

# Updated Mental Health Literacy to Improve Public Health in Remote Australian Communities

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## Abstract

A population approach to mental health and well-being requires that mental health be equally funded and resourced along with other health conditions. Poor mental health literacy does not enable preventable health strategies to be successfully delivered in struggling communities. Sub-optimal mental well-being in remote Queensland locations is delivering a public health crisis. The higher prevalence of suicidality in remote areas of Australia worsens the crisis-driven nature of accessing mental health services. While telehealth services help to bridge distance barriers, poor mental health literacy does not support preventative strategies for struggling communities. The perceived cause of mental health disorders continues to inform mental health literacy, associated with inter-generational stigma and increased suicidality. At its inception, stigma is rooted in history. A historical review was undertaken which applied an evidence-based lens to the available literature on mental health stigma and perceived causes of mental disorders. Reducing mental health stigma supports the reform of mental health services. Magnesium supplements may help reduce suicide. However, mental disorders begin with a lifestyle underpinned by food insecurity and restrictive eating, and worsened by social determinants of drugs, alcohol, and tobacco. Food insecurity is a consequence of poor nutritional education, or sub-optimal access to food due to remoteness, lack of finances or disaster. Without sufficient nutrients, low brain energy metabolism damages tissues, producing symptoms of psychosis and mood changes. Adaptation to low energy metabolism results in a poor ability to cope with stress. Inadequately treated concussion, COVID-19 and viral infections impair energy metabolism, to indirectly progress brain damage. Community mental well-being is likely to improve with initiatives to secure the nutrients needed for a healthy brain and a sustainable future. Suggestions are to diversify the plant and seafood species people eat for cheaper food options, plant vegetable gardens on higher ground, and build climate-resistant houses with cyclone-protected emergency shelters, or gardens on rooftops.

**Keywords:** mental health literacy, stigma, food insecurity, suicide, public health

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## Introduction

The mental health system is overdue for a change in thinking from custodial care to community care (Math et al., 2011). Across the globe there has been a scattered approach to mental health reform, with many countries being slow to effect changes directed by the World Health Organization. Here in

Australia, a Royal Commission into Victoria's Mental Health System (2021) has released recommendations which support approaches to mental health care that are less crisis driven and fairer to access from the community. Queensland Health has adopted this approach. The health department has introduced telehealth in Queensland to promote fairer access in

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remote areas; however, poor mental health literacy is still a barrier to supporting suicidal individuals (Gulliver et al., 2019). The roadblock is community attitudes towards individuals based on mental health stigma and discrimination. The premise of this paper is to promote discussion for better public health and to support mental health service reforms. Stigma associated with mental health has arisen from what a culture perceives the cause of mental disorders to be. The mental health literature has such a complex array of perspectives that it is easy for the casual reader to pull towards alternate viewpoints without the benefit of evidence-based information.

### **Materials and Methods**

At its inception, mental health stigma is rooted in history. A historical review is a useful means of reconsidering the past and integrating the available evidence to provide novel insights to the reader. Central to this review is Queensland, Australia. An extensive search of Google Scholar was conducted. This review extrapolated topics and then delved into the topic to gain an understanding and provide background to what was happening in the world at that point in time. An evidence-based lens was applied to interpret the available literature. Papers were included if they provided historical context around the mental health narrative and clarified specific topics around mental health stigma and the causes of mental disorders. Obviously with such a large volume of material, a potted history is described. Excluded papers were those that did not provide added information, described minute details of biochemical pathways, political propaganda, or repeated earlier findings. Information was considered from peer-reviewed publications, published statistics, and official websites providing statistics. The author applied critical thinking to the information, and the resultant themes are presented in this comparative study.

### **Results and Discussion**

The Australian Commission on Safety and Quality in Healthcare promotes mental health as an integral part of health (Gaskin, 2019). Any public health strategies should promote physical and mental well-being in communities. To underscore the significance of this, Queensland Health figures show that 20% of Australians will have a mental health issue

(The Queensland Health and Hospitals Plan, 2023). Here in Queensland, mental health stigma and discrimination, suicide risk and community mental well-being continue to require action (Queensland Mental Health Commission Strategic Plan 2018-2023). Mental health stigma is associated with increased suicide attempts (Oexle et al., 2019). Suicide rates in Queensland are higher in remoter areas and amongst lower socioeconomic demographic groups (National Rural Health Alliance, 2021). In the literature, suicide is variously stigmatised as inherited, bad luck, an inability to transmigrate the soul (Tzeng & Lipson, 2004), weakness, or a lack of coping. There is no doubt that coping with natural disasters, the COVID-19 pandemic and the rising cost of living have put pressure on remote communities that already have well-described, higher suicide rates than city counterparts (National Rural Health Alliance, 2021). The literature shows that individuals with high mental health literacy are more likely to offer support to people seeking help with mental health services (Gulliver et al., 2019) and produce lower stigma (Svensson & Hansson, 2016). With vulnerable individuals in mind, education to improve the public understanding of mental disorders is likely to influence discrimination. Presently, literature on mental health literacy is strongly informed by personal and family experiences, as well as cultural stereotypes which are dependent on feelings and belief around the cause of mental illness (Svensson & Hansson, 2016).

### **Multicultural Context of Mental Disorders in Queensland Communities**

According to Queensland Health, 28% of Australian First Nations peoples live in Queensland (The Queensland Health and Hospitals Plan, 2023). In many First Nations communities, a curse is uttered with the intention of wishing the intended person poor health in a supernatural fashion. A sorcerer is then hired to lift the curse. Curses are widely recognised amongst peoples who still rely on traditional healers (Wijsen, 2009). Traditional medicine has been relied upon since prehistoric times, in the absence of medical care or a medical diagnosis (Yuan et al., 2016). In the absence of a medical diagnosis, a curse is both an explanation for afflictions and a means of settling political fights within the community.

The cause attributed to mental disorders differs across the cultures represented amongst Queensland migrants. For instance, the Chinese concept of mental disorders is environmental (Chan et al., 2015). The practice of Feng shui aims to create a harmonious space within the environment to promote positive emotions for mental health (Jin & Juan, 2021). The practice of Feng shui is thought by some people to explain mental disorders. Belief in Feng shui is a barrier to help-seeking for those with an undiagnosed mental health concern. A proposed solution to overcoming such barriers is improved mental health literacy (Na & Ryder, 2016). Mental disorders were perceived historically as being the result of witchcraft in Britain, Europe, and the Americas. British culture still influences Queensland school children learning the plays of William Shakespeare. The entrance of poor Tom in William Shakespeare's play *King Lear* evokes natural imagery linking storm and health. The Shakespearean audience would have recognised the veiled reference to witches (whose imagery Shakespeare linked to storms) and the layered clothing sign of schizophrenia on the back of widespread famine (Shakespeare, 1606). However, witches are traditional healers who use herbal medicines, alcoholic brews, and animals to treat mental disorders (Llanes et al., 2022). Some of the traditional herbs used by witches target dopamine and serotonin neurotransmitters (Fields, 2015). Modern pharmaceutical companies have utilised this knowledge in the development of modern-day psychotropic medications (Blows, 2022).

### **Queensland Conceptualised Assimilation as an Alternative to Eugenics**

Before neuroleptic medications, forced sterilisation preceded the first gas chambers in Germany for people diagnosed with schizophrenia, bipolar disorder, and depression, alcoholics, gay people, Romani people, epileptics, cerebral palsy, muscular dystrophy, and other deformities, before being applied to people of Jewish ancestry (Torrey & Yolken, 2010). The excuse was that mental disorders were genetic. The incidence of schizophrenia quickly returned after World War II despite Nazi extermination policies, proving the falsity of genetic transmission (Torrey & Yolken, 2010). Nevertheless, genetic transmission has wrongly lingered in psychiatry.

Rationale for the Nazis' atrocity was that Germany faced economic hardship after World War I and needed to make room during World War II for returning Nazi soldiers to convalesce. Joseph Goebbels created the Nazi propaganda promoting fear of the mentally ill and disabled. This propaganda was in films, theatre, music, the press, and radio broadcasts. It shone a poor light on targeted people.

In Australia, similar propaganda was used to help recruit for the war in the Pacific. Eugenics started as a movement before the rise of fascism and became popular during the Great Depression in Australia (Garton, 2009). Forced sterilisation and marriage prohibition was legislated to control mental defects and prevent propagation (Raeburn et al., 2023). The Queensland Government took a different approach, despite the eugenics movement having many sympathisers in Queensland. On the basis that First Nations peoples were a "dying race", Queensland instead opted for a "protective stance" and legislated for assimilation that gave complete authority over First Nations people's lives, finances, and access to healthcare (Raeburn et al., 2023). Traditional food sources were replaced by reliance on processed British cuisine (Australian Institute of Health and Welfare, 2022).

This colonial legacy of social hierarchy enacted laws on sanity and for placing the mentally ill in asylums (Clarke, 2012). The British system was adopted for the mentally ill, who were housed in colonial lunatic asylums or criminal gaols from 1824 until suitable transportation was undertaken to New South Wales (Raeburn et al., 2023). Woogaroo Lunatic Asylum (1865–2001) was the first in Queensland, confining mentally ill people, intellectually disabled persons, and geriatrics in overcrowded living conditions devoid of gardens, separated from the city for their own protection and that of society (Besley & Finnane, 2011). Moral treatment for mental disorders linked dietary health to moral values (Kearin, 2022). De-institutionalisation was only possible with the advent of pharmaceutical treatments for mental disorders. Today, individuals with a diagnosed mental disorder live increasingly in the community, supported by mental health services and protective legislation to uphold human rights. However, social determinants have a negative impact on recovery. For instance, limited finances (disability pension)

reinforce food insecurity to increase psychological stress (Australian Institute of Health and Welfare, 2022).

### **Food Insecurity**

Amongst the general population, 4% are facing food insecurity compared to an estimated 31% of Australians living in remote areas (Littlewood, 2022). A disproportionate 60% of these people in remote areas live in Queensland, with 28% identifying as First Nations people (Littlewood, 2022). Social determinants, such as housing and finances, underscore food insecurity amongst financially disadvantaged peoples (welfare recipients, homeless) and those in remote communities where cost, transport, and location impact access to the nutrients for brain health (Nolan & Rajadurai, 2020). This is worsened by poor mental health literacy and a lack of nutritional knowledge. People need to know which food to choose, how to prepare the food, and how to store the food.

### **Natural Disasters**

In the aftermath of natural disasters, affected people tend to have limited access to food. Climate-driven disasters regularly cut supply routes along the State Highway (No. 1) in Queensland to restrict food supplies during floods or the aftermath of cyclones. A seminal paper to support people following disaster came from a New Zealand event. In 2011 Christchurch, New Zealand experienced a 6.3 magnitude earthquake which was preceded by a 7.1 magnitude quake five months earlier. Incidentally, Julia Rucklidge and her team examined the response to a combination of multivitamins by people diagnosed with ADHD in the population affected. The repeated consumption of a combination of multivitamins reversed indices of low mood, anxiety, and stress (N=1713) for the disaster survivors (Rucklidge et al., 2012). The study was replicated after Canadian floods (Kaplan et al., 2015) and used in a solitary case study to treat Bipolar II disorder (Rucklidge & Harrison, 2010). This combination of multivitamins held the essential nutrients needed for brain well-being.

### **Restrictive Eating Patterns**

Over one hundred years of work verifies the pre-condition of restrictive eating practices with erratic eating patterns or consistently skipping meals

among people with psychosis or mood disorders (Kraepelin, 1919; Rao et al., 2008). Disruptive eating patterns in adolescence may become restrictive and persistent by adulthood. Anxiety is associated with a selective eating pattern, attention-deficit hyperactivity disorder (ADHD) with binge eating, low fruit and vegetable consumption, and high consumption of sweetened drinks (Cortese et al., 2007). Conduct disorders are associated with junk/convenient eating (Oellingrath et al., 2014), and self-harm is associated with not only disordered eating pattern, but also alcohol (Greydanus & Shek, 2009). The presence of disruptive eating behaviours in individuals with a diagnosis of ADHD is linked to metabolic disease in adulthood (Ptacek et al., 2014).

### **The Brain-Gut Microbiome (BGM System)**

Work understanding a two-way brain-gut-microbiome relationship involves brain biochemistry germane to depression, anxiety, autism, Parkinson's disease, Alzheimer's disease, epilepsy, ADHD, and eating disorders (Horn et al., 2022). Gut hormones are essential for regulating energy metabolism, glucose homeostasis, chronic stress, and the onset of puberty. This work involving the brain-gut is a departure from work on early adversity, changes in the stress system, and adult brain structure (Raymond et al., 2018). Where previously traumatic life events were solely linked to stress and the hypothalamic-pituitary-adrenal axis (HPA axis) (Shea et al., 2005), more recent work shows there are widely seen alterations to gut microbiota, increased intestinal permeability, impairment of the hypothalamic-pituitary-adrenal axis (HPA axis), hypothalamic-pituitary-thyroid axis (HPT axis), and sub-clinical inflammation in people presenting with anxiety and severe mental disorders (Fischer & Ehlert, 2018; Misiak et al., 2020). This is an emerging science, with still much to learn. However, these changes in the gut microbiota are not attributable to diagnostic symptom clusters for schizophrenia, bipolar disorder, or depression (McGuiness et al., 2022), which suggests another mechanism.

Instead, the brain adapts to an environment of near nutrient starvation. To elaborate, 20% of all body energy, in the form of glucose, is used by the brain. Critical brain energy requirements are unmet during intermittent starvation (Csete

& Doyle, 2004) which is what restrictive eating patterns and food insecurity produce. The brain is therefore under cellular stress from a lack of nutrients, changing astrocyte-induced energy transfer to neurons and the neuroprotective benefit following a traumatic brain injury (Deitmer et al., 2019). To clarify, low nutrients interfere with the production of hormones. An imbalance of hormonal supply and demand alters cognitive and social brain functioning. There are certain times in an individual's life that coincide with an increased risk of developing a severe mental disorder. This corresponds to times of hormonal adjustment at puberty for both sexes, post-partum, and menopause. Concussion from sports or blasts during military service involve a separate mechanism. Menopause, including premature menopause in mental disorders, carries an increased risk of first-episode psychosis (Riecher-Rossler, 2009). Interestingly, post-partum depression is associated with deficiencies of zinc, iron, magnesium, and copper (Etebary et al., 2010), the reason being the same nutrients required for healthy brain functioning are also essential for hormone production and transport.

### **Energy Metabolism**

The neurobiological model accurately describes findings germane to psychosis, mood disturbances, or anxiety symptom clusters. Neurobiology involving energy metabolism (Zuccoli et al., 2017), oxidative stress (Hassan et al., 2016), impaired redox regulation (Kim et al., 2019), impaired mitochondria (Iwata, 2019), apoptosis, and autophagy (Chen et al., 2021) are well described in the literature. However, the story of mental disorders is difficult to extrapolate from the neurobiological perspective or systems approach. The literature pivots away from curative medicine towards lifestyle (Witkamp & van Norren, 2018).

The brain requires nutrients that may be obtained by a regular dietary intake of fish, seafood, or seaweed (commonly eaten as sushi) (Laupu, 2016). Eating fish is thought to be useful for people with diagnosed bipolar disorder, post-traumatic stress disorder or major depression, to help prevent psychosis and/or suicide (Mischoulon & Freeman, 2013). Other foodstuffs, of course, have the iron, zinc, selenium, and iodine required for thyroid hormone production to support energy metabolism

(Laupu, 2016). Moreover, magnesium, manganese, copper, and oxygen are needed for energy metabolic enzymes, transporters, and antioxidant defence (Laupu, 2016) for people who have experienced a mild hypoxic brain injury.

### **The Brain Needs Oxygen**

Nutrition is also obtained by oxygen inhalation. Concussion is an example of a mild hypoxic brain injury involving military personal and sports people (Buczek et al., 2002). Interruption to oxygen supply is thought to produce an energy crisis in the brain where there is increased demand for energy supply to alter energy metabolism (Walton et al., 2020). Mild interruption to oxygen supply is of interest with respect to latent mental disorders. Moreover, major depression, mania, obsessive-compulsive disorder, post-traumatic stress disorder, behavioural and personality changes are reported after a traumatic brain injury (Schwarzbold et al., 2008).

### **Viral Role**

Linkage between immunity, viruses, and mental disorders have been alluded to in the literature. Fever does put pressure on energy metabolism (Khandaker et al., 2012). Moreover, the post-viral effect of COVID-19 (Paul et al., 2021) shows impaired energy metabolism (Walton et al., 2020) to add to health and economic burden.

### **Lifestyle Impacts Health**

In the brain, low thyroid hormone levels change neurotransmission and create epigenetic changes (Losi et al., 2008). Lifestyle factors that influence human health are known to generate reversible epigenetic changes, such as nutrients, stress, illicit substances, physical activity, tobacco smoke, alcohol, and pollutants (Algeria-Torres et al., 2011). Imagine being able to turn a gene off (silenced) and on (expressed) at will. A missing nutrient does this. It silences expression of a particular gene so that when the gene is read it is silent and the sequence is altered, therefore influencing human health. Moreover, cells adapt to their unfamiliar environment by forming an epigenetic cell memory such as personality changes documented following cardiac transplantation (Liestner, 2020). Adaption prepares the offspring for a low energy metabolic environment if the nutrient or hypoxic stressor persists

(Laupu, 2017). Therefore, it is environmental adaptation and not Mendelian genetics in families with mental disorders.

### **Inability to Cope with Stress**

Stress is a lifestyle factor that affects health. At the time that their mental disorder is first diagnosed, individuals are presenting with a history of traumatic events (82.7%), substance use disorder (74.1%) and suicide attempts (14.3%) according to one Australian study (Conus et al., 2007). Other effects of psychological stress include depletion of serum iron and erythropoietin (Wei et al., 2008).

### **Marijuana, Illicit Substances, Heavy Alcohol and Tobacco Products**

Epidemiological studies reveal a comorbidity between the use of illicit substances, alcohol, and mental disorders (Jane-Llopis & Matytsina, 2006). Both pharmaceutical and illicit substances bind to receptor sites in the brain. The use of illicit substances can produce brief psychotic episodes, typically lasting days. Longer term, the use of illicit substances, heavy alcohol consumption and tobacco products worsen symptoms of mental disorders. To recap, antioxidant defence pathway signalling is impaired in mental disorders. Impaired antioxidant defences leave the brain susceptible to oxidative stress from free radicals (Laupu, 2017). Heavy drug and alcohol use is associated with poor eating patterns, poor water intake, and increased oxidative stress. For instance, marijuana smoke increases oxidative stress (80%) to damage lipids, proteins, DNA, and reduce antioxidant enzymes by 81% (Sarafian et al., 1999).

### **Suicide Mechanism**

While cannabis use is thought to have an indirect link to suicidality (Serafini et al., 2012), post-mortem studies reveal suicide is a dissociative behaviour with a neurobiological basis. There comes a point when the individual may not realise, they are going about the work of dying. Abnormalities in number of serotonergic neurons, serotonin transportation, receptor binding and serotonin levels in key brain areas have all been linked with suicide (Menon et al., 2015). Sowa-Kucma et al. (2013) found that concentrations of both magnesium and zinc were reduced in the hippocampal tissue of suicide victims. Lower serum magnesium levels have been associated with

depression and suicide (Ruljancic et al., 2013), so a blood test can guide magnesium supplementation. As proof of concept, magnesium supplements promote rapid recovery from major depression when used in conjunction with pharmaceutical treatments (Eby & Eby, 2006) and in treatment-resistant depression (Eby & Eby, 2010). This finding has been replicated across 12 randomised controlled trials in different populations using differing scales to measure the effect of the magnesium (Botturi et al., 2020).

### **Conclusion**

Mental health stigma is embedded in political and legislative actions, serving as a negative driver of suicidal thoughts. There is much evidence of the influence nutrition has on brain functioning. Low magnesium has been associated with reduced serotonin, depression and suicide in the literature. Magnesium supplementation has clinical support.

Education aiming to inform preventative strategies for community mental well-being should draw attention to food insecurity as the underlying factor that leads to low energy metabolism and the development of severe mental disorders. Once the brain organelle has been damaged, improved dietary intake does not reverse mental disorders (Laupu, 2016). Moreover, energy metabolism requires oxygen. Concussion preceding the latent appearance of mental disorders has been clinically documented (Ledoux et al., 2022). This paper confirms the need to develop neuroprotective nutrients as an avenue for future work germane to concussion.

Food insecurity is a precondition for the development of chronic mental disorders as well as chronic physical disease. A focus on adequate nutrients for mental and physical health should support community well-being. Alternative solutions to mitigate the effects of more frequent climatic events should be planned for and implemented. Australia is unique in having an ancient inland sea that floods. Seedbanks such as those in China and Britain are of little use if the land floods regularly, unless the food is grown above the flood plain. In Queensland, “gather and grow” initiatives in remote communities should be planted above traditional flood plains to be sustainable. Rooftop gardens and hydroponics are underutilised alternatives. The COVID-19 pandemic highlighted

the need for robust food supply networks. Until now the government has supplied short-term solutions in the form of emergency food drops which need to be well co-ordinated. While this action is appreciated, long-term solutions are more likely at a local community level, where improvements to the immediate environmental land and water systems can be sustained. A practical stance is for remote communities to be educated about novel technologies used to grow, harvest, and safely store food. These can be incorporated into community practices as needed. Farming practices that support future food security are needed to combat climatic challenges that will compound food insecurity if not planned for today. Climate change is widely predicted to impact ecosystems and biodiversity this

century. There exists a need to diversify, where practical, the range of plant and seafood species that are eaten, to supply cheaper food options. Soils are the source of nutrients entering the food chain (Laupu, 2016). Alternatives may need to be looked for. In remote areas, public health education should include aquaponic technology for mental well-being. Solar-powered fish farming, seafood, and seaweed production, as well as hydroponic vegetable and herb growing, are suggestions to help remote communities deal with poor soils and unstable climatic conditions. The alternative is the use of supplements, e.g., iodised salt for thyroid hormone production and to maintain brain functioning (Smith et al., 2002), and magnesium supplements to maintain brain tissue (Sen & Gulati, 2010).

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**Author Profile**

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