

Role of nutrition in depression

Abstract

One of the major causes of global disability is depression. Many patients suffering from depression are not able to show a positive response to treatments used to cure depression. Initial studies show that parallel nutrition therapy has the ability to ameliorate treatment results in patients suffering from depression. In this article we review the studies for the effectiveness and mechanism of the following nutrients: magnesium, vitamin D, Folate, zinc, omega 3 and vitamin B6. The existing knowledge and data proves that these nutrients may aid in mood management by managing the neurotransmitters, by carrying out oxidation-reduction or by regulating the structure of neurons. In spite of the fact that the preliminary research is favorable, larger placebo controlled studies are required to substantiate, corroborate and verify the effectiveness of the research.

Keywords: human health, seafood, walnut oil, canola oil, soybean oil, chia seeds, hemp seeds, drugs, distress, alcohol drinking, insulin resistance, GI tract disease, adrenal diseases

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Introduction

Seventy-five percent of psychiatric disorders in a person's lifetime will appear in adolescence.¹ According to a report by the National Comorbidity Survey Replication, the percentage of adolescents from ages 13-18 who had gone through and experienced mental health issues that were of value clinically was above 22%.² An inverse relationship between mental issues that are common such as anxiety and depression, and the quality of diet has been discovered by many studies that have been published in the past few months.³⁻⁵ Two prospective studies further showed that the chances of depression in adults are affected by the nature and type of diet.⁶ Lower intake of reduced fat or low fat dairy related products, vegetables and fruits, fish and whole grains in a person is associated with a greater severity of depression. A positive relationship between a higher total energy intake from sugars and saturated fats and severity of depression has been found. Omega 3 polyunsaturated fatty acids in diet have been linked to positively contributing to human health. Their part in preventing and treating disorders like depression has been highlighted in several experimental and epidemiological studies. Several human and animal studies provide evidence to support that abnormal neurological function and abnormal inflammatory status were consequences of a deficiency of omega 3.⁶ Vital dietary sources of PUFAs include seafood, walnut oil, canola oil, soybean oil, chia seeds, hemp seeds and flaxseed.⁷ Magnesium has a vital role in human body. Its presence is a must for various biochemical processes to prevent any abnormality and promote smooth functioning of the bodily systems related to the heart, GI tract, endocrine and osteoarticular systems. It also has a role in some pathways that are associated to the depression development. Deficiency of magnesium shows symptoms such as depression, anger, tiredness and perplexity. A study was performed where rodents were made to consume a magnesium deficient diet, the result was depressive state of rodents. This condition of the rodents was later corrected by providing the rodents with drugs related to depression alleviation.

Magnesium deficiency may occur due to some reasons that include use of some drugs, distress, alcohol drinking, insulin resistance, GI tract disease, adrenal diseases and inadequate nutrition and poor dietary habits.⁸ Evidence from studies show a strong link between the deficiency of vitamin D and developing depression. Studies also show improvements in the patients suffering from depression, who were provided with supplementation of vitamin D.⁹ Another risk factor for depression that has been suggested by several studies is Folate insufficiency or deficiency. Studies were done on cases and control subjects which concluded that more than one third people diagnosed with depression had reduced levels of folate in serum.¹⁰ Recent studies performed indicated that zinc supplementation increased the effectiveness of pharmacotherapy that was being used on patients suffering from severe depression. Zinc was also found to be of help in increasing the effectiveness of antidepressant medications for the use of patients that were resistant to the treatment.¹¹ There are many different enzymes that effect different neurotransmitters present in the brain for example serotonin. Vitamin pyridoxine is a cofactor for these enzymes. A study showed that premenstrual symptoms can be managed by B6 intake of up to 100 milligrams each day.¹²

Nutrients that reduce depression

Zinc in depression

To carry out various functions in living organism zinc is an important micro element.¹³ They are needed for the functioning of more than 300 enzymes. Protein synthesis, transcription, DNA replication, immunological and neuronal system all require zinc for their functioning. Deficiency of zinc can cause various complications such as delayed growth, dysfunctionality of immune system, decreased formation of new tissues, and sensory problems. Neuropsychiatric disorders are also linked with deficiency of zinc that can cause change in behavior, perception, understanding, learning and can also result in depression.¹⁴ The second most major cause of human illness and death

will be depression as estimated by World Health Organization.^{15,16} Around 350 million people around the world suffer from depressive disorder.¹⁷ Each year depression causes 1 million death by suicide.¹⁸ According to new assumptions, the identification of depression can be done by reduced growth and development of nervous system, especially the neurons in the brain which may be associated to inflammatory action.¹⁹

Zinc deficiency and depression Evidence suggested a link between zinc deficiency and depression. Symptoms of depression were observed with zinc serum level of $1.8\mu\text{M}$ or below as compared to healthy control individuals.¹⁸ The dietary zinc intake regulate the zinc homeostasis in brain and the zinc deficiency directly effects hippocampus. Function such as learning, neurogenesis, memory is performed by region of brain hippocampus, so deficiency of zinc affect these functions. Hippocampal neurogenesis and synaptogenesis in adult are regulated by zinc. Recent data suggested that in rodents in DG there is low level of hippocampal vesicular zinc due to zinc deficient diet that results in immature neurons and reduced amount of progenitor cells. Amount of progenitor cells was restored by taking normal zinc containing diet. Neurogenesis can be regulated by zinc by activation of mechanism of p53-dependent molecular that commands cell multiplication and survival of neuronal precursor. The effect of zinc deficiency on learning behavior and memory was also studied. Irreparable effect on learning and memory was produced during the early development as decreased amount of dietary zinc. A study was performed on a young adult rat which was given zinc deficient diet and showed reduced learning behavior but when controlled diet was given the outcomes were recovered. This data suggest that for memory ability and learning appropriate amount of zinc is needed for mature brain (Figure 1).¹⁹

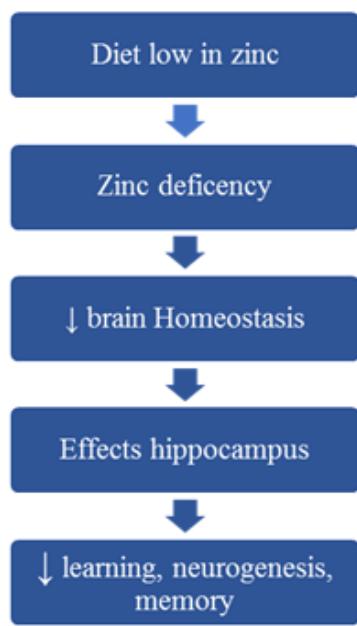


Figure 1 Shows how low zinc diet causes decreased learning, neurogenesis, memory.

For the treatment of depression zinc is one of the important element,²⁰ and its level in the blood can be a cause of depression.²¹ In depressed patient the amount of serum zinc is low and with the use of antidepressant the level increases.²² In particular, there is a correspondence in the level of serum zinc and the seriousness of

depression,²³ and the effect of antidepressants is enhanced by taking zinc supplements in patients that were unaffected by drug therapy.²⁴ Enhanced mood have been shown due to an increase in BDNF levels in obese and overweight subjects who were only on zinc supplementation.²⁵

It has been shown that the activation of metabotropic GPR39 involves zinc.²⁶ A notable decrease in GPR39 and BDNF protein expression in frontal cortex of mice along with symptoms of depression, when for six weeks zinc deficient diet was given.²⁷ In the hippocampus the impression of BDNF and CREB also reduced when for six weeks a zinc deficient diet was given.²⁸ There was reduction in GPR39 expression in the frontal cortex and hippocampus of rats and mice due to zinc deficiency and also in the suicide victim's cerebral cortex and hippocampus. In the hippocampus there is reduction in p-CREB and BDNF levels when a zinc deficient diet for four or six weeks is given.²⁹

Role of vitamin d in depression

Vitamin D, its sources and metabolism Vitamin D belongs from the category of steroid hormones. Diet and supplements provide vitamin D₂ and D₃ which are the forms of vitamin D, or the ultraviolet B radiations converts 7-dehydrocholesterol in the skin to D₃ cholecalciferol, and then to 25 hydroxyvitamin D [25(OH) D], which is formed in the liver and is the prime flowing vitamin D. 1,25-dihydroxyvitamin D which is formed by 25(OH) D is metabolically functional form of vitamin D. Round about 30 kinds of cell all around the body as well as the neurons contain 1,25-(OH) D₃ attached with vitamin D receptors. Even though metabolism of bone and calcium homeostasis requires vitamin D but its wide result is seen on health as well as on mood and depression.³⁰

It is seen that very little amount of vitamin D is stored with help of diet. Cholecalciferol (D₃) that is from the animal source and ergocalciferol (D₂) that is from the plant source both are the only dietary sources to provide vitamin D. Fish such as salmon, tuna, sardine, mackerel, egg yolk, cod liver oil, shiitake mushroom are some of the sources to get vitamin D from diet. It is difficult to maintain adequate vitamin D levels on daily basis, beside an oily fish is eaten by a person more often. Therefore, consumption of vitamin D supplements in form of D₂ (ergocalciferol) and D₃ (cholecalciferol) (three times more effective than D₂) along with adequate exposure to sunlight are required to meet the need for vitamin D. According to the Institute of Medicine of the National Academies for children and adults up to 50 years of age 200 IU, for adults 51-70 years of age 400 IU and adults of 71 years and older 600 IU of the adequate daily consumption of vitamin D (in form of D₃) is required.³¹ According to the new details from the same institute in 2010 for children and adults of less than 70 years of age 600 IU of vitamin D is required and for adults of more than 70 years of age 800 IU of vitamin D is required per day.³² About 800-1000 IU/day of vitamin D is required for children and adults who are not properly exposed to sun. To fulfill the deficiencies and to maintain appropriate levels of vitamin D, 1000 IU/day of 25(OH)D is required.³¹

Vitamin D, Brain and Depression There is great biological probability that mood health is linked with vitamin D. Human brain has vitamin D distributed all around it as well as the limbic structure that include hippocampus along with the prefrontal cortex region that are involved in control of mood and affect. In animal models the brain health has been affected due to the deficiency of vitamin D and in rodents it has shown changes in the behavior and functioning of brain. Studies on animal has shown that vitamin D has effect on behavior.

Link between depression and vitamin D was also seen when studies were done on human.³⁰

Hoogendoijk et al., did cohort study that involved a population of age 65 years and older in Netherland. CES-D (Centre for Epidemiologic Studies Depression) was used to measure depression status and its intensity. Research showed that 169 people with minor depression had 14 % less 25(OH) D level and 26 people with major depression had 14 % less 25(OH) D level, whereas low levels of 25(OH) D was associated with increased depression. The last link remained important after having control over the number of medical condition, smoking status, BMI age and gender.³¹

Magnesium and depression

Essential minerals are required for proper functioning of an individual. Mg being one of them is required for functioning of nervous system, along with that it emulates over hundreds of enzymatic reactions. Dietary insufficiency of mg can lead human body towards non-communicable diseases. Magnesium is natural Ca antagonist and voltage dependent blocker of N methyl D aspartate channel, which serves as neuro-protective role. If there is insufficient Mg and increased level of Calcium and glutamate at synaptic level, then this condition may promote depression and other mental disorder.³³ The the recommended dietary allowance of magnesium for women (19-30 years) is 310 mg/day and for men (19-30 years) is 400 mg/day. Dietary sources include nuts, legumes, whole grains, dark green vegetables seafood, choclate, coca.³⁴

Effect of dietary magnesium on depression: Low magnesium intake has been associated with depression and many studies has supported this theory. A cross sectional study was conducted from 2007-2010 with the purpose to find out association of dietary magnesium and depression in 8894 adults of US population. This study targeted population above 20 years of age and found out association of very low magnesium intake less than 184 mg/day with depression.³⁵ Another cross sectional study was conducted which supported the hypothesis that low magnesium intake causes depressive symptoms. They targeted 402 university students in Malaysia, who belonged to Iran. Students with chronic diseases and those who were already taking some mental help were not included. Results presented that prolonged magnesium consumption can reduce the effect of symptoms involved in depression.³⁶ One 20 years follow-up study on Eastern males also found relationship between Mg intake and risk of depression. But did not stated whether Mg can be used for treatment of depression and its symptoms.³⁷

On other hand, few studies also found out no significant association with low Mg levels and depression. A study on depression patients focused to observe the connection of Mg level and depressive symptoms. Serum analysis of these one hundred and twenty-three patients showed their Mg level were within normal range.³⁸ A cohort longitudinal study presenting the association of mg intake with depression and its symptoms, did not found any link of Mg intake with risk of depression.³⁹

The role Mg in depression is still not clear. A number of literature supported the theory that low intake of Mg is linked with depression and its symptoms and on other hand few were unable to find out any relationship. Therefore, few researchers studied the effect of mg in treating depression.

Treatment of depression using Magnesium Supplementation: Magnesium deficiency has been found out to cause some chronic diseases such as hypertension, diabetes and stroke etc., and has

neuroprotective role which makes this mineral one of the subject to study in treating depression. A case control study was conducted by Tarleton et al., observed the effect of Mg supplements in treating depression. Analysis reported that patients with depression who consumed 248mg of Mg had reduced depressive symptoms.⁴⁰ A randomized, double-blind, placebo-controlled study observed that 500mg of Magnesium oxide supplements for less than 8 weeks reduced the symptoms of depression in depressed patients with Mg deficiency.⁴¹

Folate and depression

Folate is water soluble B vitamin that plays role in activating vitamin b12, supports DNA synthesizes and cell growth. In dietary form folate can be obtained from legumes and vegetables and is also available in from of supplements and fortification. The bioavailability of supplemental and fortified folate is more than natural food.³⁴

Mechanism of folate in depression: Folate is converted into s-adenosylmethionine. These both are involved in production of neurotransmitters that are involved in depression. Folate deficiency causing depression: 5 methyltetrahydrofolate, active metabolite of folate is involved in re-methylation of homocysteine, methionine, S-adenosylmethionine participates in various methyl donation reactions. If there is hinderness of 5 MTHF in this process, then it can lead towards depression and other mental disorders (Figure 2).⁴²

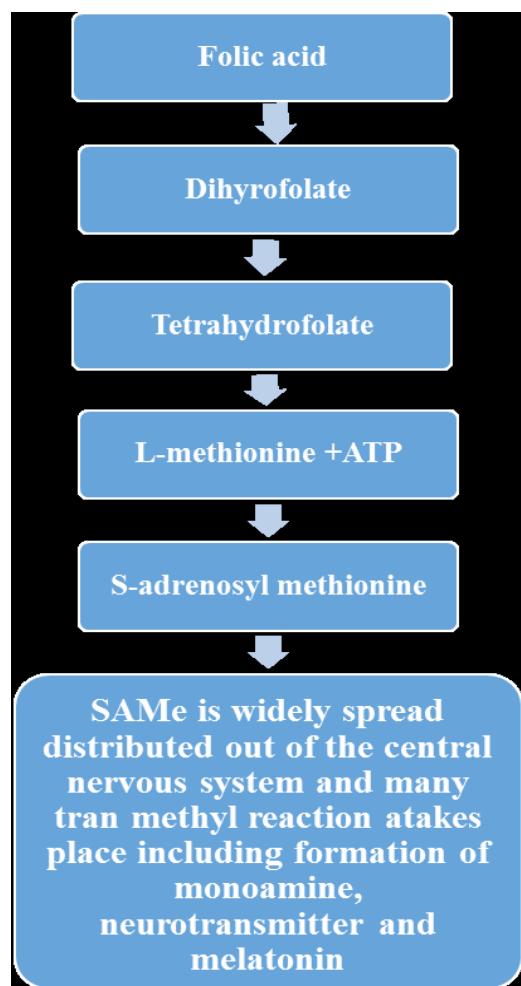


Figure 2 Synthesis of SAMe.

Treatment with folate: Many studies have supported the theory that folate consumption may reduce depression and its symptoms if consumed for specific periods of time. A randomized placebo control trial was conducted to observe the effect of folate consumption and decreased depressive effects. Which found out that patients with depression who consumed folate for prolonged periods of time showed some improvement with depressive symptoms where as those who consumed for shorter period of time presented no significant improvement.⁴³ A case control study was conducted in which females who were suffering from major depression were targeted and their serum folate levels along with other factors were observed. And they found out low serum folate level in depressed patients.⁴⁴ A systematic review and meta-analysis presented low serum folate level and depression in older age group in both males and females.⁴⁵

Some studies did not find out any relationship with folate supplementation consumption and reducing depression. A study was conducted for 2 years to check whether lowering homocystine level in depressed patients by giving them vitamin B12 and folate supplements reduces depression. But no significant reduction in depression or its symptoms was found out but increased quality of life style was observed.⁴⁶ Hence, literature has found low level of folate in depressed patients. And future more studies are needed to be conducted to find out more association of folate levels and depression.

Omega 3 polyunsaturated fatty acids and depression

PUFAs play a vital role in the process of coagulating blood, inflammation, contraction of the blood vessels and the proper functioning of brain and eye, making them essential not only for adequate growth and development, but also for the proper functioning of the adult human body.¹ The following figure 1 shows the structures of different forms of n-3 PUFAs that are available in the major plant and animal based diets.

Dietary Sources: The unsaturated fatty acids of the omega-3 series cannot be synthesized in sufficient amounts by the human body, therefore, it must be supplemented by adequate diet or supplements.⁴⁷ Crop seeds, vegetable oils, canola, chia seeds, perilla, soybean, corn and sunflower oils have low proportions of n-3 fatty acids in the form of ALA. Animal sources include fish, mutton (lamb) and beef that are a source of different types of PUFAs and are used in different physiological functions of the body. In terms of fish, the marine fishes are higher in n-3 PUFAs concentration as compared to fishes brought up on farms.⁴⁸

Role of omega-3 PUFA in Depression Several studies have shown that there is a link between the consumption of PUFAs and depression. One meta-analysis observed that the overall impact of omega-3 PUFA supplements for patients suffering with major depressive disorder can have positive results, especially in patients that are using diet and supplements having higher dose of EPA and are also taking antidepressants, however the researchers also indicated the need for studying the long-term side effects of high dose of EPA supplements. Both EPA and DHA have different chemical natures and etiology and treatment efficacy when it comes to neurological and mood disorders.⁴⁹

Mechanism of action of pufas in terms of depression

Giuseppe Grosso⁵⁰ has presented the following hypothesized mechanism of action for PUFAs in case of depression, and has stated that the protective role of omega 3 PUFAs against depression depends on physiological mechanisms in which fatty acids take part:

Monoamine imbalance has been found to be the core pathophysiological reason for depression and the present strategies against depression mainly include SSRIs or NARIs.⁵¹ However, intake of omega-3 has been suggested to cause improvement in states of depression by interact with serotonergic and dopaminergic transmissions and enhancing the signal transduction that is mediated by G-protein (Figure 3).

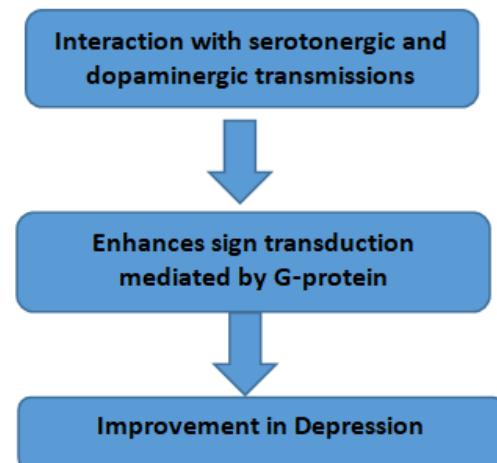


Figure 3 Intake of omega 3 PUFA reduces depression.

Experimental studies reported mode of action of omega-3 to be relevant to the development of the glutamatergic system development in children,⁵² degradations of which has been linked to depressive behaviour in adults.

Anti-inflammatory nature of omega-3 PUFA has also been linked with improving the depressive symptoms in patients of depression.

Vitamin b6 and depression

Vitamin B₆ is a general term that is used to refer to 6 pyridine vitamers that are soluble in water, shown in figure 2 given below. Out of these vitamers, PLP is a biologically active vitamer that is used as enzyme cofactor in numerous biochemical transformations.⁵³ Humans obtain the PLP required by them from the B6 vitamers that they get from diet and recycled in a salvage pathway.

Dietary Sources The Dietary sources of B₆ include cereals that are fortified and ready-to-eat, meat, yeast, potatoes, bran, some seeds, starchy vegetables and non-citrus fruits, making the source of B₆ to essentially be a varied diet.⁵⁴ Figure 4 given below shows dietary sources of vitamin B6 and the amount present in each of these sources. The daily requirement of B₆ for men and women is up to 2 mg, for children is 1.7 mg and in infants is 0.1 to 0.4mg.⁵⁵

Role of Vitamin B6 in Depression The low status of vitamin B6 has been found to coexist with the symptoms of depression in some cross-sectional studies.⁵⁶ In a study conducted on old people (ages 65 and above) living freely in Chicago, it was found that the intake of vitamin B6 (diet and supplements both) was inversely related to the incidence of symptoms of depression for about 7 years in the follow up of the study. The synthesis of several neurotransmitters is known to be PLP-dependent, making the researchers believe that a diet that is deficient in B6 may lead to symptoms of depression.⁵⁷ Another trial that was conducted in a controlled environment with 225 elderly patients that were hospitalized for an acute illness and these patients were given a daily dose of multivitamin and mineral supplements

that improved their vitamin B6 status and led to a decreased number as well as severity in the symptoms of depression,⁵⁷ however, the etiology of late onset of depression are still considered unclear by this research.

Mechanism of action of B6 in terms of depression

Vitamin B6 is important for the synthesis of neurotransmitters such as dopamine, serotonin and gamma-aminobutyric acid. Increased pyridoxine in diet in form of supplements or in dietary form has been attributed to have a neuroprotective role. In the figure 4 given below shows that PLP helps in the production of dopamine and serotonin (Figure 4).

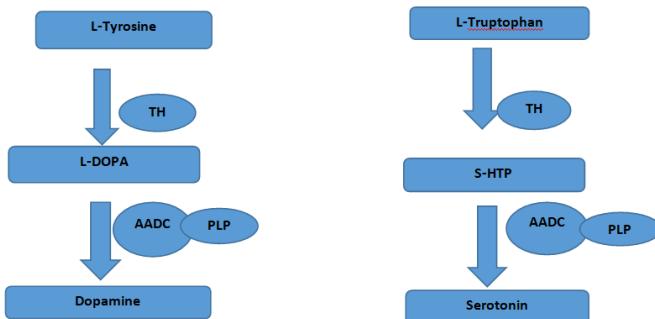


Figure 4 Production of Dopamine and Serotonin by B6.

Pyridoxine is linked to treatment of seizures and it is known that deficiency of B6 can lead to impairing the central and the peripheral nervous systems. In summary, it has been found in research the modes of action of pyridoxine are responsible for ensuring the proper functioning and development of the neurological and the nervous system because it facilitates the neurotransmitter synthesis and the synthesis of myelin and is also capable of controlling the glutamate excitability and metabolism in the neurons (Figure 5).⁵⁷

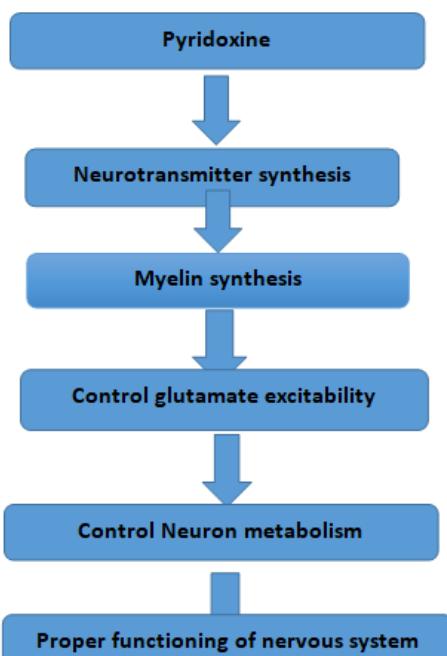


Figure 5 role of pyridoxine in proper functioning of nervous system.

Role of vitamin b12 in depression

The deficiency of vitamin B12 can cause psychiatric manifestations that can lead to the symptoms that are hematological and neurological. Even with the variety of symptoms depression in vitamin B12 deficiency is not very frequent. No therapy is needed instead when this deficiency is found in psychotic depression then it is successfully treated with vitamin B12. A water-soluble vitamin, B12 which takes part in metabolism of each human body cell. It is also essential for the development of red blood cells. It also develops our nervous system.⁵⁸

A case reported a woman suffering from depression and she couldn't recover from the conventional therapy, but she recovered when it was replaced with vitamin B12. Psychiatric manifestations may occur within the presence of low amount of B12 serum but they will be early indications before the neurological and haematological abnormalities are developed. The common explanation for anti-pernicious anaemia factor deficiency is problems in absorption and poor intake. For during the case, being a vegetarian may give rise to the likelihood of deficiency and perform a task within the evolution of mood disorders. Intake of supplements is also enough to stop and attain all the ache in most individuals.⁵⁹ A report says that symptoms of depression may be connected to vitamin B12 levels and folate too. As vitamin B12 is very essential so these observations can be justified. A study says that vitamin B12 supplementation can be as effective as anti-depressants.⁶⁰ Levels of Vitamin B12 within the sub-clinical scope of low to normal are related to presenile dementia, vascular dementia, and Parkinson's disease. Use metformin also donate in depressed levels of vitamin B12 so they will enlarge the danger of cognitive impairment. B-complex vitamin insufficiency is related to cognitive impairment. B-complex vitamins supplementation managed orally at a very increased dose helped in the correction of biochemical insufficiency, and better cognition in patients who already have anti-pernicious anaemia factor insufficiency.⁶¹

The models of logistic regression, which are used in calculating general equations, proved that increased aggregate of these intakes, including supplements for vitamins B-6 and vitamin B-12 were related to a reduced chance of depression for almost 12 years of outcome. Following the outcome and adjusting age, gender, income, schooling and antidepressants utilization. as a sample, every ten extra mgs for vitamin B-6 and ten added mgs for vitamin B-12 were related to 2% decreased chances of symptoms of depression annually. No link was found that connected depressive symptoms and consumption of diet of those vitamins and folate.⁶²

Beydoun et al.⁶³ analysed the findings in depression of a coffee plasma and specifically red cell folate, but even because of low B vitamin levels. Both low folate and low cyanocobalamin levels are found in studies patients of depression, and a union connected to depression and decreased vitb12 can be established in studies of the overall population. decreased levels of plasma and serum folate can even be established in people with mood disorders. People who consume more alcohol are also vulnerable to this deficiency.

Depression is very common in people living in America, and expenses linked with it are almost \$44 billion per annum. Depression is also very common in the old age; some reports say that the group of clinical depression in people of old age reaches from a number of 7 to 49%. Also, depression might cause various added health issues, which also comprises death, also research also proved irrespective of morbidity, depressed patients that are old have 50% increases expenses of health care than the people who are not depressed. There's a possible theory that decreased levels of B12 vitamins are

connected with depression. A large part of studies that have tried out this theory are cross-sectional; there are some inspections, especially in the America.⁶

Nevertheless, clinical observations have assisted deficiency of vit B12. As everyone knows vitamin B-12 deficiency is familiar within the overall population. Latest facts have proved that vitamin B-12 deficiency in 6% of older people, and 20% of older people have marginal consumption. Biochemically, vitamin B-6, folate, and vitamin B-12 are concerned within the metabolism of homocysteine, S-adenosyl methionine, and methionine, an important organic compound.⁶⁴ Vitamin B12 levels help with the mood swings and depression and studies proved that even if depression can't be treated with anti-depressants and therapies. Balanced levels of vitamin b12 can help.⁶⁵

Role of iron in depression

Iron deficiency is counted between one of the most common nutrition related problem which can lead to other health issues if it is not treated on time.⁶⁶ This means that treating iron deficiency is beneficial for humans. Iron is present in a variety of foods in different concentrations in the form of haem iron and non-haem iron. Haem iron can be obtained from animal sources such as meat, fish, and poultry. Non haem iron on the other hand can be obtained from plant sources such as green leafy vegetables, some fruits, nuts, and seeds.⁶⁷ An increasing amount of evidence shows that iron has an important in neurological developments and functions.⁶⁸ In the development of brain iron is responsible for the formation of myelin sheath of the white matter as well as the functioning of neurotransmitters which includes serotonin, dopamine, and norepinephrine.⁶⁹

In a study performed with 100 female subjects it was noted that patients who were suffering from iron deficiency anemia or iron deficiency displayed symptoms of depression and mood swings. Many of these depressive symptoms in ID patients can be treated by iron supplementation.⁶⁶ In another study performed in Sindh ranger's hospital in Karachi it was concluded that depressed subjects had higher prevalence of anemia than non-depressed subjects.⁷⁰ Low iron levels and depressive symptoms were also observed in a cross-sectional study including older people from ages 65 and above.^{71,7}

Postpartum depressive disorder is another common psychiatric disorder which maybe linked with iron deficiency, due to loss of blood during childbirth iron deficiency is common in new mothers. A strong relationship between ferritin levels and PPD was noted in a study performed on postpartum mothers.⁷² However, in a double blinded placebo study it was observed that early supplementation of iron improved the symptoms of postpartum depression. The improvement rate in this study was 42% within 6 weeks.⁷³

These results indicate that there is an inverse relation between iron and depression. Iron levels should be monitored during pregnancy and childbirth. Further detailed studies should be performed on this subject.⁷⁴

Nutrients that cause depression

Consumption of baked foods and commercial foods and their relation with depression

A large-scale study was done to understand the relationship between different diets and their possibility with depression. Usage of pizzas, French fries, burgers all fast foods and processed cakes, pastries, and ice-creams were evaluated at beginning by a legitimate partially-quantitative food frequency questioner as to check the

association of depression with fast foods. If any assessment results cause a participant diagnosed as depressed or he/she also taking an antidepressant medicines, then it will be a push up to reassessment questionnaires. Because of relapse model which was assigned to check the association of consumed commercial food and occurrence of depression. The project was held at SUN; a Spanish cohort study was subjected to 8964 individuals in Spain. After 6'2 years of research the approximately 493 cases of depression were announced. And all of them were consumed fast food. So, a risk of depression is directly proportional to the consumption of fast food. But there was no straight relationship found between the depression and the intake of commercial baked food. So, it has been proved that people with high level of consumption of fast food are more vulnerable to have depression than the people with low level of usage of fast foods. There is probability of depression on intake of commercial fast and baked products.⁷⁵

Another study was reported in which intake of fast food and possibility of depression in midlife women was discussed. The consumption of fast food can be measured by filling questionnaires as at least weekly or less than weekly, and at least monthly or less than monthly. About 14% women were consuming fast food out of 25 cases of depression. With this study it was confirmed that fast food consumption is directly concerned with depression or many other health conditions.⁷⁶ For adolescent girl's dietary pattern is also very important for their mental and physical strength and growth. Another research had conducted to assess the association of dietary pattern with depression. A case-control study conducted on 849 girls of age 12- 18 years to assess their dietary pattern of past 12 months by using FFQ (food frequency questionnaire). Out of all, 116 cases were reported to have symptoms of depression and those are girls who were more likely to have processed or unhealthy food. So, it is proved that consumption of processed or unhealthy food associated with increased risk of depression in adolescent girls.⁷⁷

Diet quality and pattern affecting depression

The relationship between diet quality and pattern affecting depression is not fully understood. Many articles are discussed to understand the association of diet quality and pattern with risks of depression. Twenty-five studies from nine countries are performed and chosen. There are many best-evidence analyses which are on side of association and many are in opposition for association.⁷⁸ Dietary patterns have a potential role in the prevention and management of depressive symptoms. Modern evidences describe the role of food quality in affecting the mental state of person mostly depression. It is proved that people who take quality food are at less chance of symptoms of depression and those who take processed food or unhealthy diet they are more eligible to have risk factors of depression. Diet quality is related to depression (odds ratio [OR]=0.71 5. Many confirmed the association of depression with dietary pattern. Another meta-analysis research reported to find out the relationship of dietary pattern with risk of depression. A dietary pattern of those who have more fruits, vegetables, whole grain, and low-fat food in their diet and have low intake of animal foods are linked with low risk of depression and dietary pattern of opposite of this are apparently linked with high risk of depression. It is proved that people who have healthy dietary patterns are associated with less risk of depression in their life.⁷⁹ Another study conducted to evaluate the association of Mediterranean dietary pattern with risk of depression in the middle age women. They conducted (50-55 years) women and filled their food frequency questionnaires for evaluation. It is proved that women who was taking higher consumption of Mediterranean diets are more

likely to decrease risk of depression. Women of mid age who are taking Mediterranean diet-style are more likely to protect themselves from risks or symptoms of depression.⁸⁰

There are a lot of researches on diet quality and their association with risk of depression. Another large research data was taken from national longitudinal survey of Canadians. The data conducted 8353 contenders of age 18 years and older. And they self-acknowledged their daily dietary intake, consumptions of fruits and vegetables, their physical activity, smoking behaviours and its association with depression and other mentally stresses for almost 2 years. It is proved that physical activity and smoking behaviours are more likely to have impact on symptoms of depression as compared to consumption of fruits and vegetables.⁸¹

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Conflicts of interest

The author declares that there is no conflict of interest to declare.

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