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A Review on the Relationship between Nutrition, Diet and Mental Health

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Abstract: ***Nutritional status and dietary intake are very important factors of mental health and prevent the risk of psychiatric disorders. G.I track is the home to billions of beneficial bacteria that influence the production of Neurotransmitter (serotonin, GABA, dopamine). Bad foods can cause of inflammation that hampers the production of Neurotransmitter. Some specific nutrients of food (omega3 fatty acids, phospholipid, cholesterol, niacin, folate, vitamin B6, B12 are very much effective in mental wellbeing. On the other hand saturated fat, sugar, artificial sweeteners etc. are considered as the increasing factors of mental disorders. A study shown mainly traditional diet like Mediterranean diet and traditional Japanese diet help to maintain mental wellness.***

Keywords: psychiatric disorders, neurotransmitter, inflammation, Mediterranean diet, Japanese traditional diet

1. Introduction

"A very large body of evidence now exists that suggests diet is as important to mental health as it is to physical health"

says by Felice Jacka.

Recent reports estimated that the population of whole world living with depression is well over 400 millions people. Nowadays mental diseases lead the major contributors to year of life lost in developed countries. Depression, anxiety are related with other some non-infection diseases such as cancer, cardiovascular diseases and dementia etc. It is the high time to flash back on that fact, the food intake and diet quality are highly associated with mental health. It cannot be mentioned that lacking of only one or two specific nutrients is responsible for those mental disorders. But some food compounds are also responsible for mental illness like sugar, artificial sweeteners, Nitrate, caffeine etc. Microorganisms are highly associated with mental wellbeing. Gut bacteria prevent the inflammation in brain as to maintain mental wellbeing. Fermented food like kefir, yogurt contains these beneficial bacteria. Traditional diet is most effective for mental wellness, these diet contain high in vegetables, fruits, unprocessed whole grain, fish, seafood and moderate amount of meats and dairy, also fermented foods which act as natural probiotics. Recent evidence suggests a link between low level of serotonin and suicide. Patients who are suffering from depression exhibit suicidal tendency to larger degree deficiencies in transmitters such as serotonin dopamine noradrenaline and GABA are often associated with depression. As reported in several studies, the amino acids tryptophan, tyrosine, phenylalanine, methionine are often reduce the risk factor of mental disorders. Not only that omega-3 fatty acid, found in fish oil and vitamins like B complex, B12, folate, minerals like calcium, chromium, iodine, iron, lithium, selenium, zinc reduce mental stress, depression and others mental disorders.

2. Method

A cross sectional logistic analysis was performed to describe odds ration for GHQ score $\geq$5 (poor mental health) according to dietary intake of foods Studies examined the inner-relationship between diet quality, food nutrients intake and mental disorders that enclosed depression, anxiety, low mood, mood swings, emotional problems access via important report and medical records. Furthermore this review assesses a deep relationship exists between diet quality and mental health. Key nutrients deficiencies have been observed in patients with Schizophrenia and major depressive disorders.

3. Food Nutrients and Mental Health

3.1 Macronutrients

Food macronutrients such as fats, proteins play a major role in the maintenance of brain health. Carbohydrates also play a role by promoting the cell growth of brain. Some major constituents play the major role are-

3.1.1Fat-omega-3 fatty acids-

Omega-3 fatty acids have been extensively studied with regard to the brain health. FAs' action on brain is mainly as a structural and functional component of membrane phospholipids in brain and retina. Alpha-linoleic acid, a plant-based omega-3 FA, is found in flaxseed oil and soybean oil, and main dietary source of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) is fish oil. These omega-3 FAs are potent activators of transcription factors and inflammatory modulators. Anti-inflammatory activities of omega-3 FAs are often related to the suppression of excess extents of pro- inflammatory actions of omega-6 FAs.

Phospholipid

Phospholipid is a principal component to maintain integrity and functionality of neuronal Membrane, and is recently suggested as a blood biomarker for mental health. Altered Plasma phospholipids were observed in patients with mild cognitive impairment (MCI)]. Metabolome analyses enabled to screen phospholipid profiles and to identify altered levels in response to specific conditions in

a comprehensive way.

Butyrate
It is an essential fatty acid occurs in foods such as nuts, legumes etc. It might help to grow new brain cells and prevents inflammation to decrease depression, anxiety, fatigue.

3.1.2 Protein
Tryptophan- *An essential amino acid, acts as an upstream precursor of bioactive metabolites related to sleep, including serotonin and melatonin.*

Glycine- *Non essential amino acid, may exert a positive action towards sleep quality by reducing the core body temperature exerting an excitatory and inhibitory role on neurotransmission via N- methyl- D- aspartate-type glutamate, glycine receptors respectively.*

Ornithine- *It may play a direct role in the central nervous system relieving stress and improving sleep and fatigue symptoms through reducing stress- induced activation of hypothalamic- pituitary-adrenal axis accompanied by attenuating the stress response mediated by the GABA.*

Carbohydrates-
Carbohydrates are mainly needed to supply energy of brain cells. And it also enhance serotonin synthesis. Brain cell can use only glucose to produce energy, lacking of carbohydrates may cause of fatigue and others mental diseases.

Micronutrients
Micronutrients like vitamin and minerals are play important roles in the prevention of psychiatric disorders. They are as follows-

Micronutrients		*Effects of deficiency in mental health*	*Sources*
Vitamin B1		*Poor concentration and attention*	*Whole grains, vegetables*
Vitamin	B3	*Depression*	*Whole grains, vegetables*
Vitamin	B5	*Poor memory, stress*	*Whole grains, vegetables*
Vitamin	B6	*Irritability, stress, depression ,poor memory*	*Whole grains, bananas*
Vitamin	B12	*Psychosis poor memory, confusions*	*Meats, dairy products, fish eggs ,*
Vitamin C		*Depression, anxiety*	*Vegetables and fresh fruits*
Folic acid		*Anxiety, psychosis, depression*	*Fresh leafy green vegetables*
Minerals-			
Zinc		*Blank mind, loss of appetite, confusion, depression*	*Oyster, nuts, seeds, fish,*
Magnesium		*Irritability, insomnia, depression*	*Green vegetables, nuts, seeds*
Selenium		*Irritability, depression*	*Wheat germ, Brewer yeast, liver, fish, garlic, nuts, sunflower seeds*

3.1.3 Probiotics

Probiotics bacteria naturally reside in the gut but are also found in fermented food like kefir, yogurt etc. some research shown that certain **lactobacillus sp.** Improve stress resilience. AS the vagus nerve connects with gut and brain, as well as allowing nutrients to enter the body and keep opportunistic pathogen locked out, their activities also influence brain.

Gut microbes produce **serotonin**, a neurotransmitter that regulates mood. Bacteria in fermented food can also produce another neurotransmitter

Gamma-Amino-Butyric-acid(GABA), regulates and improve mood and switch of stress.

3.1.4 Diet

"Genius foods can help you to reset your mental agility, cope with stress, battle brain for, and even smack back dementia. What are you waiting for?"- says MEHMET OZ, professor of Columbia University.

Studies have compared "traditional diet" like **Mediterranean diet** and **the Japanese diets have** shown that the risk of psychiatric disorders is 25% to 30% lower in those who eat a traditional diet.

These diets tend to be high in **fruits, vegetables, unprocessed grain, fish and sea foods** and to contain only modest amounts of **lean meats** and **dairy.** They are also void of processed and refined foods and sugars. In addition many unprocessed foods are fermented and therefore act as natural probiotics, which reduce the factor of mental disorders.

Influencing factors of mental disorders
Alcohol, nitrate, artificial sweeteners, gluten, nicotine, modified food, sugars, caffeine, saturated fat, etc. are most common influencing factors of psychiatric disorders. To maintain mental wellness these have to avoid. These are cause of inflammation in brain, for which the production rate of neurotransmitter is decreased as results different types of psychiatric problems are arised.

4. Conclusion

Nowadays the world is moving very fast, and also the mental disorders are highly increased proportionally. Based on current evidence, nutritional factors are important for mental well-being. Especially, eating balanced meals on a regular basis and consuming nutrients for mental health including omega-3 fatty acid, niacin, folate, vitamin B6, and vitamin B12 at recommended dietary intake levels are suggested. Development of dietary guideline that is specific to each type and stage of mental disorder. A proper diet can prevent mental disorders. Some specific components have to avoid to maintain mental wellness.

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