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Impact of nutrients on mental health and wellbeing: A regular study

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Abstract

In recent years, the relationships between nutrition and mental health have gained considerable interest. Indeed, epidemiological research has observed that adherence to healthy or Mediterranean dietary patterns—high consumption of fruits, vegetables, nuts, and legumes; moderate consumption of poultry, eggs, and dairy products; and only occasional consumption of red meat—is associated with a reduced risk of depression.3 However, the nature of these relations is complicated by the clear potential for reverse causality between diet and mental health. For example, alterations in food choices or preferences in response to our temporary psychological state—such as "comfort foods" in times of low mood, or changes in appetite from stress—are common human experiences. In addition, relationships between nutrition and longstanding mental illness are compounded by barriers to maintaining a healthy diet. These barriers disproportionality affect people with mental illness and include the financial and environmental determinants of health, and even the appetite inducing effects of psychiatric medications.

Keywords: Anxiety; Brain Health; Depression; Dopamine; Endorphins; Serotonin; Stress

1. Introduction

Severe studies shows that diet and nutrition are critical not only for physiology and body composition but also have significant effects on mood and mental wellbeing. A significant nutritional status is important for maintaining normal body function and preventing or mitigating the dysfunction induced by internal or external factors. A healthy dietary pattern can affect mental health and wellbeing through anti-inflammatory neurogenesis, microbiom and immune modify mechanism as well as through epigenetic modifications. Nutrients present in our diet perform several role regarding growth and development of our body. Meanwhile they also play a very critical rolling proper functioning of the brain there for the effects on our mood, behavior, cognitive and intellectual performance. Diet effect brain development and performance at all stages of life starting from fetal development and continuing through infancy, childhood adulthood till old age.

The world Health Organization (WHO) who defined mental health as not just absence of mental disorder.It is a state of complete emotional and psychological well being in which a person is able to cope with everyday's challenges, think clearly, be responsible and have good relationships with others. Maternal and early life nutrition is also emerging as a factor in mental outcomes in children while serve deficiencies in some essential nutrients during critical development periods have long been implicated in the development of both depressive and psychotic disorders. Nutrition can play an important role in behaviour learning and mood. Scientific evidence shows that diet is important not only for Physical health but also for optimal mental development and functioning. The dietary intake pattern of the general population in many nutrients especially essential vitamins, minerals and Omega 3 fatty acids. The most common nutritional deficiencies seen in patient with mental disorder are of Omega 3fatty acids, vitamin B, minerals and amino acids that are precursors neurotransmitters. Iron is also necessary for the synthesis of neurotransmitters and myelin. Iron deficiency is found in children with attention- deficit/ hyperactivity disorders. These indicates the possible importance

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of iron in the etiology of depression since deficiency is known to cause fatigue and depression. These may be appropriate for controlling and to some extent preventing depression, bipolar disorder, schizophrenia, eating disorders and anxiety disorders,attention deficit disorder/attention, deficit hyperactivity disorder (ADD/ADHA), autism and addiction. (Shaheen and Vieira, 2008)

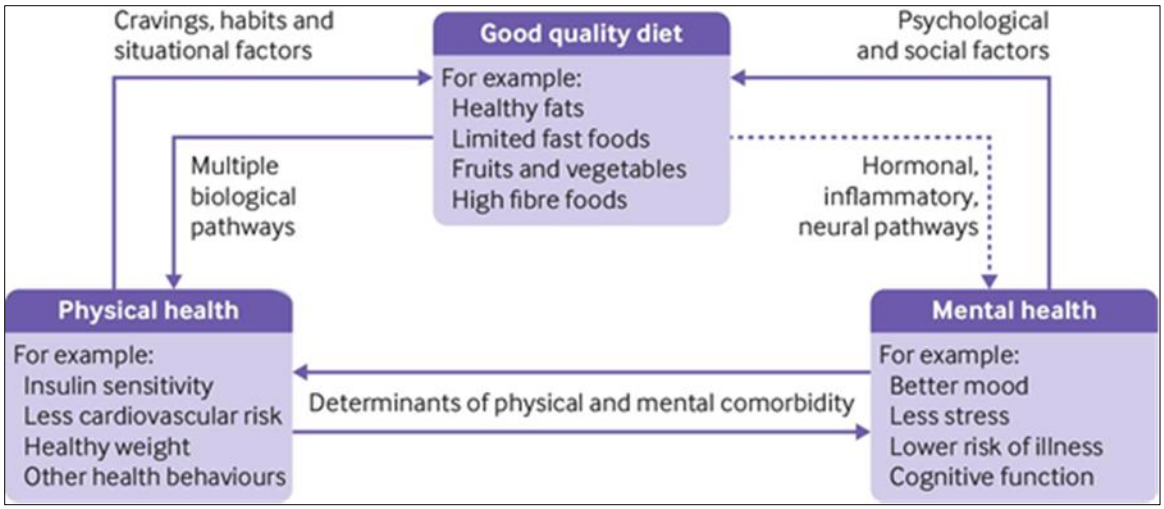

Figure 1 Relationship between diet and health

1.1. Factors affecting mental health

As well as the links between diet and positive mental health including healthy brain development, there is emerging evidence that good quality nutrition may play a role in contributing to the prevention of mental health problems and in the management and recovery from these when and if the do occur. There are range of inequalities that are contribute to the development of mental health problems including the heightened and risk associated with poor physical mental health and Socio economic factor such as poverty. In Mental Health like eating disorders, anxiety disorders and substance abuse that general results in terms of obesity.There are many things that can contribute to mental health problems, including biological factors, genetic factors, life experiences (such as psychological trauma or abuse), and a family history of mental health problems.

1.1.1. A-Biological factors:

According to the National Institute of Health Curriculum Supplement Series book, most scientists believe that changes in neurotransmitters can cause mental illnesses. In the section "The Biology of Mental Illnesses" the issue is explained in detail, "...there may be disruptions in the neurotransmitters dopamine, glutamate, and norepinephrine in individuals who have schizophrenia".

1.1.2. B-Economic factors

Unemployment has been shown to hurt an individual's emotional well-being, self-esteem, and more broadly their mental health. Increasing unemployment has been shown to have a significant impact on mental health, predominantly depressive disorders. This is an important consideration when reviewing the triggers for mental health disorders in any population survey. The prevalence of mental illness is higher in more economically unequal countries.

Emotional mental disorders are a leading cause of disabilities worldwide. Investigating the degree and severity of untreated emotional mental disorders throughout the world is a top priority of the World Mental Health (WMH) survey initiative, which was created in 1998 by the World Health Organization (WHO). "Neuropsychiatric disorders are the leading causes of disability worldwide, accounting for 37% of all healthy life years lost through disease. These disorders are most destructive to low and middle-income countries due to their inability to provide their citizens with proper aid. Despite modern treatment and rehabilitation for emotional mental health disorders, "even economically advantaged societies have competing priorities and budgetary constraints".

1.1.3. C-Cultural factor

There are significant variations in the cultural views of mental illness across cultures.Culture influences the epidemiology, phenomenology, outcome, and treatment of mental illness. Culture has multiple roles to play in the expression of psychopathological disorder.

2. Nutrition for Brain development

A healthy diet can boost brain function and improve mood, but research also suggests that deficiencies in certain nutrients may contribute to or exacerbate conditions such as depression, bipolar disorder, schizophrenia, and obsessive compulsive disorder (OCD).Serotonin helps regulate sleep, appetite, moods, and pain. Over 90% of the body's serotonin is produced in the gut, where it has a protective effect. So the health of our stomach and the balance of bacteria within it impacts our stress resilience and immunity.. Production of serotonin is influenced by the "good" bacteria in our gut. These good bacteria serve as a protection in the gut, limit inflammation, help you absorb nutrients, and "activate neural pathways that travel directly between the gut and the brain". Serotonin helps to regulate autonomic functions in the central**.**

In 2019, the Baylor College of Medicine conducted a study on gut permeability and depression. They found that increased gut leakiness was associated with increased depression and stress responses. They also found that gut leakiness triggered the immune response. The relationship between the stomach and the brain goes both ways — it's bidirectional.

Eating a healthy diet can help you feel better, help you concentrate, and feel more alert. Your diet can also be a valuable source of serotonin. Although foods don't typically contain serotonin, they do contain tryptophan, folate, and B12. These are necessary for the body to synthesize serotonin.Here are some foods which helpful in mental health.

- Antioxidants: berries, spinach, broccoli, pecans, and carrots
- Omega-3 fatty acids: mackerel, salmon, flax seeds, chia seeds, and walnuts
- Folate: spinach, romaine lettuce, and other dark leafy greens, beans, and peanuts
- Vitamin B12: beef, chicken, salmon, trout, shrimp, dairy, and eggs
- Magnesium: spinach, dark chocolate, almonds, and bananas

3. Significance of Nutrients

The significance of various nutrients in mental health is

3.1. Carbohydrates

Carbohydrates are naturally occurring polysaccharides and play an important role in structure and function of an organism. Eating a mael which is rich in carbohydrates triggers the release of insulin in the body.Insulin helps blood sugar into cells where it can be used for energy and simultaneously it triggers the entry of tryptopan to brain. Consumption of diet low in carbohydrate tends to presipitate depression.As the production of brain chemicals serotonin and tryptophan promote the feeling of well being it is suggested that low Glycemic index (GI) foods such as some fruits and vegetables, whole greens, pasta etc are most likely to provide a moderate but lasting effect on brain chemistry, mode and energy level than the high GI foods - primarily sweets tend to provide immediate but temporary relief (Hoes, 1982).

3.2. Proteins

Protein are made up of amino acids and are important building blocks of life. As many as 12 amino acids are manufactured in the body itself and remaining 8(essential amino acids) have to be supplies through diet. A high quality protein diet contains all essential amino acids. Foods rich in high quality protein include meat, milk and other dairy products and eggs. Plant proteins such as beens, peas and grains may be low in one or two essential amino acids. Protein intakes and in tern the individual amino acids can affect the brain functioning and mental health. Many of neurotransmitters in the brain are made from amino acids. The neurotransmitter dopamine is made from the amino acid tyrosine and the neurotransmitter serotonin is made from the triptophan. If there is a lack of any of these two amino acids, there will not be enough synthesis of the respective neurotransmitters which is associated with low mood and aggression in the patients. The excessive buildup of amini acids may also lead to brain damage and mental retardations. For example,excessive build up of phynylalanine in the individuals with disease called phynylketonuria can cause brain damage and mental retardation (Bourre, 2005).

3.3. Omega 3 fatty acids

The brain is one of the organs with the highest level of lipids(fats). Brain lipids, compose of fatty acid and structual constituents of membranes. It has been estimated that grey matters contain 50% fatty acids that are polyunsaturated in nature (about 33% belong to the Omega 3 family). It has been observed that lowering plasma cholesterol by diet and medications increases depression. Among the significant factors involved are the quantity and ratio of omega-6 and omega -3 polyunsaturated fatty acids (PUFA) that affect serum lipids and alter the biochemical and bio physical properties of cell membranes. Long chain PUFAs, especially DHA, may decrease the development of depression (Sinclair et al., 2007). The glycerophospholipids in brain consist of high proportion of PUFA derived from the essential fatty acids (EFAs), lenoleic acid and alpha -linolenic acid, arachidonic acid (AA) and docosa tetraenoic acid, both deprived from omega 6 fatty acids linoleic acid. Studies have revealed that diets lacking Omega 3 PUFA leads to considerable disturbance in neural function(Sinclair et al.,2007). During late gestation and the early postnatal period, neurodevelopment occurs at significantly rapid rates which make the supply of adequate quantity of PUFAs,perticularly DHA needed for appropriate development of brain (Anita et.al. 1998).

3.4. Vitamins

3.4.1. B complex vitamins

A study reported supplementation of 9 vitamins, 10 times in excess of normal recommended dietary allowances (RDA) for 1 year improved mode in both men and women (Benton et. al. 1995) the mood improvement was particular associated with improved Vitamin B2 and B6 status. In women baseline vitamin B1 status was linked with poor mood and an improvement in the same after 3 month was associated with improved mood.Thiamine is known to modulate cognitive performance particularly in the geriatric population. (Bell et. al., 1991). Vitamin B 12 (cynocobalamin) clinical trial have indicated that vitamin B12 release the onset of sign of dimentia and blood and normalties, if it is administered before the onset of the first symptoms. Supplementation with cobalamin enhances cerebral and cognitive functions in elderly and promote the functioning of factors related to the frontal load, in addition to the language function of people with cognitive disorders. Adolescence having vitamin B12 deficiency is developed signs of cognitive changes (Alpert and Fava,1997). Folate low levels of folate have been identified as a strong predisposing factor of poor outcome with antidepressant therapy.Folate's critical role in brain metabolic pathways has been recognised by various researches who have noted that depressive symptoms are the most common neuropsychiatric manifestation of folate deficiency (Abou-Saleh and Coppen, 2006).

3.5. Minerals

3.5.1. Calcium

Selective serotonin uptake inhibitors (SSRIs) inhibits absorption of calcium into bones. In addition of this, the SSRIs can also lower blood pressure in people, resulting in falls which may lead to broken bones. Indiscriminate pers priscription of SSRIs by doctors and ingestion by patients at risk of depression or other mental health problems may put them at increased risk of fractures. (Golzman,2007)

3.5.2. Chromium

Association of chromium in humans depression has been recorded which indicate the significance of this micro nutrient in mental health (Docherty et. al. 2005).

3.5.3. Iodine

Iodine plays an important role in mental health.The iodine provided by the thyroid hormone insures the energy metabolism of the cerebral cells. During pregnancy, the dietary reduction of iodine induces severe cerebral dysfunction, eventually leading to cretinism.

3.5.4. Iron

Iron is necessary for Oxygenation and produce energy in the cerebral parenchyma, and for the synthesis of neurotransmitters and myelin. Iron deficiency is found in children with attention- deficit / hyperactivity disorder. Iron concentration in the umbilical artery are critical during the development of the foetus, and in relation with the IQ in the child ; infantile anemia with its associated iron deficiency is associated with disturbance in the development of cognitive functions (Alpert and Fava,1997).

3.5.5. Lithium

The role of lithium has been well known in psychiatry. The therapeutic use of lithium also includes its uses as an augmenting agent in depression, aggression, impulse control disorder eating disorder. The use of lithium due to pregnancy and lactation in pediatric and geriatric population needs careful observation about its toxicity.

3.5.6. Selenium

Intervention studies with selenium with patient population reveasl that selenium improves moods and diminishes anxiety (Benton,2002)

3.5.7. Zinc

Zinc levels are lower in those with clinical depression. Furthermore, the intervention research shows that oral zinc can influence the effectiveness of antidepressant therapy. Zinc also protects the brain cells against the potential damage caused by free radicals.

It has been observed that composition of diet the meal Patan can have beneficial or adverse, immediate or long term effect. Dietary deficiency of antioxidants and nutrients(trace elements vitamins and non essential micronutrients such a polyphenols) during aging may precipitate brain diseases, which may be due to failure for protective mechanism against free radicals.(Roberts,2000).

3.5.8. Foods to avoid

Incorporating the right foods into your diet is important for your well-being, but so is avoiding the wrong foods. Evidence is starting to show that people prone to mental illness should be cautious about sugar consumption. Holistic psychiatrist Dr. Kelly Brogan cautions that ups and downs in your blood sugar levels “deprive the brain of important nutrients.” Sugar may also “create systemic inflammation,” dysregulate hormones, and trigger adrenal fatigue.In addition to sugar, other foods to avoid or consume less frequently include: Caffeine, Alcohol, Hydrogenated oils,Fried foods,Highly processed foods.

3.6. Tips to improve mental health

3.6.1. Avoid processed snacks

Processed foods often have flavors or preservatives added to them to help them survive the freezing and shipping process. This often means higher amounts of fat, sodium, and added sugar. Swap out your processed snacks for nutrient-rich foods. Try a yogurt parfait or hummus and pita instead of candy and chips.

3.6.2. Set a schedule

Plan your meals out in advance. While meal planning is a “thing,” you don’t have to go overboard. Simply glance at the day or week ahead and plan out your meals, plus a few stacks, for each day. When you have healthy food ready to go, you're more likely to practice intuitive eating.

3.6.3. Drink enough water

If food is the fuel that keeps you going, then water is the oil that keeps everything running smoothly. Like motor oil, water helps keep your temperature regulated, clean out your system, and improve your performance. Without water, your body has a much harder time extracting micronutrients from food. Mild dehydration also results in cognitive impairment, which leaves your brain less capable of regulating serotonin.

3.6.4. Balance your macros

The big three macronutrients are fat, protein, and carbohydrates. All of them (yes, even fat) are necessary for optimal functioning. Balancing your intake with healthy amounts of each will help ensure that you have steady energy throughout the day. If you’re unsure how to find the right combination or need specific advice, reach out to a nutritionist.

3.6.5. Get some bacteria in the mix

Your stomach is full of bacteria, and that’s a good thing. Probiotics can be helpful in regulating your digestive health by giving those bacteria a boost. When the bacteria in your gut is balanced and thriving, digestion is smoother and more serotonin is produced. Try taking a daily probiotic or adding fermented foods to your diet.

3.6.6. Avoid inflammatory foods

Certain foods are more likely to cause an inflammatory response. Processed and high-sodium foods are obvious culprits, but even healthy foods can be triggering. Tracking your diet and mental health can help you determine if you have any underlying food sensitivities. You can also ask your doctor for an allergy test.

3.6.7. Eat regularly

One benefit of a nutritious diet is consistent blood sugar levels. In order to keep your blood sugar steady, it's important to eat at regular intervals.

4. Conclusion

A healthy diet is one way you can improve your mental health. Other things include staying physically active, spending time in nature, avoiding cigarettes and alcohol and developing good sleep habits. Like an expensive car, your brain functions best when it gets only premium fuel. Eating high-quality foods that contain lots of vitamins, minerals, and antioxidants nourishes the brain and protects it from oxidative stress — the "waste" (free radicals) produced when the body uses oxygen, which can damage cell.

Compliance with ethical standards

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