

The relationship between psychiatric disorders and nutrition

Psikiyatrik bozukluklar ve beslenme arasındaki ilişki

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ABSTRACT

Health is a state of being well not only physically, but also psychologically and socially. Psychological state and physical health are interconnected factors. Deterioration of any one of these two factors can also adversely affect the other factor. Psychological problems set the stage for psychiatric diseases. Psychiatric Diseases are an important public health problem that is becoming more prominent with each passing day. Depression, bipolar disorder (manic depression), schizophrenia and dementia are common mental disorders. Nutritional therapy has emerged as a new approach in the treatment of psychiatric diseases in addition to pharmacology (antidepressants) and psychotherapy. The relationships between carbohydrates, proteins, fats, vitamins and minerals and psychiatric disorders were examined. It is believed that nutritional deficiencies, which occur when individuals do not receive essential nutrients in balanced and adequate amounts, may be related to an increase in mental disorders. The consumption of fast-food products, which has become quite popular today, can have negative effects on people's moods. These products cause an increase in psychological problems such as depression and anxiety with their high sugar or trans fat content. It has been understood that adequate intake of nutrients (carbohydrates, proteins, unsaturated fatty acids, vitamins and minerals) required for the human body has a positive effect on mental disorders. As a result, the medical nutritional treatment approach paints a promising picture for the treatment of psychiatric disorders.

ÖZ

Sağlık, sadece bedensel olarak değil, psikolojik ve sosyal açıdan iyi olma halidir. Psikolojik durum ve beden sağlığı birbirine bağlı 2 etkidir. Bu 2 etkenden bir tanesinde oluşacak bozulma diğer etkeni de olumsuz etkileyebilir. Psikolojik sorunlar psikiyatri hastalıklarına zemin hazırlamaktadır. Psikiyatrik Hastalıklar, dünyada her geçen gün artan önemli bir halk sağlığı sorunudur. Depresyon, bipolar bozukluk (manik depresyon), şizofreni ve demans yaygın olarak görülen ruhsal rahatsızlıklardır. Psikiyatrik rahatsızlıkların tedavisinde farmakoterapi (antidepresan) ve psikoterapi tedavilerine ek olarak beslenme tedavisi yeni bir yaklaşım olarak karşımıza çıkmaktadır. Karbonhidratlar, proteinler, yağlar, vitaminler ve mineraller ile psikiyatrik bozukluklar arasındaki ilişkiler incelenmiştir. Bireyler elzem olan besin öğelerini yeterli ve dengeli almadıkları takdirde oluşan besinsel eksikliklerin ruhsal bozukluklarda artış ile ilgili olabileceği düşünülmektedir. Günümüzde oldukça popüler hale gelen fast food ürünlerinin tüketimi, insanların ruh halinde olumsuz etkilere yol açabilmektedir. Bu ürünler yüksek şeker veya trans yağ içerikleri ile depresyon ve anksiyete gibi psikolojik problemlerde artışa neden olur. İnsan vücudu için gerekli besin öğelerinin (karbonhidrat, protein, doymamış yağ asitleri, vitaminler ve mineraller) yeterli düzeyde alınmasının ruhsal bozukluklara olumlu etkide bulunduğu anlaşılmıştır. Sonuç olarak, psikiyatrik rahatsızlıkların tedavisinde tıbbi beslenme tedavisi yaklaşımı gelecek için umut vericidir.

Key Words:
Psychiatric Disorders, Nutrition,
Diet, Fast food

Anahtar Kelimeler:
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INTRODUCTION

The World Health Organization (WHO) has defined health as a state of complete well-being physically, spiritually and socially. Physical and spiritual well-being are two complementary elements. A deterioration in one of these elements may cause the other element to deteriorate. Mental and behavioral problems comprise the basis of psychiatric diseases (1-3).

Psychiatric diseases are among the leading diseases in the world and constitute 18.9% of these diseases (4,5). It is stated that more than 450 million individuals worldwide are being affected by psychiatric problems. Moreover, it has been reported that many people have experiences of mental and behavioral problems in their past (1). Reports on the subject indicate that 4.4% of the world population suffer from depressive disorder and 3.6% from anxiety

disorder. This situation occurs at a higher rate in western countries such as the United States of America (6).

In Turkey, studies related psychiatric diseases were commenced initially after the 1960's and studies that included the entire country in their scope were started after 1990. A study on disease burden in Turkey has determined that psychiatric diseases rank second among the causes of disease burden with 19% (1).

Pharmacotherapy (antidepressants) and psychotherapy (cognitive-behavioral therapy) approaches are effective on less than half of the psychiatric disease burden, and this situation highlights that there is a need for additional strategies (4,7).

Medical nutrition therapy has started to gain importance, both nationally and globally, in the prevention and treatment of psychiatric diseases. Nutrients related to psychiatric diseases, their interactions and the nutritional problems that affect these patients are subjects that are being focused on within the scope of medical nutrition therapy today (1).

It is observed that fast-food products such as hamburgers, pizzas, French fries, sausages, and sugary sodas are being consumed very often in the western style diet that is dominant today. There are studies which demonstrate that fast-food based diets compound depression and other psychiatric disorders. Fast-foods are risk factors for mental illnesses due to processed/ refined ingredients and trans fats they contain (8,9). Consumption of processed high-fat and high-sugar foods has been demonstrated to cause an increase in common mental disorders and depression (10,11).

Studies examining the relationship between diet and common psychiatric diseases have revealed that healthy eating patterns positively affect psychiatric disorders (10,12).

PSYCHIATRIC DISORDERS

Depression

Depression is a common and economically burdensome disorder that is associated with severe and persistent problems such as apathy, fatigue, feelings of guilt or low self-esteem, and has negative associations such as insomnia and loss of concentration (1). This disease causes symptoms such as a low mood, restlessness, changes in body weight and appetite, lack of energy and decreased ability to think (13). These symptoms may be accompanied by other symptoms such as insomnia, decreased sexual drive, and problems in the function of the gastrointestinal system (14). Depression may also be related to other problems such as personality disorders

(schizophrenia, bipolar disorder) and addiction (substance, alcohol, eating) (15).

Bipolar Disorder

Bipolar Disorder (Manic Depressive Disorder) is a psychiatric disorder which presents with elevated or low mood changes accompanied by severe depression and euphoric behavior. This disorder is classified among depressive disorders and psychotic disorders (15,16).

The duration and incidence of this disease varies from individual to individual. While it sometimes manifests in long intervals, it sometimes manifests with short intervals. Bipolar disorders are less common than depressive disorders (15).

Schizophrenia

Schizophrenia is a mental disease that presents with paranoia, hallucinations and significant problems in cognitive activities and behaviors, and it often manifests during adolescence (1,16, 17). It has been determined that individuals with this disease meet all symptoms of bipolar disorder or depression (16). Additionally, schizophrenia may occur as a result of a mixture of factors such as genetic, biochemical, environmental factors and nutrition (18).

Dementia

Dementia is a mental disorder characterized by a decrease in cognitive and functional abilities compared to previous performance levels and the problems related to this loss of ability. It may manifest due to brain damage or due to long-term physiological illnesses. This condition can be chronic and progressive. One of the most common causes of dementia is the Alzheimer's disease (1).

PSYCHIATRIC DISORDERS AND THE ROLE OF NUTRIENTS

Carbohydrates

The energy needed by the brain is met only by the use of glucose. The most important matter here is the amount and type of consumed carbohydrates (19). Sugars, starches and desserts are classified as unrecommended and unhealthy types of carbohydrates, while foods with complex carbohydrates such as grains, legumes, vegetables and fruits are considered to be healthy and beneficial (9,20).

Carbohydrates have significant effects on an individual's mood. Consumption of high levels of simple carbohydrates raises the blood sugar and

causes an increase in the serotonin levels in the brain, which in turn causes sleepiness (9,20). High levels sugar consumption can also lead to lack of attention and hyperactivity disorders in children. Additionally, another negative aspect of nutritional habits that are based on simple carbohydrates is the inadequate intake of nutrients that are essential for the protection of brain functions and mental health (21).

Proteins

The amino acids that constitute proteins have an important place in the formation of neurotransmitters, such as dopamine and serotonin, in the brain. Mental damage can occur if serotonin cannot be synthesized at sufficient levels. Including protein-rich foods in the daily diet is believed to be necessary for good brain function and mental health (20,22).

Fatty Acids (Omega-3)

Polyunsaturated omega 3 fatty acids are a priority for the development of brain and the nervous system. Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are the essential omega-3 fatty acids. These fatty acids make important contributions to the function of the brain and the nervous system (23,24). It has been stated that adequate EPA intake is important as an adjuvant treatment for depression and mental health in general (25).

The fatty acids (DHA) found in fish oil make up a large portion of the fats that exist in the brain. For this reason, it could be said that fish oil has positive effects. It has been reported that these positive effects also include benefits against depression and schizophrenia in addition to general benefits to the brain. Additionally, the other type of fish oil, EPA, has been determined to be beneficial in the treatment of depression and bipolar disorder (26). In studies conducted to examine the relationship between fatty acids and psychological problems, it was discovered that there was a positive relationship between insufficient intake of certain fatty acids, omega-3 in particular, and negative moods and depression. It was determined that when these fatty acids were taken in sufficient levels, the levels of depression and anxiety would decrease (24,27). It has been suggested that omega-3 fatty acids may reduce the risk of cognitive decline at advanced ages (28).

VITAMINS

Vitamin B1

Vitamin B1 (Thiamine) acts as a co-enzyme in the glucose metabolism. It is involved in the biosynthesis of certain neurotransmitters, including acetylcholine,

glutamate and serotonin, and it plays a role nerve conduction. It has been determined that chronic oxidative stress increases with thiamine deficiency (29,30). Impairment in thiamine-dependent enzymatic activities has been found in patients with Alzheimer's disease (AD) and other neurodegenerative diseases (30).

Behavioral problems and learning disorders in children were corrected with high doses of thiamine (31). In another study, it has been demonstrated that individuals with Alzheimer's have lower levels of serum thiamine compared to other types of dementia (32).

Vitamins B2-B3-B6

No relationship was determined between vitamin B2 (riboflavin) and psychiatric disorders. Vitamin B3 (Niacin) is important for the synthesis of dopamine, and dementia manifests in its deficiency. Besides dementia, its deficiency has been observed to cause symptoms such as anxiety, low energy, and impaired concentration. Vitamin B6 (pyridoxine) have also been associated with mental problems due to its role in homocysteine metabolism (29,33,34).

Vitamin B12 and Folic Acid

These two vitamins are the types of vitamin that play an active role in the functioning of the central nervous system mechanism. They are essential vitamins, especially for the synthesis of serotonin and other neurotransmitters. Therefore, Folic Acid and B12 deficiency have been associated with neuropsychiatric diseases (29).

Folic acid deficiency is associated with retardation in cognitive functions, depression, and Alzheimer's disease, and has been identified as a risk factor for schizophrenia. Negative symptoms of schizophrenia can be eliminated with folic acid supplementation. Response to this treatment is affected by genetic conditions that affect the absorption of the vitamin in question (35). It has been demonstrated in a certain study that high levels of folic acid is associated with a 50% reduction in the risk of developing Alzheimer's disease (36).

Mental problems such as decreased consciousness, increase in negative behaviors, depression and dementia may occur due to vitamin B12 deficiency. In a study involving 168 elderly people over the age of 70, it was found that B12 and folic acid supplementation slowed down cognitive performance decline and brain atrophy by 53.3% (37). In a study conducted among people who were being treated for depression, it was determined that people with higher serum B12 levels had a higher tendency to use antidepressants (38).

Vitamin E and Vitamin C

Vitamin C is a powerful antioxidant and provides a protective effect against oxidative stress. Vitamin E is another source of antioxidants which provide protection against lipid peroxidation. These two vitamins have been associated with major depression. Serum levels of vitamin E were found to be low in people with depression. In addition to decreasing the prevalence of symptoms in these patients, Vitamin C intake also decreases the depressive scores of healthy individuals (39).

Vitamin D

Vitamin D is considered to be an essential nutrient for brain health and clinical studies have demonstrated that its deficiency may cause cognitive and mood disorders and increase the risk of depression (40).

Vitamin D has a helpful effect on improving neurocognitive decline and maintaining the related functions. In one study, it has been demonstrated that taking vitamin D supplements alongside a drug used in treating Alzheimer's disease provided a more positive effect compared to taking either the drug or the supplements on their own (41).

MINERALS

Iron (Fe)

Iron is a mineral that has beneficial effects on mental activities (strong memory, learning capacity) and motor skills. Its deficiency causes insufficiencies in brain myelination. Psychological and emotional problems emerge as a result of this insufficiency (42). Iron deficiency is observed to be linked with important psychiatric conditions such as increases in low mood, anemia, mood problems, lack of attention and hyperactivity disorder (43).

Selenium (Se)

Selenium is a mineral that has positive and regulating effects on mood. Studies have shown that insufficient selenium intake can cause depression (44,45). In one study, it was discovered that individuals who are consuming diets with low selenium content have high probability of depression. Similarly, it has also been understood that individuals who consume diets with high selenium content have decreased symptoms of depression, and their moods changed positively (44).

Zinc (Zn)

Zinc is a mineral with antioxidant characteristics, and it possesses functions such as regulating the activities

of enzymatic proteins, regulating the dopamine production in the brain, and regulating the receptors with antidepressant effects (46,47).

A study of older individuals residing in Australia has determined that people who consumed high levels of zinc were at a 30 to 50% lower risk of developing depression (47). It has been found that children with attention or hyperactivity disorders had lower zinc levels in comparison to children without such disorders (48). Another study established that students who were given 20 mg/day zinc supplements improved memory function levels and increased school performance (49).

DISCUSSION

Studies have presented a variety of evidences suggesting a link between quality of nutrition and commonly encountered psychiatric diseases.

It has been indicated that consumption of foods with high fat content, such as trans fatty acids, fast-foods or commercial bakery products could present an increased risk of depression (50,51). Consumption of fast-foods causes deficiencies in nutrients such as omega-3, polyunsaturated fatty acids (PUFAs) and vitamin D, a situation which in turn paves the way for the development of major depressive disorder (52). Observational studies have demonstrated a positive relationship between the consumption of foods with high glycemic index and increased depression (53).

As a result of a meta-analysis which scrutinized 115 studies, it was reported that patients with depression had lower antioxidant capacities (54). Several studies have established a correlation between dietary habits with low folate and vitamin B (B12 and B6) levels and depression (55,56).

A prospective cohort study conducted in the United Kingdom has reported that the Western-style nutritional model produces negative effects in the context of depression (57). Some studies have indicated that the Western diet increases depression (57-59). As a result of the analysis of 13 observational studies, Lai et al. have determined that there was a relationship between healthy diet and lower levels of depression (10).

Elmslie et al. (60) examined the nutritional consumption of 89 bipolar patients against a control group consisting of 445 people, and discovered that the bipolar disorder patients often consumed sugary beverages and sweets rich in carbohydrates. These study demonstrate that bipolar patients tend to diet on unhealthy and low quality foods. Therefore, it could be believed that there may be a relationship between bipolar disorder and nutrition.

In schizophrenia patients, vitamins C and E provide positive effects against oxidative stress (61). In an 8-week study with 40 schizophrenia patients, the patient group was given vitamin C. As a result of the study, it was found that providing vitamin C supplements alongside antipsychotic therapy had a positive effect (62). Another study has demonstrated that there was a positive correlation between nutrition rich in vitamins E and C and the decline in the risk of Dementia (63).

In a cohort study conducted with 9114 individuals, a correlation was established between providing vitamin D supplements in the first years of life and reduced risk of developing schizophrenia at the age of 31(64). In another study on vitamin D performed with female participants, it was determined that risk of developing psychotic symptoms were 37% lower in the group with the highest vitamin D intake (65). In addition, the presence of low levels of vitamin D was associated with an increased risk of cognitive decline (63).

A 12-week supplement regimen of 700 mg EPA, 480 mg DHA and 220 mg of other types of Omega-3 acids was given in another study conducted with young individuals. In addition to these supplements, a 7.6 mg of vitamin E supplement was also provided. As a result of the study, the risk of developing psychotic disorders in individuals taking these supplements was decreased (66). It has been suggested that PUFA supplementation may be beneficial to schizophrenia patients who have been demonstrated to have reduced fatty acids levels in their brains (67). Diet rich in vitamins, omega-3 fatty acids and antioxidants has been found to improve cognitive performance in patients diagnosed with dementia (68)

CONCLUSION

As a result of these studies, it has been determined that nutrition plays a significant protective role against certain psychiatric diseases (such as depression, bipolar disorder, schizophrenia, dementia). The diets of individuals with psychiatric disorders generally consist of high glycemic index and high-energy foods. Deficiencies in vitamins and minerals develop as a result of this type of nutritional habits. It has been found that when adequate and balanced nutrition is provided to individuals with psychiatric disorders, this situation significantly contributes to their recovery. These results have indicated that nutrition is very important in the treatment of psychiatric diseases.

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