WHY WOULD NUTRITION IMPROVE MENTAL HEALTH?

Here we present the highlights from a recent Swisse Nutra+ webinar with guest speaker Rachel Arthur BHSc BNat (Hons). Rachel is a respected and widely published naturopath and registered nutritionist specialising in integrative nutrition & diagnostics.

When times are tough, it's common to think that stress and poor mood are beyond our control. However, recognising the essential function of nutrition for the healthy anatomy and physiology of the central nervous system (CNS)[1] paves the way to understanding why dietary strategies are a key consideration in both prevention of mental illness and effective management.

Mental Health Matters

Prior to 2020, mental health issues were leading causes of the global health-related burden,[2] with depression incidence alone increasing 49.9% between 1990 and 2017.[3] Researchers estimate a further 27.6% increase as a direct consequence of the pandemic.[2]

Research investigating the protective, and potentially therapeutic relationship, between nutrition and mental health, particularly depression, began in the 1970s[4] but has burgeoned since 2000.[5] Such research has examined this association from different angles: from diet quality and patterns, specific food groups, individual foods, single or cluster nutrients, nutraceuticals, e.g. N-acetyl cysteine, to even non-nutritive components, such as fibre.[5–7] This growing body of evidence led to the new term 'Nutritional Psychiatry' as a defined field of research[8] and has progressed our understanding of the myriad mechanisms of action implicated. This includes modulation of pathways involved in inflammation and oxidative stress, through to the health of our microbiota and the nature of our stress-response via the hypothalamic-pituitary-adrenal (HPA) axis.[6]

Rachel Arthur, BHSc BNat (Hons 1st). Rachel Arthur received a speaker honorarium from Swisse Nutra+. This summary was written by Rachel Arthur in January 2022.

What is the HPA axis?

The HPA axis, comprised of the hypothalamus, pituitary and adrenals, is a complex neuroendocrine feedback system and the prime regulator of our adaptive response to stress.[9]

While there is consensus that dietary behaviours typical of a Mediterranean diet, e.g. plant rich, including wholegrains and legumes, high in monounsaturated fat, have a protective and positive effect on our mental wellbeing,[7,10] research also underscores how stress, depression and anxiety compromise our capacity to make or maintain such healthy dietary choices.[11–13] For example, 'breakfast skippers' are over-represented both pre and post a depression diagnosis[14] and are also consistently found to have poorer overall intake of key brain nutrients, magnesium and folate.[15]

Folate First

One of the first single nutrients of interest was folate,[5] and while earlier research focussed on its protective role, more recent studies confirm its therapeutic efficacy as either a stand-alone or adjunctive treatment for depression.[16] Most noteworthy is the pivotal role folate status plays in a patient's antidepressant experience, with deficient vs replete individuals contrasting strongly in relation to response rate, speed of onset of drug response (+1.5 wk),[17,18] and rate of relapse (49.2% v 3.2%).[18] Similarly, a meta-analysis of adjunctive folate therapy with selective serotonin reuptake inhibitors (SSRIs) and serotonin and norepinephrine reuptake inhibitors (SNRIs) demonstrated statistically significant improvements in these areas.[16]

Key Practice Points

- The Australian recommended dietary intake (RDI) for non-pregnant, non-breastfeeding women and men is 400 mcg folate.[19]
- Folate deficiency is a recognised risk factor by the Royal Australian and New Zealand College of Psychiatrists, with their clinical practice guidelines for mood disorders recommending a blood test to clarify status.[20]
- The most rigorous randomised controlled trials (RCTs) administering folate as an adjunct to antidepressants, employed doses between 0.5-15 mg/d in a variety of different forms.[16]

Magnesium and Mood – A Perfect Storm?

With wholegrains representing the richest and most reliable dietary source of magnesium, risk of inadequacy is common in a Western diet. Particularly when those under stress may omit breakfast while increasing their intake of added sugar, processed foods, caffeine and alcohol.[21] Each of these factors increases the prevalence of magnesium deficiency.[21] The experience of stress itself results in increased body losses of magnesium, producing HPA hyperexcitability coupled with a lack of N-methyl-D-aspartate (NMDA) antagonism in the brain that reduces

the individual's stress tolerance.[22,23] Therefore, when an individual faces trying times and chronic stressors, the risk of inadequacy is both probable and problematic.

Key Practice Points

- The Australian RDI for non-pregnant women is 310–320mg and men is 420mg magnesium.[19]
- RCTs in individuals experiencing stress/depression/anxiety have employed doses ranging from 120–500mg/d, average dose 300mg.[21,24–27]
- Divided doses are best throughout the day for increased bioavailability with maximal fractional absorption evident ≤150mg.[28,29]
- Larger single serves before bed, +/- in combination with melatonin and B vitamins, can aid sleep onset and maintenance.[30,31]

Good Night Glycine? Or GABA's 2IC?

Glycine, while structurally the smallest and simplest amino acid, possesses a large role within the CNS, being the major inhibitory neurotransmitter within the brainstem and spinal cord, and occupying the role of second in command to Gamma-aminobutyric acid (GABA) within the brain.[32]

> **What is GABA?**
>
> GABA is the major inhibitory neurotransmitter in the CNS. It is critical in balancing neuronal excitation and inhibition and has calming and sleep-promoting properties.[33]

"In the adult nervous system, glycine exerts fast postsynaptic inhibition that is important for control of excitability of motor neurons, auditory processing, pain transmission in the dorsal horn, and other functions."[32]

Accordingly, there is growing research interest in the therapeutic potential of glycine in a variety of psychiatric and neurological presentations, including sleep disorders from maintenance insomnia to obstructive sleep apnoea.[34–3

Key Practice Points

- Several small RCTs administered 3g of glycine 30–60mins before bed to produce both objective (reduced sleep latency, faster onset of slow wave sleep, improved cognition) and subjective (improved sleep quality, greater levels of refreshment) benefits.[35]
- The passive, non-regulated uptake of glycine across the blood brain barrier means that increased intake and plasma concentrations produce linear dose-dependent increases within the brain.[34]
- Pharmacokinetic data for glycine support its use as a fast-acting CNS agent with peak concentrations within the brain detected within 30-45 minutes of ingestion, with a half-life of 6hrs.[38,39]
- Current evidence supports reduction in core body temperature and synchronisation of the circadian clock as glycine's main actions in sleep support. As it is non-sedating, it can be taken during the day, similar to supplemental melatonin.[34]

A Case in Point

A 40-something female presents saying she's feeling 'rundown and irritable', that the stress of the last 18 months is 'starting to catch up'. Although she denies frank insomnia, she does report diminished sleep quality and 'probably taking a little longer to go to sleep'. She admits that this leads to relying on an extra cup of coffee (or two) every morning to help her energy and she now has no alcohol-free days, though her intake is moderate at 1–2 glasses per night. She's not taking any medications or supplements and says, as part of her tiredness, she's not cooking as often and is more reliant on take-aways. Her GP has ruled out iron issues.

Watch the webinar recording here

Key issues and nutritional risks

- Chronic stress
- Impaired sleep quality
- HPA hyper-excitability and possible
- Reduced stress tolerance
- Poor diet quality
- Increased caffeine and alcohol

Nutrient Prescription

- B-complex with folate to prevent deficiency, taken with breakfast.
- Magnesium in small, divided doses (≤ 150mg) across the day to help normalise HPA activity.
- Larger dose of magnesium in combination with 3g of glycine 30–45minutes before bed to increase inhibitory tone and improve sleep.

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