te wā e noho ai rātou i raro i te manaaki a ngā ratonga hōhipera, kia tino eke ai tā mātou whakapiki anō i tō ora me te hauora, ā, haere ake nei. Ka morimoria tō kuhu mai, otirā, mā tēnei kuhu e mārama ai mātou ki ngā āhuatanga i Aotearoa nei, me te whai whakaaro ake ki ngā panaonitanga mō te āpōpō.

I tēnei wā, kāore anō ahau kia whiwhi i ō taitopito whakapā. Kua whiwhi koe i tēnei tona taritari mai i te rōpū whakaora manawa, nā rātou nei koe i manaaki i a koe e noho hōhipera ana. Mena koe ka rata ki tēnei rangahau, tēna tirohia ngā kōrero kei te reta (e āpiti nei) e whakarāngirangi ana i ngā mahi māu.

Kia mōhio mai, kei a koe te tikanga, arā, kia kuhu mai, kia kaua rānei. Ki te hia kuhu, mena rānei he pātai āu mō te rangahau, tēna īmeratia mai, whakapā mai rānei ki ahau kylie.short@pg.canterbury.ac.nz/ 021 09067491, tukua rānei ō taitopito whakapā ki te rōpū whakaora manawa, ka tukua ai e rātou ki ahau.

Tēnei te mihi nui ake ki a koe.

Nāku, i roto i ngā whakaaro matihere,

Kylie Short RN, BN, MSc (Ped) (Kairangahau matua)

021 09067491  
Manawa (Level 5)  
PO Box 540, Christchurch  
8140 New Zealand
Hello,

My name is Kylie Short and I am a PhD student from the School of Health Science at the University of Canterbury. I am also a Registered Nurse with over 20 years of experience. I am writing to invite you to participate in my research study “What are patients understanding from their hospital cardiac health education?” A New Zealand study.

As health care professionals, we know how important it is to give you education following a new cardiac diagnosis and we also know that this information can be complicated, overwhelming and hard to understand. My study hopes to look at what patients understand from the information given whilst under the care of hospital services, so that we can do the best job to support your recovery and on-going health. Your participation would be extremely valued and would help us understand the situation in New Zealand and consider changes for the future.

At this stage, I have not been personally given your contact details. You are receiving this recruitment pack from the cardiac rehabilitation team, who have been looking after you whilst you have been in hospital. If participation in this study is something you would like to consider, please see the information letter (included) that outlines what would be required from you. Please know this is completely voluntary and you can choose to be in the study or not. If you would like to participate or have any questions about the study, please email or contact me at kylie.short@pg.canterbury.ac.nz / 021 09067491 or please feel free to ask the cardiac rehab team to pass your contact details onto me.

Thank you very much.

Kind regards,

Kylie Short RN, BN, MSc (Ped) (Lead Researcher)
021 09067491
Manawa (Level 5)
PO Box 540, Christchurch
8140 New Zealand
Do patients understand hospital cardiac education? An Aotearoa New Zealand study.

Information sheet for participants in the patient focus group.

My name is Kylie Short and I am a registered nurse with more than 22 years experience. I am completing this research as part of a PhD through the University of Canterbury. The research questions are: What do newly diagnosed patients understand about heart health following their first engagement with acute cardiac hospital services, and what are cardiac patients and health care professionals’ understandings of patients’ levels of heart health knowledge. The overall aims of the research are to 1) Assess what patients understand about their cardiac health, utilising the previously validated and verified Coronary Artery Disease Education Questionnaire II (CADE-QII) and describe the demographic characteristics that influence knowledge scores. 2) explore what patients and health care professionals believe is understood by patients after engaging with the acute hospital services. 3) explore how health care professionals and patients believe understanding is assessed and 4) to analyse if there is a gap between actual knowledge (from the calculated knowledge scores – the quantitative data) and perceived perceptions around what patients understand about their heart health (from the staff and patient focus groups/interviews – qualitative data).

You have been approached to take part in this study because you recently experienced a new heart event or a new cardiac (heart) diagnosis and were given education about how to manage your on-going heart health whilst you were in hospital. Your contact details have not personally been given to me. All patients who meet the inclusion criteria have been provided with this information sheet by the cardiac rehabilitation team overseeing your care.

If you choose to take part in this study, your involvement in the project would be to participate in a focus group discussion. This is a group interview where you will have the opportunity to share your thoughts relating to the cardiac education process with other individuals who have had a similar experience. Each focus group will contain no fewer than 4 people, with a maximum of ten. Prior to the focus group, you will be emailed the questions that will form the basis of the discussion and the ground rules for the focus group. This will allow you the opportunity to reflect and journal your thoughts prior to coming to the focus group.

Conversations from the focus groups will be collected by a voice recorder operated by a research assistant in the room. The primary researcher (Kylie Short) will facilitate the focus groups to promote a semi-structured dialogue using pre-planned focus group questions. The research assistant will be documenting the group interactions during this time. Upon completion of the focus group the primary researcher will summarise the group discussion and ask if you agree with the summary and would like to add any further information.

It is anticipated that each focus group will run for approximately 90 minutes, with a maximum time of two hours. Focus groups will be held at a mutually agreed venue in the Christchurch CBD with allocated parking. Upon mutual negotiation with most participants, the date, time and room will be confirmed. During the focus group, morning/afternoon tea will be provided and one ‘spot prize’ per focus group to be given out to a randomly selected participant.

It is anticipated that there will be minimal physical risk to your well-being during participation in this research project. Should a physical injury occur, the lead researcher is able to provide first aid and you will be encouraged and directed to seek treatment as required. There is a small risk that the discussion may provoke feelings of distress. Should this be the case and you feel that you would like further support, you will be provided with the details of an independent professional counsellor at the time of the focus group.
Participants will also be offered the 24-hour counselling hotline number for post focus group counselling, if required.

Participation is completely voluntary; all participants have the right to withdraw at any stage without incurring any penalty prior to the data analysis stage.

Maintaining the confidentiality of the focus group participants is a priority for this research project. No identifying information will be published from either individuals or the organisations participating within the focus groups. Participants of the focus groups do not have their names recorded on the transcripts but will be assigned a number. The results of the project will be published, but you may be assured of complete confidentiality of data gathered in this investigation: your identity will not be made public. All data from focus groups will be reported as group findings rather than individual statements. As a result, if you do decide to voluntarily withdraw from the study after the data analysis stage has begun, your individual contribution to the group discussion will not be able to be separated out from the overall discussion.

All focus group participants, the research assistant and the transcriber will be required to sign a confidentiality agreement regarding what is discussed in the focus group sessions.

As this is a PhD project, there may be a number of years before the final results will be available for publication. Once the project is completed, a summary of the results will be published for review via the Heart Foundation Newsletter. It is also likely that the results will be published in professional journals throughout the time of the project. The final thesis, being a publicly available document, will be accessible for review through the University of Canterbury Library. All participants are welcome to contact the primary researcher for information regarding the progress towards the publication of results. Please indicate to the researcher, on completion of the focus group, if you would like to receive a copy of the summary of results of the project.

Any paperwork or recordings from the research project will be stored on a password-protected computer during the active research period. After the completion of the project, data will then be stored on a separate password protected hard drive for ten years and, once no longer required for an on-going database, will be destroyed. It is anticipated that the topic of this PhD will be an aspect of the primary researcher’s ongoing research interests as an academic. It is conceivable another national and/or international study may pool the data in the future. For this reason, the research data may still be required beyond 10 years. Once the data is no longer required for an ongoing research database, it will be destroyed as previously outlined.

The project is being carried out by lead researcher, Kylie Short kylie.short@pg.canterbury.ac.nz as part of a PhD, under the supervision of Dr Alison Dixon and Dr Isabel Jamieson, both of whom can be contacted at alison.dixon@canterbury.ac.nz or isabel.jamieson@canterbury.ac.nz. They would be pleased to discuss any questions or concerns you may have about participation in the project.

This project has been reviewed and approved by the University of Canterbury Human Ethics Committee on 29th October 2019, reference number HEC 2019/120 and participants should address any complaints to The Chair, Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz). Thank you for considering participating in this research.

Lead Researcher Contact Details:
Kylie Short RN, BN, MSc (Ped)
Telephone: 021 09067491
Manawa (Level 5)
PO Box 540, Christchurch, 8140 New Zealand - kylie.short@pg.canterbury.ac.nz
Appendix K: Focus Group Guidelines

Focus Group Guidelines

- Participation consent forms will need to be completed and we will be collecting these prior to the commencement of the focus group.
- Maximum duration for each focus group is expected to be about two hours:
  - Introductions and interviews (90 minutes) and tea/coffee (30 minutes).
- There is an appreciation of openness and honesty without any consequence.
- Only first names will be used, and participants may use an alias if they prefer.
- During the focus group sessions, no participant’s identifying data will be collected.
- Following the focus group sessions, no participant’s identifying data will be recorded on transcription.
- The focus group facilitator will ensure that all participants have an opportunity to contribute if they wish to.
- The focus group facilitator will be sensitive to any signs of distress that the discussion may be causing, and appropriate action will be taken.
- Participants will also be offered the 24-hour counselling hotline number for post focus group counselling if required.
- All ideas are welcome – no such thing as a small comment or bad idea.
- Participants are encouraged to provide constructive/productive dialogue and feedback.
- Participants are asked to keep the conversation centred and that no side conversations or negative body language occurs.
- Respective disagreement is asked to be openly presented in the group environment and not passively to others in a side discussion.
- Participants have the right to ask for clarity.
- Participants are asked to be honest in the answers that they give.
- All discussions that occur during the focus group will remain confidential and not discussed outside the environment.
## Appendix L: Focus Group Protocol

<table>
<thead>
<tr>
<th>Date:</th>
<th>[Day, month, year]</th>
<th>Time:</th>
<th>Start:</th>
<th>End:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>Researcher leading the focus group:</td>
<td></td>
<td>Research Assistant:</td>
<td></td>
</tr>
<tr>
<td>Researchers:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participants:</td>
<td><strong>Participants</strong>: [Write first names participants, as per research project protocol). MR X, MRS S</td>
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<tr>
<td></td>
<td>FG1 Participant a:</td>
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<td></td>
<td>FG1 Participant b:</td>
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<td>FG1 Participant c:</td>
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<td>FG1 Participant j:</td>
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<tr>
<td>Question:</td>
<td>Include general notes on 1) participant responses 2) who is making the responses 3) general interaction of group members</td>
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</tr>
<tr>
<td>Q1:</td>
<td><img src="image" alt="Diagram of group interaction" /></td>
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</tbody>
</table>

Key points from question.
### Appendix M: Focus Group Debriefing Tool for Research Team

<table>
<thead>
<tr>
<th><strong>Research Project Title:</strong></th>
<th>Focus Group Notes: Do patients understand hospital cardiac education/information. An Aotearoa New Zealand Study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date:</strong></td>
<td>[Day, month, year]</td>
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<tr>
<td><strong>Time:</strong></td>
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<tr>
<td><strong>Location:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Researchers:</strong></td>
<td></td>
</tr>
<tr>
<td>Researcher leading the focus group:</td>
<td>Research Assistant:</td>
</tr>
<tr>
<td>To be completed by the research team (together) after the participants have left.</td>
<td></td>
</tr>
</tbody>
</table>

- **What were the themes?**

- **What were the most important points that we learnt from this group?**

- **What was surprising or unexpected?**

- **What quotes were particularly helpful?**

- **How was the group similar or different from earlier groups?**

- **Does anything need to change before the next group?**
Appendix N: Example of the Six-Stage Qualitative Analysis Protocol

<p>| Focus group date: | 9th October 2020 1.30pm-3.30pm | 853 Colombo Street (cnr of Colombo St &amp; Salisbury St); CBD; Christchurch |
| Research team and participants | FG Facilitator: Kylie Short Assistant: Di Hudson | Four male participants W1 W2 B J |
| (1) Confirming main points with participants | Post FG discussion the research team presented main points to the participants. Participants agreed with main points and added final comments |
| (2) Research team review post focus group | Following the focus session and after the main points were fed back to the group, the research team convened and discussed main points and themes of the sessions. This discussion was facilitated and notes completed on the Focus group debriefing tool |
| (3) Data familiarisation | First review: 31/10/20 Review of completed transcript | Second review: Re listened to recorded session. Re read the transcript. Compared the transcript and recording were a correct match Confirmed individual speaker dialog. 26/07/21-2/8/21 |
| (4) Deductive themes | Deductive themes | Deductive themes – using FG questions which were established from the national/international guidelines. | Second analysis 11-17/8/21 Theme adjustments following first analysis: Exercise Further resources Hospital information (Key hospital information) these themes are overlapping Heart health pathology (Reason for admission) patients actually expressed their reason for admission as their pathological heart event. Knowledge Check Lifestyle and Risk factors participants used this interchangeably Management Medications Nutrition Unanswered questions What did you know On further review – this actually fits across other themes. Therefore, dialog merged into other themes Who gave the information |
| First past analysis: 6-11/08/21 | Exercise Discussion around exercise - both information provided and partaking in exercise | |
| Further resources | Any discussion that refers to resources, people and/or information they would or did use once they left hospital. |
| Heart health patho | Any discussion around the underlying pathophysiology of their heart disease - may be overt or discrete. |
| Hospital information given | Overt or discrete discussion around the perceived information given in hospital |
| Key hospital information | What did participants express to be the most important hospital information |
| Knowledge check | How was the participants knowledge or understanding checked |
| Lifestyle | Overt or discrete discussion around the lifestyle factors for their heart disease. |
| Risk factors | Overt or discrete discussion around risk factors for their heart disease. |</p>
<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>How they or their healthcare team managed their heart disease.</td>
</tr>
<tr>
<td>Medications</td>
<td>How they manage their heart disease with medications and/or what they understand about their medications.</td>
</tr>
<tr>
<td>Mental Health</td>
<td>Overt or discrete discussion around mental health issues. Including any references to words using ‘emotional’ phrases.</td>
</tr>
<tr>
<td>Nutrition</td>
<td>Overt or discrete discussion around nutritional management and understanding</td>
</tr>
<tr>
<td>Unanswered questions-what wanted to know</td>
<td>Any discussion around questions they still had.</td>
</tr>
<tr>
<td>What did you know</td>
<td>Discussion depicting areas of prior understanding of heart health issues.</td>
</tr>
<tr>
<td>Who gave information</td>
<td>Discussion depicting dialog around who was providing the participant with information about their heart disease.</td>
</tr>
</tbody>
</table>

### Exercise:

**Code** Exercise:

- **Participants Self-thinking around future exercise management**
  - Discussion around how participants were/are going to manage their exercise and activity in the face of uncertainty
- **Relationship between education and exercise outcomes**
  - Discussion around how the education and hospital information gave participants confidence to begin exercise regimes
- **Perception of how exercise influenced recovery**
  - Discussions around the practical implications for commencing exercise after a heart event
- **Perceived information delivered**
  - Participants’ perceptions of the information they received regarding resuming exercising
- **Expression of confusion around exercise information**
  - Participants’ perceptions of how the information they received around exercise, post heart event, caused confusion.

### Further resources:

**Code** Further resources:

- **Cardiac team**
  - Discussion around how the participants utilised the
| **Cardiac team as a place of further resource** | Health professionals outside the cardiac team  
Other health care professionals who were not part of the acute hospital services.  
Identified areas of limited resources  
Dialog around if participants knew where to go if they had questions – limited discussion 23/8/21  
Information overload  
Discussion around large amount of material  
Internal conflict around where to seek further information  
Discussion around which services they need to go to for further advice.  
Online inquiry  
Discussion around using online resources to support knowledge  

**Code Heart Pathophysiology:**

| Knowledge that developed after or in relation to admission  
Knowledge that was developed following information that was given in hospital. Likely from the results of tests and procedures  
Perceived knowledge of heart disease prior to admission  
Discussion that reflected the knowledge the participants had around their heart disease before admission into hospital.  
Misunderstanding around their heart disease presentation  
Discussion that suggested a level of misunderstanding about their heart disease prior to hospital admission.  

(5) Searching themes for codes  
**Code Knowledge Check:**

| Participants thinking around best/time place to check knowledge and influences in how this is done  
Theme covers the participants discussion around the timing of checking what the person had understood – often discussed as capacity to ‘take it in’  
Perceived knowledge was checked in hospital  
Participants perceptions of how their knowledge was checked in hospital/outpatients  
Check using - do you have any questions  
Discussion that explored that checking knowledge by asking ‘if they had any questions’  
Checked at a deeper level  
Discussion that explored that checking knowledge at a deeper level.  

---

538
<table>
<thead>
<tr>
<th>Perceived knowledge was never checked</th>
<th>Focus group discussion highlighted that ‘no check’ never took place – 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived knowledge was not check in hospital but as outpatient</td>
<td>Discussion about the place of checking the participants knowledge</td>
</tr>
</tbody>
</table>

**Code** Lifestyle and risk factors:

<table>
<thead>
<tr>
<th>Identified risk and lifestyle factors</th>
<th>Discussion where participants overtly discussed lifestyle and risk factors that contribute to heart disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unidentified risk and lifestyle factors</td>
<td>Discussion around risk and lifestyle factors but was not overtly linked to the development of heart disease</td>
</tr>
</tbody>
</table>

**Code** Nutrition:

<table>
<thead>
<tr>
<th>Expressed confusion around Nutrition information</th>
<th>Participant discussion around confusion around changing guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identified new information</td>
<td>Participant discussion around guidelines given in hospital</td>
</tr>
<tr>
<td>Perceived links to Heart Health - indirect or direct</td>
<td>Discussion around links to heart disease and diet</td>
</tr>
<tr>
<td>Psychological impact in relation to nutrition education</td>
<td>Discussion around indulgence only one small comment made in this section.</td>
</tr>
</tbody>
</table>

(5) Searching themes for codes
18/08/21-21/08/21

**Code** Who gave information:
Who gave information – this theme included dialog around who was providing the participant with information about their heart disease. This was in-hospital verses out-of-hospital and then broken down from there.

<table>
<thead>
<tr>
<th>Conflicting information between who was delivering material</th>
<th>Discussion that highlighted a conflict between advised given from different health care professionals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital information</td>
<td>Discussion that covers information given whilst in the acute hospital setting</td>
</tr>
<tr>
<td>Capacity to understand</td>
<td>Participant discussion around the ability to take information in.</td>
</tr>
<tr>
<td>Hospital information that did or did not add to understanding of heart disease</td>
<td>Discussions that covered information that was given and improved or added to the participants understanding of their heart disease</td>
</tr>
<tr>
<td>Hospital information that influenced management of illness</td>
<td>Discussions that covered information that was given to the participants around management of heart disease</td>
</tr>
<tr>
<td>Impact of hospital education</td>
<td></td>
</tr>
<tr>
<td>Out of hospital</td>
<td>Information given outside of the acute admission setting</td>
</tr>
<tr>
<td>GP, GP clinics, primary health</td>
<td>Confusion and confliction around where to seek information from</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------------------------------------</td>
</tr>
<tr>
<td>Information that contributed to knowledge around health</td>
<td>Discussions that covered information that was given and improved or added to the participants understanding of their heart disease</td>
</tr>
<tr>
<td>Outpatient clinic or follow-up</td>
<td>Information that contributed to knowledge about disease</td>
</tr>
<tr>
<td>Information that contributed to management</td>
<td>Discussions that covered information that was given to the participants around management of heart disease</td>
</tr>
<tr>
<td><strong>Code Management:</strong></td>
<td></td>
</tr>
<tr>
<td>Management approaches that were led by HCPs</td>
<td>Discussion that covered management plans from the initial event to ongoing care</td>
</tr>
<tr>
<td>Participant self-led management</td>
<td>Management of rehab and disease management led by the participant.</td>
</tr>
<tr>
<td><strong>(5) Searching themes for codes 23/08/21</strong></td>
<td><strong>Code Medications:</strong></td>
</tr>
<tr>
<td>Medication actions</td>
<td>Discussion by the participants that linked to the actions and purpose of the medications</td>
</tr>
<tr>
<td>Medication confusion</td>
<td>Discussion that suggested there was confusion around the purpose or use of medications</td>
</tr>
<tr>
<td>Medication resources</td>
<td>Discussion that suggested where participants were going for further resources or specific resources they were sent home with.</td>
</tr>
<tr>
<td>Medication - emotional links</td>
<td>Discussion that used ‘emotion’ words to describe how participants felt in relation to medication management.</td>
</tr>
<tr>
<td><strong>Code Mental Health:</strong></td>
<td></td>
</tr>
<tr>
<td>Overt discussion related to mental health education received</td>
<td>Dialog that included participants directly referring</td>
</tr>
<tr>
<td>Emotional changes identified by participants</td>
<td>Discussion around how they have experienced emotional change or worried they would experience emotional change</td>
</tr>
<tr>
<td>Reported possible impact of covering MH</td>
<td>Discussion around the possibility of having MH education could actually cause a negative impact on well-being</td>
</tr>
<tr>
<td>Reported experience of limited mental health education</td>
<td>Discussion that identified that mental health impact was not really covered in the hospital education</td>
</tr>
<tr>
<td>Subconscious discussion that uses words associated with emotions</td>
<td>Discussion where participants used dialog to discussing emotions – for them and or family</td>
</tr>
<tr>
<td>Negative emotional responses related to heart health</td>
<td>Dialog that used words to express ‘negative’ emotional outcomes related to heart health and education given</td>
</tr>
<tr>
<td>Subconscious discussion that uses words associated with positive emotions</td>
<td>Dialog that used words to express ‘positive’ emotional outcomes related to heart health and education given</td>
</tr>
</tbody>
</table>

**Code** Unanswered questions:

| Confusion over where to go for further information | Participants’ discussion around their need to know where to go for further information/follow-up. |
| Individual specifics about my case | Discussion around wanting to know more about the specifics of the individual’s biology |
| My prospects - my outcomes - moving forward | Dialog participants had around their ‘future’ outcomes and expectancy |
| Related to medications | Discussion around further medication information they needed |
| Unmet questions related to exercise moving forward | Discussion around confusion following the education they received about their exercise moving forward. |
| Why me | Participants’ discussion around their desire to know why this has happen to them. |

*(6a) Reviewing themes*

26/08/2021

Today, I mapped out all the themes and subthemes that emerged from the above processes. The aim was to start looking for overarching themes from the qualitative discussion of this focus group. The codes above were derived as a deductive process from previous readings around the topic, national and international guidelines and the questions that formed the basis of the focus group discussion.
Following on from this, an inductive process was used to identify subthemes for each of the codes. These Codes and subthemes were ‘mapped out’ on a pin board to provide an opportunity to identify for common overarching themes in the data.

The following are my initial thoughts around themes that I see emerging.

a) Perceived confusion towards information, education and/or resources received.

b) Indirect subconscious discussion around how education provided improvements to health outcomes.

c) Knowledge perceived by participants to improve management and health outcomes.

   a. Considering if b) and c) are one theme ‘Education and knowledge that influenced management and health outcomes’

d) Unmet educational and knowledge needs

e) Emotional impact of knowledge and educational delivery – consciously and subconsciously discussed.

f) Identified education (content) delivered related to heart health disease and management.

g) Information overload, and when/where information is best delivered.

h) Checking understanding

Key points that stood out for me with FGP1:

- The participants wanted to know ‘why me’. Why did they have a heart event when they thought they were doing everything right?
- Most of the group felt that genetics played a major role in their heart disease.
- The information they got about their medications was good but there was a lot of new medication and information to take in.
- There was a level of confusion around how long you were on medications and where to go for repeat prescriptions. This caused some ‘emotional’ responses.
- Some confusion around medication side effects.
- There was confusion around where to go if you had further questions. Some would go to their GPs, others preferred to go back to the cardiac team, as they were the ‘experts’.
- There was a major discussion around exercising and incorporating this into your life moving forward.
- The participants felt the exercise information was ‘vague’ and markers were not clear. Emotional wording was linked to this discussion i.e. feeling scared.
- The impact that heart disease may have on mental health was not an area of education that participants felt was covered in hospital.
- The participants were not sure this was something that needed to be covered. They were concerned that by including it, the discussion may actually cause more distress.
- A lot of the conversation did include references to mental health and emotional responses but subconsciously and consciously.
- The participants discuss the concept of information overload during hospital stays and when would be the best time to receive information.
- Participants discussed where they would go for further information, should they need it – online/google, GP, Cardiac rehab team.
- The participants identified that conflicting advice and information between different health settings caused stress and confusion.
- The participants all felt that their knowledge was checked in hospital following the delivery of education.

Comparison with the themes identified by the research team facilitating the focus group at the time of the discussion.
Main themes identified on paperwork from 09/10/20
• Why me
• Conflict between advice given in different health settings
• Learning in retrospect
• How far to push themselves when resuming exercise?
• Education differed around ‘where to from here’
• Unclear of their limitations

Most important points identified on paperwork from 09/10/20
• Inconsistency between what education was offered – 2 week verse 6 week follow-up with CR team
• Who to contact with questions
• Level of anxiety with no clear exercise plan/progression pathway.
• Lack of no clear exercise plan/progression pathway resulted in participants self-managing this process.
• No discussion/education around mental health effects
• Conflicts around scripts and medication management between health care professionals.
• There appeared to be no link in the participant discussion around their histories of diabetes and heart disease.

Distribution of coding discussion from NVIVO via the deductive themes. This reflects the key points that I identified above.

(6b) Reviewing themes with the research team.
This meeting took place after the PhD supervisors had the opportunity to do a read through of the transcript from FGP1.

The transcript appears to represent the Participants’ journeys or transition
1) before
2) hospital
3) home again

Cross transition points:
2 patients aware of family history
2 patients this was a bolt out of the blue

The questionnaire is going to be more a reflection of the hospital experience.

Key points and quotes that stood out for Dr dixon:
• Talk about T-bone steak
• Talk about wife getting anxious and getting her a satellite phone that he can use when away fishing.
• The individualisation of information for the situation – regarding the guy that road in. If he is use to being fit before, telling him to walk to the letterbox and then the next letterbox, may not be realistic. To add to coding
• May wish to discuss the context of hospital in relation to the ability to take in information.
• Notion of the wives doing their cooking
• Unanswered question of ‘why me’ and ‘how long have I got’.

Feedback from the focus group research assistant

• Participants identified a level of confusion around how far to push themselves after discharge.
• The participants questioned ‘why has this happened to me’
• Exercise was key in the discussion
• Medications not fully understood
• Who should they go to for further prescriptions and advice around meds
• Participants were unclear how long they needed to be on their medications
• Participants did not have clear instructions/thinking’ around how to manage on discharge.
• Gap between patients’ discussions towards readiness for discharge and later staff thinking around patients ‘needing to be safe” for discharge.
• Participants were not always linking between heart disease and risk factors.
• Di felt that patients may benefit from having follow-up sooner in their journey
• Discussion indicated a level of mistrust/lack of confidence in GPs

Review following analysis of both the patient focus group

Key thoughts/points from both groups:

• Both group discussion highlighted that the educational experiences differ amongst participants.
• There is a need for individualised education approaches, especially towards exercise.
• Perception of information overload
• Confusion around where to go and who to connect with should they have further questions
• Emotional impact of heart disease and education.
• Mental health impact is often expressed at a subconscious level.
• Confidence around where to seek further help/advice
• Lack of confidence in primary health advice and support
• Unanswered question – why me
• Exercise v nutrition v medications

Theme thoughts:
Perceived readiness for discharge
Cognisance of unmet health education needs – patients verses HCP
Acquisition of knowledge
Improved functionality
Psychological well-being

From Ghisi 2014

Patient:
Medications
Emergency/safety
Diagnoses/discharge

Cardiac team:
Stress and psychological factors
Emergency/safety
Risk factors

(7) Defining and naming themes
First draft Overarching theme names

06/12/2021
- ‘Brain overload’ – confusion and overload of educational information
- Knowledge acquisition that influenced management and health outcomes
- ‘Questions I still have’. Unmet educational and knowledge needs.
- The unspoken and spoken impact education has on psychosocial well-being.
- Did you understand? Perceptions towards checking understanding
- All to be underpinned by a discussion around the cognisance of health educational needs – patients’ versus HCPs’ perceptions.

(8) Writing up

See analysis chapter.
Appendix O: CADE-QII Information Pack

Hello,

My name is Kylie Short and I am a PhD student from the School of Health Science at the University of Canterbury. I am also a Registered Nurse with over 20 years of experience. I am writing to invite you to participate in my research study to explore ‘What do newly diagnosed patients understand about heart health following their first engagement with acute cardiac hospital services, and what are cardiac patients and health care professionals’ understandings of patients’ levels of heart health knowledge.’

As health care professionals, we know how important it is to give our patients education following a new cardiac diagnosis and we also know that this information can be complicated, overwhelming and hard to understand. My study hopes to look at what patients understand from the information given whilst under the care of hospital services, so that we can do the best job to support their recovery and on-going health. Your participation would be extremely valued, it would help us understand the situation in Aotearoa New Zealand and consider changes for the future.

If participation in this study is something you would like to consider, please see the information letter (included) that outlines what would be required from you. Please know this is completely voluntary and you can choose to be in the study or not. If you would like to participate or have any questions about the study, please email or contact me at kylie.short@pg.canterbury.ac.nz / 021 09067491.

Thank you very much.
Kind regards,

Kylie Short RN, BN, MSc (Ped) (Lead Researcher)
021 09067491
Manawa (Level 5)
PO Box 540, Christchurch
8140 New Zealand
College of Education / School of Health Science

021 09067491 - Email: kylie.short@pg.canterbury.ac.nz

Department: College of Education / School of Health Science
Telephone: 021 09067491
Email: kylie.short@pg.canterbury.ac.nz
Date: 1st August 2020.
HEC Ref: [HEC 2019/120]
An invitation

To help us explore

“Do patients understand hospital cardiac education?”

To fill in questionnaire online –

www.heart-ed-nz-study.com

This is not a test. Please do not worry if there are questions you cannot answer. We are happy for you to answer any questions that you can. This is an opportunity for us to learn what our patients know and if our education/information is meeting the needs of Aotearoa New Zealanders. We hope that this information will help our services and give us a chance to think about the way in which we deliver heart health education.

Lead Researcher’s Contact Details:
Kylie Short RN, BN, MSc (Ped)
Telephone: 021 09067491
Manawa (Level 5)
PO Box 540, Christchurch
8140 New Zealand
kylie.short@pg.canterbury.ac.nz
Do patients understand hospital cardiac education? An Aotearoa New Zealand study.
Information sheet for participants in the national questionnaire.

My name is Kylie Short and I am a registered nurse with more than 22 years experience. I am completing this research as part of a PhD through the University of Canterbury. The research question is: ‘What do newly diagnosed patients understand about heart health following their first engagement with acute cardiac hospital services, and what are cardiac patients and health care professionals’ understandings of patients’ levels of heart health knowledge.’ The overall aims of the research are to 1) Assess what patients understand about their cardiac health, utilising the previously validated and verified Coronary Artery Disease Education Questionnaire II (CADE-QII) and describe the demographic characteristics that influence knowledge scores. 2) explore what patients and health care professionals believe is understood by patients after engaging with the acute hospital services. 3) explore how health care professionals and patients believe understanding is assessed and 4) to analyse if there is a gap between actual knowledge (from the calculated knowledge scores – the quantitative data) and perceived perceptions around what patients understand about their heart health (from the staff and patient focus groups/interviews – qualitative data).

You have been approached to take part in this study because you recently experienced a new heart event or a new cardiac (heart) diagnosis and were given education about how to manage your on-going heart health whilst you were in hospital. Your contact details have not personally been given to me. All patients who meet the inclusion criteria have been provided with this information sheet by the cardiac rehabilitation team overseeing your care.

If you choose to take part in this study, your involvement in the project would be to participate in a national questionnaire. The Coronary Artery Disease Education Questionnaire (CADE-Q II) is the tool we will be using for this research. This questionnaire has been used within a number of other countries.

It is anticipated that each questionnaire should take around 20 minutes to complete. Five ‘spot prizes’ will be randomly allocated to individuals participating in the study. The Questionnaire can be completed online via www.heart.ed.nz.study.com or as a paper copy which is included in this information pack, along with a self-stamped addressed envelope for returning the questionnaire and an address card if you would like the answers posted to you as an opportunity to learn more about your heart health.

It is anticipated that there will be minimal physical risk to your well-being during participation in this research project. There is a small risk that completing the questionnaire may provoke feelings of distress. Should this be the case and you feel that you would like further support, we will be able to offer you the details of the 24-hour counselling hotline number for support, if required.

Participation is completely voluntary; all participants have the right to withdraw at any stage without incurring any penalty prior to the data analysis stage.
This is an anonymous questionnaire that has been designed to ensure that individual participants are not identifiable. Your participation is entirely voluntary. You may decline to answer any questions. By completing the paper copy (or online) and returning this, you have given implied consent to participate in this study and to the subsequent reports and publications from this study.

After completing the questionnaire, please return paper copies to the researcher via the self-addressed envelope provided. If you would like a set of the full answers to this questionnaire, please also complete your return address details on the card provided and place in the self-addressed return envelope. Your address details will be separated from the questionnaire at the time of return. An assistant will sort the mail and separate the address cards from the questionnaire prior to these being handed to the lead researcher for analysis. The lead researcher will not have access to any address details at any point during the research and once the answers have been sent to you, your address card will be placed in a confidential waste bin for shredding.

As this is a PhD project, there may be a number of years before the final results will be available for publication. Once the project is completed, a summary of the results will be published for review via the Heart Foundation Newsletter. It is also likely that the results will be published in professional journals throughout the time of the project. The final thesis, being a publicly available document, will be accessible for review through the University of Canterbury Library. All participants are welcome to contact the primary researcher for information regarding the progress towards the publication of results. Please indicate to the researcher, on completion of the questionnaire, if you would like to receive a copy of the summary of results of the project.

Any paperwork or recordings from the research project will be stored on a password-protected computer during the active research period. After the completion of the project, data will then be stored on a separate password protected hard drive for ten years and, once no longer required for an on-going database, will be destroyed. It is anticipated that the topic of this PhD will be an aspect of the primary researcher’s ongoing research interests as an academic. It is conceivable another national and/or international study may pool the data in the future. For this reason, the research data may still be required beyond 10 years. Once the data is no longer required for an ongoing research database, it will be destroyed as previously outlined.

The project is being carried out by lead researcher, Kylie Short kylie.short@pg.canterbury.ac.nz as part of a PhD, under the supervision of Dr Alison Dixon and Dr Isabel Jamieson, both of whom can be contacted at alison.dixon@canterbury.ac.nz or isabel.jamieson@canterbury.ac.nz. They would be pleased to discuss any questions or concerns you may have about participation in the project.

This project has been reviewed and approved by the University of Canterbury Human Ethics Committee on 29th October 2019, reference number HEC 2019/120 and participants should address any complaints to The Chair, Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz). Thank you for considering participating in this research.

Lead Researcher Contact Details:
Kylie Short RN, BN, MSc (Ped)
Telephone: 021 09067491
Manawa (Level 5)
PO Box 540, Christchurch
8140 New Zealand - kylie.short@pg.canterbury.ac.nz
Coronary Artery Disease Education Questionnaire

You are being invited to fill out this questionnaire because you have received cardiac rehabilitation education whilst under the hospital services. Understanding about your condition, treatments and risk factors can help you manage your heart health in the future. We would like to get a sense of what patients understand about their heart health. This is not a test. Please do not worry if there are questions you cannot answer. We are happy for you to answer any questions that you can. This is an opportunity for us to learn what our patients know and if our education/information is meeting the needs of Aotearoa New Zealanders. We hope that this information will help our services and give us a chance to think about the way in which we deliver heart health education.

About the questionnaire:

The purpose of this questionnaire is:

- To review a patient’s overall knowledge about heart disease and related factors following the delivery of cardiac rehabilitation education in the hospital.
- To review knowledge in the following areas (medical condition, risk factors, exercise, nutrition, and psychosocial risk).

Questions are structured as followed:

Part 1 - Demographic details
Part 2 - Heart health questions
  - Multiple choice
  - Each question has 4 possible answers/alternatives
  - Each answer has a score and the sum of final scores lead to a classification on knowledge.

Instructions for completing Part 2 of the questionnaire:

Please complete this questionnaire without the help of the internet (Google) so that we can more effectively evaluate what you understood from the education provided in hospital.

- Questions are grouped in domains (areas of knowledge)
- Please answer as many questions as you can
- Mark JUST ONE answer you think is the most correct one
- If you don’t know the answer, mark the “don’t know” statement (please do not leave the question blank)
- After completing the questionnaire, you just need to send it back in the prepaid envelope provided. If you would like a set of the ‘answers’ to this questionnaire, please also complete your address details on the address detail sheet provided. Your address will be kept separate from the questionnaire and at the time of return, an assistant will return the answers to you. The lead researcher will not have access to your details.
- We hope by providing you with the answers, you will have an opportunity to learn more about your heart health.

This questionnaire is anonymous and voluntary.

It should take around 20 minutes to complete.
### Part 1 - Demographic details

**Which ethnic group do you belong to?**

- Aotearoa New Zealand European
- Māori
- Samoan
- Cook Island Māori
- Tongan
- Niuean
- Chinese
- Indian
- Filipino
- Other such as KOREAN, JAPANESE, TOKELAUAN.

**Employment Status:**

- Employed fulltime
- Employed part time 20+ hours per week
- Employed part time or casual less than 20 hours per week
- Not in employment
- Retired
- Semi-retired with some employment/casual work

**Gender:**

- Male
- Female
- Prefer not to answer

**Age:**

- How many weeks has it been since you received your hospital education?
  - Less than 1 week
  - 1 week
  - 2 weeks
  - 3 weeks
  - 4 weeks
  - 5 weeks
  - 6 or + weeks

**Approximately how much education did you receive in hours?**

- Less than 1 hour
- 1 hours
- 2 hours
- 3 hours
- 4 hours +

**In which DHB did you receive your cardiac education?**

- Canterbury (Christchurch)
- Southern (Dunedin)
- Capital and Coast (Wellington/Hutt Valley)
- Waikato (Hamilton)
- Waitamata (North Shore Hospital)
- Waitamata (Waitakere Hospital)
- Counties Manukau (South Auckland)

**Which region do you live in?**

- Northland
- Auckland
- Waikato
- Bay of Plenty
- Gisborne
- Hawkes Bay
- Taranaki
- Manawatu/Wanganui
- Wellington
- Nelson/Tasman
- Marlborough
- West Coast
- Canterbury
- Otago
- Southland
What was your **highest** level of educational qualification?

| ☐ None               | ☐ High School 5 years               |
| ☐ High School 2 years | ☐ Trade Qualification               |
| ☐ High School 3 years | ☐ Under graduate degree             |
| ☐ High School 4 years | ☐ Post graduate degree              |

**Household income**: *Before tax or anything is taken out In the last twelve month period*

| ☐ Made a loss        | ☐ $30,001-$35,000                  |
| ☐ Zero income        | ☐ $35,001-$40,000                  |
| ☐ $1-$5000           | ☐ $40,001-$50,000                  |
| ☐ $5001-$10,000      | ☐ $50,001-$60,000                  |
| ☐ $10,001-$15,000    | ☐ $60,001-$70,000                  |
| ☐ $15,001-$20,000    | ☐ $70,001-$100,000                 |
| ☐ $20,001-$25,000    | ☐ $100,001-$150,000                |
| ☐ $25,001-$30,000    | ☐ $150,001+                        |

Have you had any of the following heart procedures (tick all that apply):

- ☐ Coronary Artery Bypass Surgery (CABG)
- ☐ Stent (Angioplasty)
- ☐ None
- ☐ Other: ____________________________

**Other health issues**: Mark any of the space/spaces that apply to you.

- ☐ High Blood Pressure
- ☐ Heart Attack
- ☐ Heart Failure
- ☐ Diabetes Type I
- ☐ Diabetes Type II
- ☐ Blood vessel disease in your legs
- ☐ High Cholesterol
- ☐ Breathing condition called Chronic Obstructive Pulmonary Disease (COPD)
- ☐ Mental health conditions (for example: depression, anxiety, etc)
- ☐ Other: ____________________________

**Smoking history**

- ☐ Never Smoked
- ☐ Current smoker – any amount
- ☐ Past smoker
Part 2: Heart Health Questions

Please answer all of the heart health questions in this block that you can.

Sections in this part of the questionnaire are:
- Medical Conditions
- Risk Factors
- Exercise
- Nutrition
- Psychosocial Risk
Medical Condition

Please mark JUST ONE answer you think is the most correct one.

Question 1
Coronary Artery Disease is:
☐ a) A disease of the heart’s arteries that occurs only in older age and is mainly caused by deposits of calcium in the arteries.
☐ b) A disease of the arteries of the heart which occurs in older age in people with high cholesterol or who smoke.
☐ c) A disease of the arteries of the heart that starts silently at a young age. It is influenced by poor lifestyle habits, genetics, and involves inflammation in the arteries.
☐ d) I don’t know.

Question 2
Angina (chest pain or discomfort) occurs:
☐ a) When the heart muscle is working too hard.
☐ b) When the heart muscle is not getting enough blood and oxygen to work properly.
☐ c) When the brain is not getting enough oxygen.
☐ d) I don’t know.

Question 3
In a person with coronary artery disease, which of the following is a usual description of angina?
☐ a) Headache after meals.
☐ b) Chest pain or discomfort, at rest or during physical activity, which can also be felt in the arm and/or back and/or neck.
☐ c) Chest pain or discomfort during physical activity.
☐ d) I don’t know.

Question 4
A heart attack occurs:
☐ a) If an artery in the heart becomes blocked.
☐ b) If the heart suddenly races in response to stress.
☐ c) If the flow of oxygen-rich blood to an area of heart muscle suddenly becomes blocked. If blood flow is not restored quickly, the area of heart muscle begins to die.
☐ d) I don’t know.

Question 5
The best resources available to help someone understand his/her medications are:
☐ a) The doctor, the cardiac rehab team, the pharmacist and recommended resources on the internet.
☐ b) What someone reads on the internet.
☐ c) The doctor and the cardiac rehab team.
☐ d) I don’t know.
Question 6
Medications such as Aspirin and Clopidogrel are important because:

□ a) They lower blood pressure.
□ b) They “thin” the blood.
□ c) They reduce the “stickiness” of platelets in the blood so that blood flows more easily through coronary arteries and past coronary stents.
□ d) I don’t know.

Question 7
The “statin” medications, such as Atorvastatin (Lipitor™), Rosuvastatin (Crestor™), or Simvastatin (Zocor™), have a beneficial effect in the body by:

□ a) Lowering LDL cholesterol in the blood stream.
□ b) Blocking the production of LDL cholesterol in the liver, lowering LDL cholesterol in the blood stream, and encouraging cholesterol to move out of plaques from the arteries.
□ c) Reducing the absorption of cholesterol from food.
□ d) I don’t know.

Section complete – please continue on next page.
Question 1
The risk factors for heart disease that can be changed are:
- a) Blood pressure, cholesterol, and smoking.
- b) Age, family history of heart disease, ethnicity and sex.
- c) Blood pressure (systolic and diastolic), LDL + HDL cholesterol, smoking and second-hand smoking, waist size, and reaction to stress.
- d) I don’t know.

Question 2
The actions that can be taken to control cholesterol levels include:
- a) Knowing the total cholesterol level, becoming a vegetarian and avoiding eggs.
- b) Knowing the LDL and HDL levels, taking cholesterol medication as prescribed, increasing soluble fibre intake and reducing saturated fat in the diet, and participating in aerobic exercise 5 times per week.
- c) Knowing the cholesterol levels and taking cholesterol medication as prescribed.
- d) I don’t know.

Question 3
The actions that can be taken to control blood pressure include:
- a) Increasing calcium in the diet.
- b) Reducing the amount of salt in the diet, and taking blood pressure medication.
- c) Reducing the amount of sodium in the diet to <2000 mg per day, exercising, taking blood pressure medication regularly and learning relaxation techniques.
- d) I don’t know.

Question 4
The first step towards controlling risk factors (such as blood pressure or cholesterol) is:
- a) Knowing if someone has the risk factor.
- b) Knowing the level of the risk factor.
- c) Setting a goal or action plan to control the risk factor.
- d) I don’t know.

Question 5
The actions to prevent developing diabetes include:
- a) Follow a heart healthy diet, do 150 minutes of aerobic exercise weekly and twice weekly resistance exercises with weights and resistance bands.
- b) Reduce the amount of fats and carbs in the diet.
- c) With a family history of diabetes, a person is bound to develop diabetes because diabetes is not a preventable disease.
- d) I don’t know.
Exercise

Please mark JUST ONE answer you think is the most correct one.

Question 1
What are the important parts of an exercise prescription?
□ a) Replacing calories and salt during a light workout.
□ b) How hard to exercise, how long to exercise, how often to exercise and what type of exercise to do.
□ c) How hard to exercise, and how long to exercise.
□ d) I don’t know.

Question 2
For a person living with heart disease, it is important to do a cardiovascular warm-up before exercising because:
□ a) It gradually increases the heart rate, it may reduce muscle soreness and can reduce the risk of developing angina.
□ b) It adds more time to the total amount of minutes of exercise.
□ c) It prepares the body for exercise.
□ d) I don’t know.

Question 3
The pulse can be found:
□ a) In the wrist below the base of the thumb.
□ b) In the wrist below the base of the pinky finger or on the neck on the Adam’s apple.
□ c) At the radial artery (wrist) or at the carotid artery (neck).
□ d) I don’t know.

Question 4
Three things that one can do to exercise safely outdoors in the cold winter are:
□ a) Check the temperature and wind-chill, and wear layers of clothing.
□ b) Check the temperature and wind-chill and make sure it is not below -10 degrees C, wear 3-4 layers of clothing and adjust the pace of walking so that the level of exertion and heart rate are on target.
□ c) Check the temperature and wind-chill and make sure it is not below -15 degrees C, wear a winter coat and jog if one gets too cold.
□ d) I don’t know.

Question 5
The benefits of doing resistance training (lift weights or elastic bands) include:
□ a) Builds up strength and muscles.
□ b) Lowers resting heart rate.
□ c) Increases strength, improves the ability to carry out day to day activities, improves blood sugar levels and increases muscle.
□ d) I don’t know.
Question 6
If a person gets chest discomfort during a walking exercise session, he or she should:

- a) Speed up to see if the discomfort goes away.
- b) Slow down and stop exercising.
- c) Slow the walk pace and if it does not go away within 1 minute, stop exercising. If it still does not go away within the next 1 minute, take nitroglycerine as prescribed. If the pain continues, get help.
- d) I don’t know.

Question 7
How does a person know if they are exercising at the right level?

- a) The heart rate is in the target zone, the exertion level is no higher than “some-what hard”, and the person can exercise and talk.
- b) The heart rate is in the target zone.
- c) Working up a sweat, breathing heavy and the heart rate is going fast.
- d) I don’t know.
Nutrition

Please mark JUST ONE answer you think is the most correct one.

Question 1
What is the best source of omega 3 fats in food?
- a) Ground flaxseed.
- b) Pasta.
- c) Fatty fish (e.g. Trout, salmon).
- d) I don’t know.

Question 2
Trans fat are:
- a) Found in nuts and seeds.
- b) Partially hydrogenated vegetable oils (e.g. vegetable shortening).
- c) Margarine.
- d) I don’t know.

Question 3
What is one good way to add more fibre to your diet?
- a) Add nuts and seeds to a salad.
- b) Drink juice.
- c) Eat plant proteins (e.g. legumes/beans, lentils).
- d) I don’t know.

Question 4
Which of the following foods has the most salt?
- a) Bread.
- b) Frozen dinners.
- c) Fruits and vegetables.
- d) I don’t know.

Question 5
What combinations of food can help lower blood pressure?
- a) Red meat, poultry, fish.
- b) Vegetables and fruits.
- c) Vegetables and fruits, whole grains, low fat dairy, nuts and seeds.
- d) I don’t know.
Question 6
When reading food labels, what should one look at first?
  □  a) Fat content.
  □  b) Brand name.
  □  c) Serving size.
  □  d) I don’t know.

Question 7
How many servings of fruit and vegetables should adults consume?
  □  a) 7 to 10 servings a day.
  □  b) 5 servings a day.
  □  c) As many as possible.
  □  d) I don’t know.

Section complete – please continue on next page.
Psychosocial Risk

Please mark JUST ONE answer you think is the most correct one.

Question 1
Which of the below are effective stress management techniques?

- a) Deep breathing.
- b) Avoid communication.
- c) Meditation, progressive muscle relaxation, making social connections, stretching/exercise, deep breathing.
- d) I don’t know.

Question 2
What stresses have been related to increased risk for heart attacks?

- a) Chronic stresses, major life events, disrupted sleep, and feelings of distress.
- b) Chronic stress at home or at work and feeling depressed.
- c) Stresses that you do not feel in control of.
- d) I don’t know.

Question 3
Which of the following describes your best option for reducing your risk from depression:

- a) Take an antidepressant, and do your exercise prescription.
- b) Do your exercises, take better care of yourself, and if required take medications.
- c) The risk of heart attack due to depression cannot be reduced.
- d) I don’t know.

Question 4
It is important to recognise “sleep apnoea” because:

- a) It leads to long term lung disease.
- b) It is associated with high blood pressure, abnormal heart rhythms, and higher risk of future heart attack.
- c) It leads to further heart problems.
- d) I don’t know.

Question 5
“Chronic stress” is defined as:

- a) Ongoing persistent stressful events in one area of your life.
- b) Events at work or at home that make you feel irritable, anxious, or sleepless.
- c) The stresses that are out of a person’s control.
- d) I don’t know.

Thanks for your participation!

☐ I would like a summary of the results of the project. Please provide address below (If you would like to be sent a report of the findings on completion of the study):
Appendix P: Translation Exemplar Te Reo CADE-QII Information Pack

He pōhiri

Kia āwhina mai i a mātou ki te tūhura i tēnei pātai:
“E mārama ana rānei ngā tūroro ki te mātauranga manawa hōhipera?”

Hei whakakī i te patapatai tuihono –
www.heart-ed-nz-study.com

CADE-QII Patapatai
Mātāmua
Coronary Artery Disease Education Questionnaire

Ngā Taipitopito – Te Kairangahau Matua:
Kylie Short RN, BN, MSc (Ped)
Waea: 021 09067491
Manawa (Level 5)
PO Box 540, Christchurch
8140 New Zealand
kylie.short@pg.canterbury.ac.nz
Kia ora,

Ko Kylie Short tōku ingoa, ā, he ākonga tohu kairangi ahau ki Te Kura Mātai Hauora ki Te Whare Wānanga o Waitaha. He tapuhi whai rēhita ahau, ā, neke atu i te 20 tau te nui o ōku wheako. Kei te tuhi atu ahau ki a koe kia kuhu mai koe ki taku mahi rangahau. "He aha ngā māramatanga o ngā tūroro i ngā akoranga mātai manawa ki te hōhipera?" He mahi rangahau ki Aotearoa.

I roto i te tūranga ngaio o te tiaki tangata, e mōhio ana tātou ki te hiranga o ngā whakamārama whai muri i te whakamātautau manawa, ka mutu, kei te mōhio hoki mātou he kōrero whiwhiwhi, he kōrero whakarangirua, he kōrero uaua anō hoki. E tūmanakotia ana mā tuku rangahau ka kitea ngā mōhiotanga o ngā tūroro mai i ngā whakamāramatanga i te wā e noho ai rātou i raro i te manaaki a ngā ratonga hōhipera, kia tino eke ai tā mātou whakapiki anō i tō ora me te hauora, ā-haere ake nei. Ka morimoria tō kuhu mai, otirā, mā tēnei kuhu e mārama hoki mātou ngā āhuatanga i Aotearoa nei, me te whai whakaroako ake ki ngā panonitanga mō te āpōpō.

I tēnei wā, kāore anō ahau kia whiwhi i ō taipitopito whakapā. Kua whiwhi koe i tēnei tono taritarī mai i te rōpū whakaora manawa, nā rātou nei koe i manaaki i a koe e noho hōhipera ana. Mena koe ka rata ki tēnei rangahau, tēnā tirohia ngā kōrero kei te reta (e āpiti nei) e whakarārangi ana i ngā māhi māu.

Kia mōhio mai, kei a koe te tikanga, arā, kia kuhu mai, kia kaua rānei. Ki te hia kuhu, mena rānei he pātai āu mō te rangahau, tēnā imeratia mai, whakapā mai rānei ki ahau kylie.short@pg.canterbury.ac.nz/ 021 09067491, tukua rānei ō taipitopito whakapā ki te rōpū whakaora manawa, ka tukua ai e rātou ki ahau.

Tēnei te mihi nui ake ki a koe.

Nāku, i roto i ngā whakaaro matihere,

Kylie Short RN, BN, MSc (Ped) (Kairangahau matua)
021 09067491
Manawa (Level 5)
PO Box 540, Christchurch
8140 New Zealand
Kei te mōhio rānei ngā tūrora ki te mātauranga ā-manā? He rangahau ki Aotearoa.

He pukapuka pārongo mā te hunga whakauru ki te patapatai ā-motu.

Ko Kylie Short tōku ingoa, ā, he tapuhi whai rēhita ahau, neke atu i te 22 tau ōku wheako. E whakaoti ana ahuai i tēnei rangahau, ā, ka noho atu hei wāhanga ki tētahi tohu kairangi ki Te Whare Wānanga o Waitaha. Ko te pātai rangahau ko tēnei: He aha ngā mōhiotanga o ngā tūrora ka oti nei te whakaakohia mai nō rātou ka noho i raro i ngā manaaki a ngā ratonga manawa o te hōhipera? Ko ngā whāinga matua o tēnei rangahau, koia ko 1) te arotake i te mārama o te tūrora mai i ngā pārongo kua hoatu ki a ia nōna e manaakitia ana e ngā ratonga hōhipera 2) te āta tūhura i te mōhio o ngā tūrora me ngā kaimahi ngaio hauora ki tā ngā tūrora i mārama ai i muri i te tukunga o te mātauranga hōhipera 3) te mātai ake mana rānei ka arotake ngā kaimahi hauora ngaio i te mārama o ngā tūrora ki ngā pārongo, ka mutu 4) te tātari ake mana rānei he āputa kei waenganui i te māramatanga tika, tēnā ko tā te tūrora i aroā ai i ngā pārongo i whiwhi ai ati te tūrora i roto i te hōhipera.

Kua whiria ake ko koe hei kaitautoko mō tēnei rangahau nā te mea kātahi anō koe ka wheako i tētahi āhutanga ā-manawa, i tētahi whakatautau māuiui ā-manawa rānei, waihoki, nōu i te hōhipera i āta whakaakohia koe ki ngā mātauranga e tiaki tonu ai koe i tō manawa ā-haere ake. Kihai au i whiwhi i ō taipitopito whakapā. Ko ngā tūrora e tika ana hei tā te paeru whakauru, ko rātou te hunga kua whiwhi i tēnei puka pārongo mai i te rōpū whakaora ngaio i te hōhipera. Ko tēnei rangahau ko tēnei: He aha ngā mōhiotanga o ngā tūrora ka oti nei te whakaakohia mai nō rātou ka noho i raro i ngā manaaki a ngā ratonga manawa o te hōhipera? Ko ngā whāinga matua o tēnei rangahau, koia ko 1) te arotake i te mārama o te tūrora mai i ngā pārongo kua hoatu ki a ia nōna e manaakitia ana e ngā ratonga hōhipera 2) te āta tūhura i te mōhio o ngā tūrora me ngā kaimahi ngaio hauora ki tā ngā tūrora i mārama ai i muri i te tukunga o te mātauranga hōhipera 3) te mātai ake mana rānei ka arotake ngā kaimahi hauora ngaio i te mārama o ngā tūrora ki ngā pārongo, ka mutu 4) te tātari ake mana rānei he āputa kei waenganui i te māramatanga tika, tēnā ko tā te tūrora i aroā ai i ngā pārongo i whiwhi ai ati te tūrora i roto i te hōhipera.

Mena koe ko whakaae kia uru mai ki tēnei rangahau, ko te wāhi ki a koe ko te kuhu ki tētahi patapatai ā-motu. Ko Coronary Artery Disease Education Questionnaire (CADE-Q II) tētahi utauta ka whakamahia e mātou i roto i te rangahau nei. Kua whakamahia tēnei patapatai ko ātahi atu whenua.

E whakapaehia ana kei te takiwā o te 20 mīniti te roa ki te whakaoti i tētahi patapatai. E rima rawa ngā ‘taonga mihi’ ka whakawhiwhi tupurangi atu ki ngā tāngata tokorima o tēnei rangahau mātāmua. E taea ana te whakaoti te Patapatai mā te ipurangi ki www.heart.ed.nz.study.com, ki te pepa rānei e āpiti nei ki tēnei kohinga pārongo, otirā, he kōpaki whai pane kuini, whai wāhi noho hei tuku i te patapatai, ka mutu, he kāri wāhi noho pēnā koe ka pirangi ki ngā whakautu mōu ake, kia ako ai koe i ētahi anō kōrero mō te hauora o tō manawa.

E matapaeitia ana ka kore noa iho te tūraru ōkiko e pā ki tō hauora i tēnei māhia ki rito i te rangahau nei. Heoi anō, arā tētahi mōmo tūraru, kia oti ana i a koe tēnei patapatai ka puea ake ngā kare ā-roto pāmamae. Pēnā ka pērā, ā, e pirangi tautoko ana koe, mā mātou e tuku ki a koe nga taipitopito whakapā 24-hāora ki tētahi kaiwhakamahereora, kei a koe te tikanga. He māhi tūao katoa te kuhu mai ki tēnei kaupapa; kei ia kaiwhakauru te tikanga kia wehe ahakoa te wā me te kore e hāmenehia i mua i ngā māhia tātari raraunga. He patapatai tūmaiti tēnei, ā, he mea āta hoahea kia kaua e tauhohua te kaiwhakauru. Ko tāu anō kuhu ki tēnei kaupapa, kei a koe tēna tikanga. Māu anō e aukati te whakautu te pātai. Mā tō whakaoti i tēnei kape pepa me te whakahoki mā, e tohu ana koe i tō whakaae ki tō kuhu ki tēnei rangahau me ngā pūrongo, tuhinga hoki ka puta mai i tēnei rangahau.

E whakapaehia ana kei te takiwā o te 20 mīniti te roa ki te whakaoti i tētahi patapatai. E rima rawa ngā ‘taonga mihi’ ka whakawhiwhi tupurangi atu ki ngā tāngata tokorima o tēnei rangahau mātāmua. E taea ana te whakaoti te Patapatai mā te ipurangi ki www.heart.ed.nz.study.com, ki te pepa rānei e āpiti nei ki tēnei kohinga pārongo, otirā, he kōpaki whai pane kuini, whai wāhi noho hei tuku i te patapatai, ka mutu, he kāri wāhi noho pēnā koe ka pirangi ki ngā whakautu mōu ake, kia ako ai koe i ētahi anō kōrero mō te hauora o tō manawa.

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kāinga noho i te roanga o te rangahau, waihoki, kia tukua ngā whakautu ki a koe, ka whiuā tō kāri kāinga noho ki tētahi ipupara tūmataiti, ka ngakungaku ai.

Nā te mea he hinonga Tohu Kairangi tēnei, ka hia kē pea nei ngā tau kātahi ngā kōrero matua ka puta, ka tāia. Oti ana te hinonga nei, ka tāia ngā kōrero whānui kia arotakengia, kei te pukapuka Heart Foundation. E tinga ana, ka tāia ngā kōrero nei ki ngā pukapuka pitopito kōrero ngaio hei roto i te roanga ake o te hinonga nei. Ko te tuhinga whakapae matua, he tuhinga tūmatanui, ka wātea kia arotakengia, ka noho te tuhinga nei ki te whare pukapuka o Te Whare Wānanga o Waitaha.

E wātea ana ngā kaiwhakauku ki te whakapā atu ki te kairangahau matua ki te whaiwhai ake i ngā kōrero, pārongo anō hoki mō te haerenga o te kaupapa nei ki tōna whakaputanga kōrero. Tēnā, kia tohutohu atu koe ki te kairangahau, hei te otinga o te patapatai, mena rānei e pīrangi ana koe ki te whakarāpopotonga o ngā kōrero matua i tēnei hinonga.

Ko ngā tuhituhinga, ko ngā mauhanga hoki mai i tēnei hinonga rangahau ka noho ki te rorohiko whai kupu huna i roto i te roanga o te wā rangahau. Oti ana te hinonga, ka noho ngā raraunga ki tētahi atu pūmārō mō ngā tau tekaupō, ā, kia take kore ana mō aha rangahau kē atu, ka mukua atu. E matapae tia ana ka noho te kaupapa o te Tohu Kairangi nei hui āhuatanga ki ngā māhi rangahau a te kairangahau matua ā haere ake nei. E whai kiko ana te whakaaro ka whai wāhi atu tēnei raraunga ki ētahi atu rangahau ā-motu, rangahau ā-tāwahī anō hoki, ā tōna anō wā. Nā reira te take nei, ka pīrangi tonutia ngā raraunga hei tua atu i ngā tekaupō tau kei mua. Heoi, kia take kore ana ngā raraunga ki ngā papa rangahau, kia kīia anō ka mukua atu.

E kawea ana tēnei hinonga e tō te kairangahau matua, e Kylie Short kylie.short@pg.canterbury.ac.nz hei wāhanga ki tētahi Tohu Kairangi, i raro i te manaakitanga o Tākuta Alison Dixon rāua ko Tākuta Isabel Jamieson, me ō rāua taipitopito alison.dixon@canterbury.ac.nz me isabel.jamieson@canterbury.ac.nz. Koakoa ana ō rāua ngākau ki te whakautu ki ngā pātai me ngā take kei a koe e pā ana ki te kuhu mai ki tēnei hinonga.

I arotakengia tēnei hinonga, ō, kua whakaaehia hoki e te Kōmīti Tikanga Matatika Tangata a Te Whare Wānanga o Waitaha, i te 29 o Whiringa-ā-nuku, 2019, ko te nama tohutoro HEC 2019/120, waihoki, me tuku atu e ngā kaiwhakauku ā rātou kōmāmu ki te Hēmana, Kōmīti Tikanga Matatiki Tangata, Te Whare Wānanga o Waitaha, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz). Tēnā koe i tō whai whakaaro mai hei kaiwhakauku ki tēnei rangahau.

Ngā Taipitopito – Te Kairangahau Matua:
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8140 New Zealand
kylie.short@pg.canterbury.ac.nz
Coronary Artery Disease Education Questionnaire

He Patapatai Māuiui ā-lau-tuku

Kua pōhiritia koe kia whakakī mai i tēnei patapatai nā i runga i tō whiwhi mātauranga whakaora manawa kātahi anō ka tutuki, nōu e manaakitia ana e ngā ratonga hōhipera. Mā te mārama ki ngā āhuatanga kei runga i a koe, ki ngā rongoā me ngā tohu tūraru ka pai ake tō manaaki i te oranga o tō manawa ā haere nei. E whāia ana e mātou kia mārama ki ngā mōhiotanga o te tūroro ki tōna anō hauora ā-manawa. Ehara tēnei i te whakamātautau. Kaua e māharahara ki ngā pātai kāore e taea e koe te whakautu. Ka mātua tō whakautu i ngā pātai e mōhio ana koe. He kōwhiringa te kaupapa nei ki a mātou ki te ako i ngā mea e mōhio ana ā mātou tūroro, otirā, e ngata ana te hiahia o ngā tāngata o Aotearoa i ā mātou whakaakoranga. E tūmanakotia ana mā tēnei pārongo hei hāpai ā mātou ratonga, ka mutu, hei whakakorikori ō mātou whakaaro mō tā mātou whakaako i ngā mātauranga oranga manawa.

Mō te patapatai:

Ko te whāinga o tēnei patapatai ko te:

- Arotake i te mōhio whānui o te tūroro ki te mate ā-manawa me ōna āhuatanga e hāngai ana whai muri i te whakaako i te mātauranga whakaora manawa ki roto i te hōhipera.
- Arotake i te mātauranga ki ēnei wāhanga nei (ngā āhuatanga ā-hauora, ngā āhuatanga tūraru, te koiri, te taioranga me ngā tūraru mātai hinengaro).

Ka pēnei te whakatakotoranga o ngā pātai:
Wāhanga 1 – Ngā taipitopito hangaporī

Wāhanga 2 – Ngā pātai mō te oranga manawa

- He pātai whiri taurea
- E whā rawa ngā whakautu ka taea te whiri
- Kei ia whakautu he whiwhinga, ā, mā te tapeke whakamutunga hei tautohu te pai o te mātauranga.

Ngā tohutohu hei whakaoti i a Wāhanga 2 o te patapatai:

- Whakaotihia tēnei patapatai, ā, kia kaua e whakamahia te ipurangi hei āwhina (Tuktuku Ao Whānui) kia tino tika ai tā mātou arotake i tō mōhio mai i ngā whakaakoranga i roto i te hōhipera.
- Kua whakahuihuia ngā pātai ki ngā rohenga (rohenga mātauranga)
- Tēnā, kia kaha te whakautu i ngā pātai katoa, ngā mea e taea ana e koe.
- Whiria kia KOTAHI te whakautu e whakatau ana koe ko te whakautu tika.
- Menā kāore koe i te mōhio ki te whakautu, tēnā, tohu te rerenga “don’t know” (kaua e waiho kia wātea)
- Ka oti ana te patapatai, pēhia te pātene tuku. Pēnā koe ka pīrangi ki ngā ‘whakautu’ o tēnei patapatai, tēnā, kia whakakīa te ‘wāhanga whakapā’ ki ō taipitopito kāinga noho. Ka noho wehe ō taipitopito kāinga noho i te patapatai, waihoki, hei te wā e whakahokia ai, mā tētahi kaiāwhina ngā whakautu e tuku ki a koe. Kāore te kairanga matua e whai wāhi ki ō taipitopito.
- Ko te tūmanako ia, mā te tohatoha whakautu ki a koe, tērā te wāhi ki a koe ka kitea ki te ako tonu mō te oranga o tō manawa.

He patapatai kirimuna tēnei, he mahi tūao anō hoki.

Kei tōna 20 mīniti te roa ki te whakaoti.
Wāhanga 1 – Ngā taipitopito hangaporī

**Nō tēhea iwi koe?**

<table>
<thead>
<tr>
<th>Matohuhi ngā pouaka e hāngai ana ki a koe:</th>
<th>□ New Zealand European</th>
<th>□ Niuean</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Māori</td>
<td>□ Chinese</td>
<td></td>
</tr>
<tr>
<td>□ Samoan</td>
<td>□ Indian</td>
<td></td>
</tr>
<tr>
<td>□ Cook Island Māori</td>
<td>□ Filipino</td>
<td></td>
</tr>
<tr>
<td>□ Tongan</td>
<td>□ Other such as KOREAN,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>JAPANESE, TOKELAUAN.</td>
<td></td>
</tr>
</tbody>
</table>

Tēnā tautohua_____________________

**Tunga Mahi:**

| □ He mahi matua                          | □ Tāne            |
| □ He mahi harangotengote 20+ hāora ia wiki | □ Wahine          |
| □ He mahi harangotengote, he mahi waimori, kei raro i te 20 hāora ia wiki | □ Non-binary / third gender |
| □ Kāore i te mahi                        | □ Ka noho huna tēnei |
| □ Kua tāoki                              |                      |
| □ Eke ana ki te tāokitanga, he mahi harangotengote/mahi waimori rānei |                      |

**Tō pakeke:**

<table>
<thead>
<tr>
<th>E hia ngā wiki kua hipa nō tō whiwhi i ngā mātauranga nō te hōhipera?</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Kāore anō kia 1 wiki □ 1 wiki □ e 2 wki □ e 3 wiki □ e 4 wiki □ e 5 wiki</td>
</tr>
<tr>
<td>□ e 6 wiki, neke atu</td>
</tr>
</tbody>
</table>

**Kī ō whakaaro, pēhea nei te roa o tō ako, ā-hāora?**

| □ Iti ake i te 1 hāora □ 1 hāora □ e 2 hāora □ e 3 hāora □ e whā hāora, neke atu |

**I tēhea Poari Hauora ā-rohe tō whiwhi mātauranga ā-manawā?**

| □ Canterbury (Christchurch) | □ Waikato (Hamilton) |
| □ Southern (Dunedin)        | □ Waitamata (North Shore Hospital) |
| □ Capital and Coast (Wellington/Hutt Valley) | □ Waitamata (Waitakere Hospital) |
|                            | □ Counties Manukau (South Auckland) |

**Kei tēhea rohe tō kāinga?**

| □ Te Tai Tokerau/Northland | □ Te Whanganui-a-Tara/Wellington |
| □ Tāmaki-makau-rau/Auckland | □ Te Tai o Aorere/Nelson/Tasman |
| □ Waikato                  | □ Te Tai o Huahuroa/Te Tai o Huahuroa/Poutini/Canterbury |
| □ Te Moana-a-Toi/Bay of Plenty | □ Te Tai o Poutini/West Coast |
| □ Tūranga-nui-a-Kiwa/Gisborne | □ Waitaha/Canterbury |
| □ Heretaunga/Hawkes Bay   | □ Ōtākou/Otago |
| □ Taranaki                | □ Murihiku/Southland |
| □ Manawatu/Wanganui       |                      |
**Kei tēhea taumata te tiketiketanga o ō tohu mātauranga?**

<table>
<thead>
<tr>
<th>Karekau</th>
<th>Kura Tuarua – E 5 tau</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kura Tuarua – e 2 tau</td>
<td>He Tohu Mahi ā-rehe</td>
</tr>
<tr>
<td>Kura Tuarua – e 3 tau</td>
<td>He Tohu Paetahi</td>
</tr>
<tr>
<td>Kura Tuarua – e 4 tau</td>
<td>He Tohu Pōkairua Paetahi</td>
</tr>
</tbody>
</table>

**Whiwhinga pūtea ki tō kāinga:** *I mua i te tāke, i te tangoanga rānei o te pūtea i ngā marama 12 kua pahure*

<table>
<thead>
<tr>
<th>I heke iho i te kore</th>
<th>$30,001-$35,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>He kore</td>
<td>$35,001-$40,000</td>
</tr>
<tr>
<td>$1-$5000</td>
<td>$40,001-$50,000</td>
</tr>
<tr>
<td>$5001-$10,000</td>
<td>$50,001-$60,000</td>
</tr>
<tr>
<td>$10,001-$15,000</td>
<td>$60,001-$70,000</td>
</tr>
<tr>
<td>$15,001-$20,000</td>
<td>$70,001-$100,000</td>
</tr>
<tr>
<td>$20,001-$25,000</td>
<td>$100,001-$150,000</td>
</tr>
<tr>
<td>$25,001-$30,000</td>
<td>$150,001+</td>
</tr>
</tbody>
</table>

**Kua oti ē nei tukanga manawa ki a koe** *(tohua ngā mea e hāngai ana):*

- **Coronary Artery Bypass Surgery (CABG)**
- **Stent (Angioplasty)**
- **Karekau**
- **Kura Tuarua**

**Ētahi atu anō raru e pā nei ki tō hauora:** *(tohua ngā mea e hāngai ana ki a koe)*

- **He kaha rawa te taukapa o te toto/High Blood Pressure**
- **Manawa hē/Heart Attack**
- **Manawa aukati/Heart Failure**
- **Mate Huka Momo 1/Diabetes Type I**
- **Mate Huka Momo 2/Diabetes Type II**
- **Mate iaia toto ki ō waewae/Blood vessel disease in your legs**
- **Ngakototo teitei/High Cholesterol**
- **Mate Aukati Hā/Breathing condition called Chronic Obstructive Pulmonary Disease (COPD)**
- **He mate ā-hinengaro/Mental health conditions (for example: depression, anxiety, etc)**

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### Te hītori o te momi paipa

- Kāore e momi paipa
- He kaimomi paipa – ahakoa te nui
- He kaimomi paipa i ngā tau o mua
Wāhanga 2: Ngā Pātai e pā ana ki te oranga manawa

Tēnā whakautua ngā pātai e mōhio ana koe i tēnei wāhanga

Ko ngā kaupeka i tēnei wāhanga o te patapatai ko:
Ngā āhuatanga ā-hauora
Ngā āhuatanga tūraru
Te Koiri
Te Taioranga
Ngā Tūraru Mātai Hinengaro
Ngā Āhuatanga ā-hauora

Whiria kia KOTAHI te whakautu e whakatau ana koe ko te whakautu tika.

Pātai 1
Ko te Mate ia-tuku (Coronary Artery Disease) ko te:
  a) mate ki tētahi o ngā ia-tuku o te manawa ka pā anake hei te kaumātuatanga o te tangata, ā, he mea hua mai e ngā putunga konupūmā ki ngā ia-tuku.
  b) mate ki ngā ia-tuku o te manawa ka pā hei te wā o te kaumātuatanga ki ngā tāngata ngakototo teitei, tāngata momi paipa rānei.
  c) mate ki ngā ia-tuku o te manawa ka timata nohopukua mai i te tamarikitanga o te tangata. He mea akiaki tēnei mate e te kino o te āhua noho, e ngā iranga, ka mutu, ko te kakā o ngā ia-tuku tētahi hua.
  d) Kāore ahau i te mōhio.

Pātai 2
Ko te pūtake o te Uma Kōharīhari/Angina:
  a) Ko te kaha rawa te mahi a te uaua manawa
  b) Ko te kore o te manawa i whiwhi i te toto me te hāora e tika ai tāna mahi.
  c) Ko te iti rawa o te hāora e tae atu ki ngā roro o te tangata.
  d) Kāore ahau i te mōhio.

Pātai 3
I roto i te tangata kua pāngia e te Mate Ia-Tuku (coronary artery disease), ko tēhea o ngā mea kei raro te tohu matua o te Uma Kōharīhari (Angina)?
  a) Ko te ānini o te māhunga whai muri i te kai
  b) Ko te mamae ki te uma, ahakoa whakatā ana, korikori ana rānei, ā, e pā ana taua mamae ki ngā ringa rānei, ki te tuarā rānei, ki te kakī rānei.
  c) Ko te mamae ki te uma ka korkori ana.
  d) Kāore ahau i te mōhio.

Pātai 4
Ka pā te Manawa Hē:
  a) Mena ka purua tētahi ia-tuku ki te manawa.
  b) Mena ka kapakapa ohorere te manawa nā te pōraruraru.
  c) Mena ka purua ohoreretia, kātahi ka aukati te rere o te toto hāoraora nui ki te uaua manawa. Ki te kore te rere o te toto e tika tonu mai anō, ka tāmate taua wāhanga o te uaua manawa.
  d) Kāore ahau i te mōhio.
Pātai 5
Ko ngā rauemi papai rawa ati hei āwhina i te tangata kia mārama ki ōna rongoā ko:

- a) Te tākuta, ko te rōpū whakaora manawa, ko te kaitaka rongoā me ngā rauemi ipurangi e tautokotia ana.
- b) Ngā mea kei te ipurangi ka pānuitia e te tangata.
- c) Te tākuta me te rōpū whakaora manawa.
- d) Kāore ahau i te mōhio.

Pātai 6
He rongoā whakahirahira te Aspirin me te Clopidogrel nā te mea:

- a) Mā ēnei rongoā ka heke te taukapa o te toto.
- b) Ka “angiangi” te toto.
- c) Mā ēnei rongoā ka ngoikore haere te hāpiripiritanga o ngā mōtepe i ngā toto, kia rere noa ake ai te toto i ngā ia-tuku manawa me te tōhipa i ngā raumata ia-tuku.
- d) Kāore ahau i te mōhio.

Pātai 7
Ko ngā rongoā “statin” pēnei i te Atorvastatin (Lipitor™), i te Rosuvastatin (Crestor™), me te Simvastatin (Zocor™), he rongoā whai hua ki te tinana nā te āhei ki te:

- a) Whakaheke i te ngakototo LDL cholesterol i te rerenga toto.
- b) Aukati i te whakatiputanga o te ngakototo LDL ki te ate, te whakaheke i te ngakototo LDL i te rerenga toto, waihoki, te akiaki kia puta te ngakototo i ngā kitokito o ngā ia-tuku.
- c) Te whakaheke i te mitinga o te ngakototo mai i te kai.
- d) Kāore ahau i te mōhio.

Kua oti tēnei wāhanga – haere ki te whārangī e whai ake nei.
Ngā Āhutanga Tūraru

Whiria kia KOTAHI te whakautu e whakatau ana koe ko te whakautu tika.

Pātaia 1
Ko ngā āhuatanga tūraru mō te māuiui ā-manawa e taea ana te panoni ko:
□ a) Te taukapa o te toto, ko te ngakototo me te momi paipa
□ b) Te pakeke, te hītori o te māuiui ā-manawa i roto i te whānau, ko te tuakiri iwi me te ai.
□ c) Te taukapa o te toto (systolic me te diastolic), ko te LDL + HDL ngakototo, ko te momi paipa aurua, ko te whānui o te hope, ka mutu, ko te tauhohe ki ngā pōrarurarutanga.
□ d) Kāore ahau i te mōhio.

Pātaia 2
Ko ngā mahi e taea ana hei pēhi i te nui o te ngakototo, ko:
□ a) Te mōhio ki te tapeke o te ngakototo, te whai kia kaimanga koe, otirā, te kore kai hua heihei.
□ b) Te mōhio ki te nui o te LDL me te HDL, te kai rongoā ngakototo kua tūtohua, te whakanui ake i te kai kaka meha (soluble fibre) and te whakaiti i te kai ngako kohura (saturated fat), waihoki, te korikori ā-hāora, kia 5 korikoringa ia wiki.
□ c) Te mōhio ki te tapeke o te ngakototo, me te kai rongoā ngakototo kua tūtohua.
□ d) Kāore ahau i te mōhio.

Pātaia 3
Ko ngā mahi kia mahia hei whakahaere i te taukapa o te toto ko:
□ a) Te whakanui ake i te kai konupūmā.
□ b) Te whakaiti ake i te kai tote, otirā, kia kainga ngā rongoā taukapa toto
□ c) Te whakaiti ake i te kai konutai (sodium) <2000 karamumano ia rā, ko te koiri, ko te auau o te kai rongoā taukapa toto me te ako ki ngā tikanga whakangā.
□ d) Kāore ahau i te mōhio.
Pātai 4
Ko te mahi tuatahi kia noho rangatira ai te tangata i ōna āhuatanga tūraru (pēnei i te taukapa o te toto me te ngakototo) ko:

- a) Te mōhio mena kei tētahi ngā tohu e tohu nei i aua āhuatanga tūraru.
- b) Te mōhio ki te nui, ki te taumata o taua āhuatanga tūraru.
- c) Te whakatakoto whāinga, mahere mahi rānei hei pēhi i taua āhuatanga tūraru.
- d) Kāore ahau i te mōhio.

Pātai 5
Ko ngā mahi ka whāia kia kore ai te mate huka ko:

- a) Te whai i te mahere kai whakaora manawa, ko te korikori tinana kia 150 mīniti iā wiki, waihoki, ko ngā korikoringa ā-tinana āpiti atu ki te hiki taumaha, āpiti atu rānei ki te whakamahi tātua kūtorotoro.
- b) Te whakaiti i te kai mōmona me te kai warowaihā.
- c) I roto i te hītori whānau kī ana ki te mate huka, kāore e kore ka tipu te mate huka i te tangata nā te mea eharā te mate huka i te mate e āhei ai te ārai atu.
- d) Kāore ahau i te mōhio.

Kua oti tēnei wāhanga – haere ki te whārangi e whai ake nei.
Te Koiri

Whiria kia KOTAHI te whakautu e whakatau ana koe ko te whakautu tika.

Pātai 1
He aha ngā wāhanga whakahirahira o ngā tūtohunga koiri?
 a) Ko te whakakapihia anō ki ngā karori me te tote ka korikori tinana ana.
 b) Ko te mōhio me pēhea te kaha o te koiri, me pēhea te roa o te koiri, kia hia ngā wā koiri, ka mutu, he aha ngā nekehanga koiri kia mahia.
 c) Ko te mōhio me pēhea te kaha o te koiri, me pēhea hoki te roa o te koiri.
 d) Kāore ahau i te mōhio.

Pātai 2
Pēnā he tangata e ora ana me te māuiui ā-manawa, me mātua whakamahana te pūnaha-toto nā te mea:
 a) Ka piki haere te hoto manawa, ka pāitiiti te mamae ki ngā uaua, oitrā, ka pāitiiti te tūraru e whanake ai te uma kōharihari.
 b) Ka āpiti atu he wā anō ki te tapke mīniti e koiri ana.
 c) He whakarite i te tinana kia koiri.
 d) I don’t know.

Pātai 3
Rongohia ai te kakapa manawa:
 a) Ki te whatianga ringa ki raro i te pūtake o te kōnui.
 b) Ki te whatianga ringa ki raro i te pūtake o te tōiti, ki te tāne o te kakī rānei.
 c) Ki te ia-tuku whatianga ringa (radial artery) rānei, ki te ia-tuku kakī (carotid artery) rānei.
 d) Kāore ahau i te mōhio.
Pātai 4
E toru ngā mea ka taea e te tangata kia haumaru ai tana koiri tianan ki waho i te hōtoke, koia ko:

- a) Te hihira i te pāmahana me te hau mātao, otirā, te mau kākahu papanga huhua.
- b) Te hihira i te pāmahana me te hau mātao, kia kītea ai kāore i raro i te - 10 putu tohurau, waihoki, kia mau e 3-4 ngā papanga kākahu me te whakatīka i te tere o te hīkoi kia tūtaki ai ko te whakaputa kaha me te kakapa manawa.
- c) Te hihira i te pāmahana me te hau mātao, kia kītea ai kāore i raro i te - 15 putu tohurau, otirā, te whakamau koti hōtoke me te oma mena ka tino makariri.
- d) Kāore ahau i te mōhio.

Pātai 5
Ko ngā hua o te korikori parenga (hiki taumaha, tātua kūtorotoro) ko:

- a) Te whai kaha me te whai uaua.
- b) Te whakaiti i te hoto manawa okioki.
- c) The whai kaha, te māmā noa ki te kawe i ngā mahi o ia rā, te whakapai ake i te huka ki te toto, ka mutu, te whai uaua.
- d) Kāore ahau i te mōhio.

Pātai 6
Pēnā ka pāmamae te uma ka korikori hīkoi ana, me:

- a) Whakatere ake kia kītea ai mena rānei ka mahea te mamae, kāore rānei.
- b) Āta haere, ā, me mutu te koiri.
- c) Āta hīkoi, ā, mena kāore e mahea i roto i te mīniti, me mutu kau te koiri. Ki te kore tonu e mahea, kainga te rongoā nitroglycerine i tūtohua ai. Ki te rongo tonutia te mamae, me kimi āwhina.
- d) Kāore ahau i te mōhio.

Pātai 7
Me pēhea te tangata e mōhio ai kei te taumata tika tana koiri tinana?

- a) E heipū ana te kakapa manawa ki te taumata tika, kāore te whakaputa kaha i te uaua ake i “tōna uaua”, waihoki, e taea ana e te tangata te koiri me te kōrero hoki.
- b) Heipū ana te kakapa manawa ki te taumata tika.
- c) E heke ana te werawera, e ngāngā ana, ā, kāore i te tere te kakapa manawa.
- d) Kāore ahau i te mōhio.

Kua oti tēnei wāhanga – haere ki te whārangī e whai ake nei.
Taioranga

Whiria kia KOTAHI te whakautu e whakatau ana koe ko te whakautu tika.

Pātai 1
He aha te kai kī pai ana ki te hinu ōmeka 3:
□ a) He kākano harakeke kuoro (ground flaxseed).
□ b) He parāoa rimurapa.
□ c) He ika hinuhinu (arā, ko te taraute me te tāmana.
□ d) Kāore ahau i te mōhio.

Pātai 2
Ko ngā ngakowhiti (trans fat) he:
□ a) Mea e kitea ai i ngā nati me ngā kākano.
□ b) He wāhanga whakahauwai-ngako hinu huawhenua kei roto (hydrogenated vegetable oils) (arā, ko te whakatāte huawhenua – vegetable shortening).
□ c) Māheri (margarine).
□ d) Kāore ahau i te mōhio.

Pātai 3
He aha tētahi huarahi e nui ai tō kai weu?
□ a) Tāpirihia he nati, he kākano hoki ki tētahi huamata.
□ b) Inumia te wairanu.
□ c) Kainga ngā pūmua huawhenua (arā, ko ngā hua wharekano – legume, ko ngā pīni me ngā rētini - lentil).
□ d) Kāore ahau i te mōhio.

Pātai 4
Ko tēhea o ēnei kai kī rawa atu ki te tote:
□ a) He parāoa.
□ b) He kai whakakōpaka (Frozen dinners).
□ c) He huarākau, he huawhenua.
□ d) Kāore ahau i te mōhio.
Pātai 5
He aha te kohinga kai tika e pāitiiti ai te taukapo o te toto:
☐ a) He mīti whero, he mīti manu, he ika
☐ b) He huarākau, he huawhenua.
☐ c) He huawhenua, he huarākau, he pata tikitū, he hua-miraka hinu it, he nati, he kākano.
☐ d) Kāore ahau i te mōhio.

Pātai 6
Ka pānuitia ana ngā tapanga kai, kia mātua tirohia te aha?
☐ a) Te nui o te hinu.
☐ b) Te ingoa o te tohu.
☐ c) Te tirikai (serving size)
☐ d) Kāore ahau i te mōhio.

Pātai 7
Kia hia ngā wā kai huarākau me te huawhenua hei kai mā te pakeke:
☐ a) Kia 7 ki te 10 ngā wā kai ia rā.
☐ b) Kia 5 ngā wā kai ia rā.
☐ c) Kia nui rawa atu ngā wā kai.
☐ d) Kāore ahau i te mōhio.

Kua oti tēnei wāhanga – haere ki te whārangi e whai ake nei.
Ngā Tūraru Mātai Hinengaro

Whiria kia KOTAHI te whakautu e whakatau ana koe ko te whakautu tika.

Pātai 1
Ko tēhea kei raro nei te rautaki whakamārie pōraruaru pai rawa atu:
□ a) Ko te hōhonu o te whakahā.
□ b) Ko te karo i te kōrero atu
□ c) Ko te whakatau wairua, ko te whakatā haere i ngā uaua, ko te whakawhanaungatanga, ko te kūtorotoro/koiri, me te hōhonu o te whakahā.
□ d) Kāore ahau i te mōhio.

Pātai 2
Ko ēhea ngā pōrarurarutanga e hāngai ana ki te pikitanga o te tūraru manawa hē:
□ a) Chronic stresses, major life events, disrupted sleep, and feelings of distress.
□ b) Ko te pōraruraru mauroa ki te kāinga, ki te wāhi mahi rānei, me te rongo i te mate pāpōuri.
□ c) Ko ngā pōrarurarutanga kāore e taea e koe te whakatau.
□ d) Kāore ahau i te mōhio.

Pātai 3
Ko tēhea o ēnei te huarahi pai rawa atu e pāitiiti ai te tūraru ki te mate pāpōuri:
□ a) Kainga he rongoā whakamārie hinengaro, whāia hoki ko ngā tohutohu koiri.
□ b) Mahia ngā mahi koiri, manaakitia tō hauora, ā, mena e tika ana, kainga ngā rongoā.
□ c) Kāore te tūraru manawa hē nā te mate pāpōuri e pāitiiti.
□ d) Kāore ahau i te mōhio.

Pātai 4
Anō te hiranga o te tautohu i te “mate moe aukati hā (sleep apnoea)” nā te mea:
□ a) Nāwai ka pāngia ngā pūkahukahu e te māuiui.
□ b) E hono ana ki te teitei o te taukapa o te toto, ki te manawa taki whakarangirua (abnormal heart rhythms), me te tūraru nui ka manawa hē ā tōna wā.
□ c) Ka hono ki ētahi atu anō raru ā-manawa.
□ d) Kāore ahau i te mōhio.
Pātai 5
Ko te “pōraruraru mauroa”, ko tōna tikanga ko:

a) Te auau tonu o ngā kaupapa whakapōraruraru i tētahi wāhanga o tō oranga.
b) Ngā kaupapa ki te wāhi mahi, ki te kāinga rānei e ānini ai, e māharahara ai, e moe toropuku ai hoki koe.

c) Ko aua pōrarurarutanga e kore e taea e tētahi te whakatau.
d) Kāore ahau i te mōhio.

Tēnā koe i tō whakauru mai ki te kaupapa nei!

E pīrangi ana ahau ki tētahi whakarāpopotonga o ngā whakautu mai i te ēhonga nei. Wāhi ēmēra (Mena koe e pīrangi pūrongo ana ki ngā hua i puta i te otinga o tēnei rangahau)
Appendix Q: Response Rate for Quantitative Data

<table>
<thead>
<tr>
<th>Site</th>
<th>Allocated to site</th>
<th>Returned from site</th>
<th>Total packs given out</th>
<th>Number of surveys completed</th>
<th>Response rate</th>
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<tbody>
<tr>
<td><strong>Waitemata DHB (WDHB)</strong> (Accounts for North Shore and Waitakere sites)</td>
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<td>Total packs given out</td>
<td>Number of surveys completed</td>
<td>Response rate</td>
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<tr>
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Appendix R: Exemplar of Deductive Coding Discussion – Focus Group / Patients 1

![Graph showing distribution of discussion under deductive themes](image-url)
Appendix S: Exemplar Mind Map – “Exercise Understanding”