Diet and Recovery: the Role of Nutrition after a Natural Disaster

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Psychological impact of natural disasters

- Studies of survivors of natural disasters show about 20-30% of population show immediate or delayed symptoms of psychological stress including PTSD, depression and anxiety
  - (Bonanno et al., 2010; Suhail et al., 2009; Wang et al., 2010)

- There are a range of treatments - cognitive-behavioural therapy, EMDR, EQ simulators, medications

- These are hard to implement widely following a disaster and side effects problematic
Nutrition after a disaster

- Immediately after a natural disaster, nutrient intake decreases *when it should be increased*
- Based on a longitudinal study, people who were impacted more severely by earthquake reported unhealthier eating habits, more difficulty maintaining a healthy diet & were more likely to choose food for mood reasons post-quake (Kuijer et al., 2012)
- Some evidence that those who eat more poorly show a poorer psychological recovery (Yesilyaprak et al., 2007)
The “natural experiment”

The UC ADHD Diagnostic Assessment & Research Group

RCT of EMP+

- Participants all assessed prior to the quake (t0)
- Some taking the supplement
- Some not taking the supplement
- Surveyed by phone 1 and 2 weeks post-quake (t1, t2)
- Used Depression, Anxiety, Stress Scale (DASS)
- + EQ impact questions

- Rucklidge et al., 2011; Rucklidge and Blampied, 2011
What is in EMP+/CNE?

A nutritional supplement containing 36 ingredients
- 14 vitamins (including all the B vitamins)
- 16 minerals
- 3 amino acids
- 3 antioxidants

Has been shown to benefit bipolar disorder, autism, and ADHD symptoms across a number of international studies
Effects on Anxiety & Depression

Control Group

Micronutrient Group

Anxiety Post-quake (t0)

Anxiety Post-quake (t1)

Anxiety Post-quake (t2)

Anxiety Pre-quake (t0)
Effects on Anxiety & Depression

Control Group

Micronutrient Group
But can these positive changes generalize to the wider “nonclinical” population?
Micronutrients for stress

- 5 RCTs have shown that over-the-counter micronutrients
decrease stress/anxiety, improve energy and mood in both stressed and non-stressed individuals

- Carroll et al., 2000; Gruenwald et al., 2002; Schlebusch et al., 2000; Kennedy et al., 2010, 2011; Stough et al., 2011
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- 185 people died, 6659 injured, 30,000 homes destroyed, cost to NZ: 12.9 billion dollars
Post-Quake RCT of micronutrients

- Participants recruited on-line ~ 3-4mo after quake
  - 201 completed survey: 127 eligible

- 91 randomized
  - 30 to Berocca™ (29 completed)
  - 31 to EMP+4 (30 completed)
  - 30 to EMP+8 (27 completed)

- 4 week trial with 1 month natural follow up
  - data collection May to July 2011

- Monitored weekly with on-line
  - assessing stress, mood, anxiety and PTSD symptoms

- 25 of original pool served as controls (7 medicated)

[Rucklidge, et al., 2012]
Results

- No mean group differences in SES, age, sex, etc.
- All 3 tx groups showed large (Berocca) or very large (EMP+ @ both doses) changes from baseline.

- EMP+ (both doses) showed superiority to Berocca for intrusions, and higher dose for CGIs of stress, anxiety, energy, mood.
  - No tx differences on other measures.

- 1 month follow up:
  - Those who stayed on continued to improve, those who didn’t, stayed same.
  - Preference for higher dose of micronutrients:
    - Five times more of these participants stayed on micronutrients compared with those in the Berocca™ group.
% with significant PTSD symptoms @ baseline & 4 weeks
Anxiety

Mood

Stress

Controls | Berocca | EMP4 | EMP8

Anxiety
- very much improved
- much improved
- minimally improved
- no change
- minimally worse
- much worse
- very much worse

Mood
- very much improved
- much improved
- minimally improved
- no change
- minimally worse
- much worse
- very much worse

Stress
- very much improved
- much improved
- minimally improved
- no change
- minimally worse
- much worse
- very much worse
Would symptoms have remitted over time?

- 30% - got worse over baseline
- Stress was ongoing
  - June 13th magnitude 6 quake occurred during data collection
- Contact with investigators minimal (1 face-to-face + on-line survey)
- Substantial change noted in a difficult to treat presentation (PTSD symptoms)
- Berocca has been shown to be superior to placebo
Long-term follow-up @ 12 mo

Stress
ES = 1.31

Depression

[Rucklidge et al., 2014]
Why might this approach work?

- **thiamine (B₁)**
  - Protects adrenal glands from exhaustion

- **niacinamide (B₃)**
  - Shunts tryptophan to serotonin

- **Vitamin B₆**
  - Cofactor for synthesis of GABA, serotonin, and dopamine

- **Vitamin B₁₂**
  - Normalizes cortisol production

- **Vitamin C**
  - Given in higher than RDA values, supports adrenal function and decreases high cortisol levels

- **Mg, Zn & Ca**
  - Play essential roles as co-enzymes in hundreds of biochemical reactions
Conclusions

- People’s nutritional intake is compromised after a natural disaster
- Nutritional supplements are beneficial during the EQ and post-EQ stress period and could be considered as a front line intervention
- Benefits may be more marked for those with existing psychopathology
- Higher doses may confer greater benefits
- Nutritional supplements are relatively cheap and easy to provide to communities cf other psychosocial, medical, organizational interventions
- Protection against worsening anxiety, depression, PTSD symptoms may be gained with little professional contact that is maintained up to one year
425 Kilometers Perimeter
11,200 Square Kilometers Area

8203 Earthquakes 4th Sept 2010 - 3rd Sept 2011
in the field of view

Christchurch

Ashburton

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2011 DigitalGlobe
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IES Total Scores
Baseline & Treatment Week 3 Compared
Results

- No differences in baseline functioning, co-occurring diagnoses, ADHD subtype, SES, gender, ethnicity, IQ

- No group differences at Time 1

- At Time 2, those taking micronutrients reported significantly less anxiety and stress (effect size 0.69) than those not taking them

- No change from baseline to Time 2 for control group (effect sizes ranged from 0.11-0.45)

- Significant changes in all areas assessed for micronutrient group at Time 2 (effect sizes ranged from 0.73-1.01)