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The Link Between Nutrition and Bipolar Disorder

Yiwen Zhang[1,a,*]

[1]*School of International Collage, Beijing University of Agriculture, Beijing, 100096, China*
a. zhangyiwen-1030@qq.com
**corresponding author*

Abstract: Bipolar disorder (BD) is a complex mental health condition characterized by extreme mood swings, including manic and depressive episodes. This study explores the relationship between nutrition and bipolar disorder with the goal of determining how dietary factors may affect how this condition is managed. Recent studies suggest that dietary consumption of specific vitamins, minerals, and fatty acids, including omega-3, vitamin D, and essential minerals, may be important in reducing the symptoms of BD. These nutrients have been linked to better mood stabilization and may increase the efficacy of pharmaceutical treatments, which could improve treatment outcomes and lower patient suicide rates. A review and analysis of the literature is the methodology used in this paper. This study reveals a link between bipolar disorder and nutrition, suggesting that patients with BD can benefit from using omega-3, vitamin D, and specific minerals to treat their illness and lower their risk of suicide or suicidal thoughts. Additionally, the study finds that certain nutrient combinations can reduce side effects and improve BD treatment when taken with medication. Overall, this study highlights how nutrition can improve the quality of life for those with bipolar disorder.

Keywords: Bipolar disorder (BD), Nutrition, Omega-3 fatty acids, Vitamin D, Minerals

1. Introduction

Bipolar disorder (BD) is a severe mental illness characterized by significant mood swings. Severe cases of BD can also lead to suicidal thoughts and behaviors. Its unpredictable nature makes treating this illness challenging. It is typified by recurrent episodes of mania and depression interspersed with periods of calm.

Despite being the primary treatment for BD, medication only prevents less than half of the disease burden, and medication treatment is not a long-term solution due to its side effects, the risk of developing the disease, and its high cost [1]. Therefore, in order to prevent and treat BD, alternative approaches must be used.

As a result, some dietitians have questioned whether dietary therapy can be more effective than medication therapy for BD and have come to some conclusions. Consistent observational, interventional, and mechanistic evidence now points to diet quality as a potentially modifiable risk factor for mental illness.

The impact of certain well-known nutrients, like vitamin D and omega-3 fatty acids, as well as the role of nutrition in the treatment of BD are particularly examined in this paper. The literature review and analysis are the research techniques employed in this work.

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Research on this topic can help some BD patients make the most out of their treatment regimens, which will make the process safer, more efficient, and less expensive. In addition to being convenient, it can support future research with data and literature.

2. Introduction to Bipolar Disorder

2.1. Symptom

Bipolar disorder is a chronic mental illness that usually first manifests in late adolescence or early adulthood and is typified by recurrent episodes of both mania and depression [2].

These conditions are typified by elevated or decreased mood. Although mood swings are a common occurrence for everyone, those who suffer from mood disorders may feel highly distressed and unable to control their emotions [3].

Depressive episodes linked to mood disorders are more than just melancholy. They are severe, upsetting, and protracted episodes of depression or disinterest and dissatisfaction that signify a substantial departure from one's typical functioning. These episodes significantly impair the person's ability to function well in interpersonal, social, or professional settings [4].

Significant emotional swings are just one of the symptoms of BD. Other symptoms include extreme fatigue, memory loss, recurrent suicidal thoughts during depressive episodes, severe weight fluctuations (rapid weight gain or loss), and difficulty thinking or focusing.

2.2. Prevalence and Demographics

Bipolar I disorder is characterized by the occurrence of manic episodes with symptoms, and its lifetime prevalence is estimated to be between 0.6% and 1.0% worldwide. Bipolar II disorder, which is characterized by major depressive and hypomanic episodes, is thought to affect 0.4 to 1.1% of people worldwide during their lifetime [5].

The majority of manic symptoms manifest in children and teenagers, and the average age at which BD first manifests is around 20. The disease itself has a high risk of suicide due to its high misdiagnosis rate and extreme difficulty in curing, which results in a significant economic loss for the nation and society.

2.3. Current Treatments

2.3.1. Drug Treatment

Nowadays, the most popular method of treating BD is with medication, such as lithium [6]. However, most drug treatments have side effects, and after long-term drug use, some patients will become resistant. Relapses frequently occur following the initial palliative medication treatment, and occasionally the drug itself is to blame. For instance, antidepressants may cause manic or hypomanic episodes.

Additionally, every patient has a unique situation, so doctors cannot prescribe the same medication to different BD patients. If patients want to find the best medication for their condition, they can only use the trial medication. However, this treatment approach carries some risks that could worsen the condition and have more serious repercussions.

2.3.2. Diet Treatment

According to a recent systematic review of research on the relationship between diet and common mental illnesses, the risk of depression is inversely correlated with healthy eating habits [7].

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This diet is distinguished by a low consumption of processed foods and a high consumption of fruits, vegetables, whole grains, nuts, seeds, and seafood.

Inflammation, oxidative stress, and neuroplasticity are among the biological processes that are being studied to investigate the connection between diet and mental health. The gut microbiota is a crucial mediator of these processes [8].

3. The Link between Nutrition and Bipolar Disorder

3.1. Role of Specific Nutrients in Mood Regulation

Nutrients are crucial for regulating mood as they affect brain function, the production of neurotransmitters, and overall mental well-being.

Research indicates that omega-3 fatty acids might help stabilize mood and could benefit those with bipolar disorder. Additionally, various vitamins and minerals are crucial for maintaining brain health. Specifically, B vitamins—particularly B12 and folate—are vital for managing energy levels and mood. Vitamin D may also contribute to stabilizing mood, while magnesium has been linked to mood regulation [9].

3.2. Key Nutrients for Managing Bipolar Disorder

3.2.1. Omega-3 Fatty Acids

Omega-3 fatty acids are a category of polyunsaturated fats that have been researched for their possible advantages in treating various mental health disorders, including bipolar disorder (BD) [10]. These vital fats must be obtained through diet because the body is unable to produce them on its own. Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are the two main omega-3 fatty acids that are important for mental health [11]. The main sources of omega-3 fatty acids are oily fish (such as salmon, tuna, and sardines), flaxseeds, chia seeds, walnuts, and dietary supplements made from algae.

Epidemiological studies have shown that the levels of DHA in the plasma of patients with BD are significantly lower than the normal range. This indicates that a deficiency in omega-3 may likely be a risk factor for BD. In other words, supplementing with such nutrients may effectively treat and alleviate some symptoms of BD. Additionally, related research suggests that there is a common presence of suicidal thoughts among individuals with bipolar disorder and depression, which is associated with low levels of omega-3 in the brain. Furthermore, randomized controlled trials have found that supplementing with several grams of EPA and DHA can improve suicidal thoughts and behaviors during depressive episodes. Omega-3 fatty acids from fish oil have been shown to improve cognitive functions like language, concentration, motor skills, and symptoms of schizophrenia. They have also been shown to decrease aggressive and impulsive behaviors [11].

Meanwhile, studies have shown that omega-3 supplements can complement drug therapy and work together with medication as an adjunct treatment, which can enhance the overall therapeutic effect. According to pertinent research, a considerable percentage of patients with bipolar disorder who exhibit a persistent sign of irritability found that adding omega-3 fatty acids to their current treatment helped with the irritability component [12].

While numerous recent meta-analyses indicate a definitive advantage of omega-3 fatty acids in treating depression, there is notable variability among clinical trials [11]. Several potential factors contributing to these inconsistent findings include genetic differences, the sources of omega-3 fatty acids from diet, and the varying doses of EPA and DHA used in different formulations, with EPA seemingly playing a more significant role. A comprehensive clinical trial that measures omega-3 fatty

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acid levels in red blood cells and tests various doses of EPA and DHA against a placebo could provide valuable insights.

3.2.2. Vitamin D

BD is typified by significant mood swings and dysregulation of mood regulation. Since serotonin has been shown to be essential for controlling and carrying out behavioral processes, it follows that aberrant serotonin signaling may be a common underlying cause of BD. This has been demonstrated. Additionally, it has been demonstrated that vitamin D is an effective nutrient for controlling serotonin.

Research indicates that the degree of impairments in social skills, executive function, and sensory processing can be influenced by the duration and developmental stage of vitamin D deficiency. This suggests that people with bipolar disorder (BD) may experience worsening symptoms if they are deficient in vitamin D. Furthermore, low vitamin D levels can cause structural brain deficits, decision-making difficulties, and social cognition to deteriorate more quickly, similar to those observed in a number of neurological disorders. Low vitamin D levels during pregnancy and early development are strongly linked to an increased risk of psychosis; in some cases, this risk can increase by up to six times. Additionally, psychosis is more common in kids and teenagers with lower vitamin D levels. According to a meta-analysis, the prevalence of schizophrenia increases dramatically with latitude; however, there is a correlation between a lower risk of schizophrenia and characteristics like lighter skin pigmentation, higher vitamin D levels, and greater fish consumption. These results suggest that vitamin D may play a crucial role in the formation of brain structures and may reduce the risk of schizophrenia and psychosis.

While vitamin D supplementation later in life may improve brain function and alleviate disorders, vitamin D administration during the early stages of brain development may help reduce the risk of neuropsychiatric disorders. The activation of TPH2 by vitamin D may contribute to this effect by increasing serotonin production [13]. Vitamin D levels are often low in people with bipolar disorder. As a result, vitamin D supplements may be helpful for many people who have been diagnosed with or are at risk for these conditions.

3.2.3. Minerals

A. Magnesium. Whole grains, legumes, nuts, milk, meat, fish, fruits, vegetables, and fortified foods like cereals for breakfast are all good sources of magnesium.

For BD patients, a declining magnesium level may worsen symptoms like weakness and anxiety [14].

According to research, magnesium may help people with bipolar disorder stabilize their mood. It is believed to affect neurotransmitter systems such as dopamine and serotonin, which are crucial for mood regulation. Magnesium is also thought to have neuroprotective properties, which may reduce the risk of neurodegeneration and lessen the mood swings linked to bipolar disorder. Additionally, it might lessen the anxiety symptoms that bipolar disorder frequently causes, especially during manic or depressive episodes. Because bipolar disorder patients often have trouble sleeping, maintaining adequate magnesium levels can improve sleep quality, which in turn can support mood stability. Additionally, research indicates that magnesium may help lower oxidative stress and inflammation, two factors associated with mood disorders, including bipolar disorder.

B. Zinc. According to a relative study, it evaluated serum hepatocyte growth factor (HGF) levels. The potential role of zinc in treating bipolar disorder has been researched [15]. Zinc may have a role in mood regulation, according to studies, and it has antioxidant qualities that can lower oxidative stress, which is often linked to mood disorders. Supplementing with zinc may increase the

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effectiveness of mood stabilizers because bipolar disorder patients frequently have lower zinc levels, according to some research.

Furthermore, it is thought that zinc affects neurotransmitter systems that are essential for mood stability, including dopamine and serotonin. The symptoms of depression and anxiety that bipolar disorder can occasionally cause may also be lessened by it. By ensuring adequate zinc intake through diet or supplements, mood swings may be reduced and general mental health may be enhanced.

However, even though taking supplements of zinc may have benefits, it should be done carefully and ideally in consultation with a healthcare provider because consuming too much zinc can have adverse effects and throw off the balance of other vital minerals.

4. Conclusion

This study explores the intricate relationship between nutrition and bipolar disorder (BD), highlighting the distinctions between medication therapy and dietary interventions. It delves into the impact of various nutrients on the management of BD symptoms, such as manic and depressive episodes. Previous research suggests a strong correlation between diet and the effectiveness of BD treatments. Essential nutrients, particularly omega-3 fatty acids, vitamin D, and several key minerals, have been shown to play a role in alleviating the symptoms associated with bipolar disorder. Incorporating these nutrients into the treatment plan can enhance the efficacy of conventional medications, potentially leading to better outcomes for patients. This combination therapy not only improves symptom management but also has the potential to reduce the overall suicide rate among individuals suffering from BD.

However, it is important to note that this paper has certain limitations. Specifically, it did not investigate the long-term effects of various nutrients on BD treatment through extensive follow-up research. This oversight suggests a need for further studies that can examine the sustainability of dietary interventions over time. Future research on bipolar disorder treatment should focus not only on managing symptoms but also on preventing the onset of the disorder and reducing its associated side effects, thereby enhancing the overall well-being of affected individuals.

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