Catching the Horse Before it has Bolted

What integrative healthcare has to offer nurse practitioners

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What are some of the factors determining our MH?

Genetics – MH family history/genetic polymorphisms

****The Human Genome Project shows us that genetics only account for a very small proportion of mental illness

Early experiences – major early influence on neurodevelopment;

***Severe adverse early events account for about 30% of risk in mental illness as identified in the Dunedin study

□ HPA axis function – how does their stress system operate?

Environment – exposure to toxins and stressors

Diet/nutrition –nutritional building blocks for CNS

□ Lifestyle – substance intake, exercise (BDNF), QOL

Stress levels – chronic stress causes deadly wear and tear

Proven hypothesis between the links of ACEs and subsequent impacts throughout the lifespan (Felitti et al, 1998)



101 of the HPA (Hypothalamus pituitary adrenal) axis



Initiates stress response/fight or flight;

- increase availability of glucose
- redirect blood into integral muscle groups

Cortisol initially protective,

- blocks inflammation initially to reduce impact on systems
- Shuts off stress response via –ve feedback loop

SNS and PNS serve to either 'turn up' or 'turn off' the stress response

Changes in HPA axis function in chronic stress



Continued release of cortisol

Glucocorticoid receptor downregulation (cortisol resistance)

Cytokines cross BBB, stressing brain regions - inflammation

Cortisol levels drop, adrenal resistance occurs which can cause lowered cortisol production

Adrenal exhaustion – SNS and PNS regulation impacted

Potential overall immune dysfunction and susceptibility to autoimmune conditions



Number of people with diabetes by IDF region in 2013



2016 Population share of MH & substance dx



Epigenetic – the modification of gene expression/activity via the environment

- Most powerfully influenced in pre-natal and early post-natal life by maternal nutrition, exposure to toxins and maternal stress
- Creates 'prenatal programming' an adaptive response by the fetus to anticipate the environmental conditions and required stress responses needed based on the maternal biochemistry
- Considerable hypothesis that early epigenetic changes can result in reduced 5HT (serotonin) function influencing neurodevelopmental processes and altered HPA axis function which sees altered glucocorticoid receptor function
- Dietary intake influential on gene expression, either continuing problematic gene expression or supporting reversal of environmentally driven epigenetic alterations

Nutrients are funnelled into a biochemical pathway that extracts methyl groups and then attaches them to our DNA.



Nutrients enter metabolic pathways where they are manipulated, modified, and moulded into molecules the body can use. Methyl groups provide important epigenetic tags that silence genes

Diet as a protective factor in toxin exposure

(Waterland & Jirtle, 2003)

These Two Mice are Genetically Identical and the Same Age



While pregnant, both of their mothers were fed Bisphenol A (BPA) but DIFFERENT DIETS:

The mother of this mouse received a **normal mouse diet**

The mother of this mouse received a diet **supplemented** with choline, folic acid, betaine and vitamin B12

Photo courtesy Randy L. Jirtle, PhD

Chemical exposure can effect the epigenome. Bisphenol A (BPA) appears to reduce methylation of the agouti gene (found in all mammals).

An animal study on mice showed when mothers were fed BPA, they were more likely to produce yellow and obese offspring

Mothers who were supplemented with methyl-rich foods (methylating the gene) alongside BPA were more likely to produce brown and healthy mice. The maternal nutrient supplementation seemed to have counteracted the negative effects of exposure.

Antidepressant treatment (Gaynes, 2009)

- Star*D study highlighted depression is difficult to treat and even more difficult to maintain in remission state
- Multi-step treatment algorithm developed with best evidence based on combination CBT and medication option for moderate to severe depression
- Initial monotherapy of citalopram 40mg achieved remission in only 30%
- A second intervention added on 26% improvement (56%)
- Very few responded after level three and up to level four achieved a maximum of 67% remission

What does this mean in terms of efficacy of treatment options for depression?

Should we be happy with these treatment outcomes for clients? Are there other options to enhance recovery?

Neurotransmitter functional factors

- Precursor supply and cofactor availability (diet and nutritional status!!)
 Enzyme function
- ° Transporter protein availability and functional status
- ° Receptor numbers (up-regulation or down-regulation)
- ° Epigenetic modulation of transport proteins and receptors
- ° Inflammatory and oxidative signalling
- ° Balance with other neurotransmitters

Serotonin & Dopamine Biosynthesis



Dopamine further converted using enzymes and cofactors into noradrenaline and adrenaline

Case study one – the meds just aren't cutting it

- ° John, 40 year old male. Successful business, married, 'should be really happy' but isn't
- History of difficult relationships with parents, poor self esteem, school achievement poor despite high intellect
- ° Long history of persistent depression (dysthymic moods of 5/10 for years), anhedonia
- Received ADHD diagnosis as an adult (attentional subtype)
- Constant worry and rumination which is all absorbing diagnosed with generalised anxiety disorder
- Tried multiple antidepressants without much help, taking Ritalin now only with reasonable effect but major come down in the afternoons
- ° Struggling to engage with family life due to anhedonia and lack of motivation generally
- Self-referred as wants to try something else

What is missing here?

° Great diet, whole foods, fermented foods, good exercise

•? Excessive need for nutrients which diet can't provide?

• Methylation issues??

° Nutritional approach has never been looked at!!

Trial of micronutrients

- A trial of high-dose micronutrients (current being studied in Canterbury University by Prof Julia Rucklidge's team) started
- 12 capsules per day over TDS dosing drug-dose nutrients and minerals aimed at filling 'potential gaps' in deficiency that may be present, supporting methlyation
- Ritalin able to be utilised simultaneously initially (monitoring for drug-nutrient interactions)
- ° No need to work on gut health as already appears in potential great function
- Some psychological work undertaken to support internal stress perpetuated by fusion with negative thinking

Two weeks later

° "I wake up and the anxiety that I felt sitting on my chest is gone"

- "I have clear, focused thinking and ability to organise myself 24 hours a day, 7 days a week with no slump in energy, motivation or concentration"
- ° "My moods are stable at 8/10 almost every day and I'm enjoying life again"
- ° "I am able to support my wife and be more present with the family"

Four months later

 All changes maintained without any plateau or drop off of efficacy (this was not placebo!!)

Case study 2 – overlooking the obvious

- 19 year old female recently discharged by secondary MH service presenting to GP service was under care of psychiatrist secondary to significant suicide attempt
- Dx MDD and GAD; depressed mood of 2-3/10, high anxiety (8/10), mood fluctuations and irritability ('not like me'')
- No significant early history of ACE's (remember these account for about 30% of risk in MH)
- ° Not working, struggled with focus in school and mood swings
- ° Dysregulated periods heavy bleeding, irregularity
- Presented covered in eczema, acne, black circles under eyes, restless and fidgety, extremely lethargic all the time
- ° Chronic history of insomnia
- Tonsillectomy as a child, chronic infections incl UTIs, asthma, E-coli contracted in school, poor digestive function (diarrhea twice daily "since I can remember")
- Identified as gluten and dairy intolerant age 4 (stopped but restarted age 12 and continued to consume to present day)

What is going on here?

- Chronic inflammation ?? Depression and anxiety caused by this?? cytokines can cross BBB!!!
- History of B12 deficiency age 16 with tx (258 within lab range but optimal???)
- Long history of low iron (ferritin 15, iron studies all abnormal NO CURRENT TX!!)
- ° Continued intake of food that appears toxic to her
- ° Body and mind are responding with significant distress and struggles
- ° The perfect 'breeding ground' for autoimmune conditions!!!

Initial treatment.....

•STOP EATING GLUTEN AND DAIRY!!!

• Further testing – plasma zinc ordered

• Mother brought in to drive the point home and identify significant improvements in childhood when dairy and gluten removed!

After two weeksMASSIVE improvement without gluten and dairy

- Skin clearer and bright, acne resolving, circles clearly reducing, ECZEMA beginning to reduce
- NOTABLY calmer and more relaxed in session, affect completely changed, not fidgeting
- MOODS 8/10 and CONSISTANT!! ANXIETY minimal and not easily triggered
- Bowels number 4 on Bristol stool chart (NO DIARRHEA!!)
- ° Insomnia and lethargy ongoing issues
- \circ Zinc 9.8 (lab range 10 17, optimal zinc considered 14)
- ° Zinc supplement started (50mg elemental zinc minimum initially spread over day) with B6
- ° Fe supplement with vitamin C commenced
- ° Course of B12 (hydroxycobalamin) prescribed

Intervention across the lifespan.....

- **Pre-natal maternal care** improve diet (take out harmful foods), improve stress, nutritional balancing, reduce toxin exposure
- **Children** ensure dietary intake is nutritionally dense, reduce exposure to 'toxic' foods on CNS, increase green space exposure, identify nutritional deficiencies (watch for behaviour and immune function), lower need for antibiotic use (treat source mouldy, damp homes, poor diet, gluten/dairy allergies), build in mindfulness and meditation to enhance resilience
- **Teenagers** increase exercise and engagement with family and the community, ensure good diet continues, enhance stress resilience, continue identifying developing warning signs for poor health (energy levels, acne, mood swings), support female reproduction and detect dysregulation early target with diet and stress regulation changes, not necessarily OCP
- Adults ensure alcohol intake lowered, increase exercise, ensure good nutrition, identify continuing nutritional deficiencies (e.g. Fe, B12, zinc, vit D ...), enhance stress tolerance through mindfulness, meditation, engagement in hobbies and activities
- Elderly community engagement and exercise, good nutrition, monitor for deficiencies

Thank you for your attention!



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