

# Mental Health and the Role of Magnesium: A Nutritional Psychiatry Perspective

Varsha<sup>1</sup>, Mamatha, H. S.,<sup>2</sup> Usha. Ravindra<sup>3</sup>, and Priya, V. N.<sup>4</sup>

<sup>1</sup>M.Sc. Scholar. Department of Food Science and Nutrition, UAS, GKVK, Bengaluru-560065

<sup>2</sup> Professor, Department of Food Science and Nutrition, UAS, GKVK, Bengaluru-560065

<sup>3</sup>Professor and Head, Department of Food Science and Nutrition, UAS, GKVK, Bengaluru-560065

<sup>4</sup>PhD Scholar. Department of Food Science and Nutrition, UAS, GKVK, Bengaluru-560065

Corresponding Author: [varshavinayak02@gmail.com](mailto:varshavinayak02@gmail.com)

Mental health concerns are surging globally. Stress, anxiety, depression, mood disorders, and sleep disturbances affect millions of people each year. While therapy, medication, and lifestyle changes are commonly recommended and remain crucial approaches, Nutritional psychiatry the study of the relationship between nutrition and mental health is gaining recognition as a complementary method to support emotional well-being.

One nutrient that stands out in this field due to its multifaceted role in brain function is magnesium. Magnesium is a vital mineral involved in nerve transmission, neurotransmitter regulation, hormone balance, and many other biochemical processes. It is often referred to as “nature’s chill pill” because of its calming effects on the nervous system.

The benefits of magnesium in treating depression were first documented in 1921 by Dr. Weston, who administered magnesium sulphate injections (1–2 cc of a 25 % or 50 % solution) to 50 patients. Nearly all of them reported relaxation and sleep up to 4 to 6 hours after treatment. In 1968, Wacker and Parisi highlighted that magnesium deficiency could cause numerous neuromuscular symptoms. Clinical observations suggest that magnesium deficiency often correlates with neurotic and psychotic mental health patterns. Additionally, chronic stress has been shown to reduce both free and total plasma ionized magnesium levels, while also increasing oxidative stress in the body.

Magnesium is recognised in homeopathic medicine, for the treatment of depression magnesium particularly in the form of magnesium chloride has long been used to address a range of emotional and psychological symptoms such as anxiety, depression, irritability, restlessness, hypersensitivity, and emotional instability.

According to global health data, a significant percentage (estimated 50–70 %) of adults in developed nations fail to meet the recommended intake of magnesium.

Unfortunately, magnesium deficiency is common in modern diets, largely due to the consumption of highly processed foods and poor soil quality in agriculture. Despite its significant role in mental health, the impact of magnesium deficiency is often overlooked in clinical practice.

## The Brain–Magnesium Connection

Magnesium is involved in over 300 biochemical reactions in the human body, many of which are essential for brain function. Its influence on mental health is particularly significant due to its roles in neurotransmission, stress regulation, inflammation control and cognitive performance. Here's how magnesium directly supports to mental well-being:

### 1. Neurotransmitter Balance

Magnesium plays a key role in regulating the activity of several important brain chemicals:

- GABA (gamma-aminobutyric acid): This is the brain’s primary inhibitory (calming) neurotransmitter. Magnesium enhances GABA receptor function, promoting relaxation and reducing symptoms of anxiety and restlessness.
- Serotonin: Often referred to as the “feel-good” neurotransmitter, serotonin contributes to emotional stability and happiness. Magnesium is involved in the synthesis and receptor sensitivity of serotonin, thereby influencing mood and emotional regulation.
- Dopamine: This neurotransmitter is responsible for motivation, reward, and focus. Magnesium helps stabilize dopamine levels, especially during periods of psychological stress, reducing the risk of emotional fatigue and depressive symptoms.

### 2. Stress Hormone Regulation

Magnesium plays a regulatory role in the hypothalamic-pituitary-adrenal (HPA) axis, which controls the body’s response to stress. When magnesium levels are low, the HPA axis becomes hyperactive, leading to prolonged release of cortisol (the stress hormone). Chronic elevation of cortisol can impair mood, sleep and cognition, and is linked to anxiety and depression. Adequate magnesium helps maintain a balanced stress response and promotes quicker recovery from stress.

### 3. Anti-inflammatory and Antioxidant Action

Chronic, low-grade inflammation is increasingly recognized as a contributing factor in mental health disorders such as depression, anxiety and neurodegeneration. Magnesium possesses anti-inflammatory properties by

reducing pro-inflammatory cytokines and lowering biomarkers like C-reactive protein (CRP). Additionally, it helps combat oxidative stress by supporting antioxidant systems in the brain, thus protecting neurons from damage.

#### 4. Neuroplasticity and Cognitive Function

Magnesium plays a crucial role in neuroplasticity, the brain's ability to adapt, form new neural connections and reorganize itself in response to experience and learning. It enhances synaptic plasticity and long-term potentiation (LTP), both vital for memory formation, learning, and emotional resilience. Magnesium supplementation may improve cognitive performance and reduce the risk of age-related cognitive decline.

#### Why Magnesium Deficiency Is So Widespread

Despite its critical role in mental and physical health, magnesium deficiency is alarmingly common across the globe. Several lifestyles, dietary and environmental factors contribute to this widespread issue:

Cause	How It Depletes Magnesium
<b>Modern Diets</b>	Highly processed and refined foods are stripped of magnesium during manufacturing. Whole grains, leafy greens, and nuts are natural sources of magnesium are often under consumed.
<b>Soil Depletion</b>	Modern agricultural practices have reduced the magnesium content in soil, resulting in crops that contain significantly less magnesium than they did decades ago.
<b>Chronic Stress</b>	Long-term stress activates the body's stress response, increasing the excretion of magnesium through urine and depleting the body's reserves.
<b>High Caffeine &amp; Alcohol Intake</b>	Both caffeine and alcohol interfere with magnesium absorption and increase its loss through the kidneys.
<b>Certain Medications</b>	Medications such as diuretics, proton-pump inhibitors, antibiotics, and hormonal contraceptives can reduce magnesium absorption or increase its excretion, leading to deficiency over time.

#### How Much Magnesium Do You Need?

Recommended Dietary Allowance (RDA 2024):

Age & Gender	RDA (mg/day)
Adult Women	370 mg
Adult Men	440 mg
Pregnant Women	440 mg

These needs can increase during periods of high stress, illness, pregnancy, or intense physical activity.

#### Natural Food Sources of Magnesium

Incorporating magnesium-rich foods into your daily diet can help maintain healthy levels. Some of the best sources include:

- Pumpkin seeds
- Spinach
- Almonds
- Black beans
- Chickpeas
- Lentils
- Avocados
- Dark chocolate
- Bananas
- Whole Grains: Quinoa (cooked), Oats (rolled, dry), Buckwheat (cooked)

For better absorption combine magnesium and vitamin B6 rich foods such as banana, potato, walnut, eggs, chicken, spinach, lentils etc. B6 enhances magnesium absorption.

Magnesium and Vitamin B6 work together to support brain and body health. Magnesium helps regulate neurotransmitters, reduce stress, improve sleep, and support muscle and nerve function. Vitamin B6 is essential for producing mood-regulating chemicals like serotonin and dopamine. When taken together, B6 enhances magnesium absorption, and the combination has been shown to relieve anxiety, depression, stress, PMS symptoms, and improve sleep quality. This synergy makes them especially valuable for maintaining emotional balance and nervous system function.

#### Should You Consider Magnesium Supplements?

For individuals with absorption issues, restrictive diets or chronic stress, dietary sources may not be enough. In such cases, supplements like magnesium glycinate, citrate, can be helpful. Always consult a healthcare professional before beginning any supplement regimen.

#### Lifestyle Factors That Help to Boost Magnesium

In addition to a balanced diet and supplements, certain lifestyle habits can help improve magnesium absorption and retention. Managing stress through practices like yoga, meditation, and deep breathing is essential, as chronic stress depletes magnesium levels. Limiting caffeine and alcohol intake is also important, as both can increase magnesium excretion. Taking Epsom salt baths (rich in magnesium sulphate) allows magnesium to be absorbed through the skin, offering a relaxing and restorative benefit.

Lastly, engaging in regular moderate exercise not only supports overall health but also enhances magnesium utilization in the body.

**Conclusion**

Mental health is multifactorial, and nutrition is one of the most powerful and controllable aspects of emotional

and cognitive wellness. Magnesium may not be the magic bullet, but it's a foundational nutrient your brain depends on to regulate mood, reduce stress, and enhance clarity. In an overstimulated world full of quick fixes, perhaps what we need is something far more elemental a humble mineral that quietly powers our peace of mind.

**Quote to Remember**

"Mental health isn't just about how we feel it's about how we fuel ourselves. Magnesium is not a miracle, but for some, it may be the missing link."

**Call to Action**

Next time you feel foggy, restless, or wired at night, don't reach for another stimulant. Start with your plate. Check your magnesium. Your brain might just thank you

\*\*\*\*\*