

Perspective Piece

Neurological Disturbances Caused by Nutritional Deficit

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Nutrition plays an important role in our lives to fight against any certain chronic state and its deficiency creates a damage that is termed as nutritional stress (Sadaf Ahmed, Shamooun Noushad 2014). Consequences stressing life events can lead to the onset and course of mood deterioration and affective disorders such as depression. Malnutrition has been observed to affect a variety of the organ systems in body with central nervous system being on top to be disrupted. Around 792 million people in the world are having a malnutrition state due to food deficits (Thornhill S et al, 2000). A number of nutritional conditions have been observed to raise the Global burden of nutritional disorders; these include the protein deficiency, iron deficiency and vitamin A deficiency. The neurological disorders associated with malnutrition can be reverted and hence it is of great importance for the public health concern. There are several disorders associated with the nutritional deficiency; some of them are briefly discussed in this review.

The epidemiology, risk factors and the burden of disease

The dietary nutrients required by human body can be grouped as macro nutrients and micro nutrients. The macronutrients are observed to yield energy from nutrients as the proteins, carbohydrates and fats, whereas, the micronutrients yield minerals and vitamins. The macronutrient serves as “firewood” and “building blocks” for the body, whereas, the micronutrients serves as a building blocks to enzymes and hormone. The term malnutrition addresses both the macro and micro nutrients. The total energy required in childhood is 2200 kcal and if any individual is deprived of this energy, the long term mental deficits are seen with these consequences. The deficiency of Vitamin B1 (Thiamine) causes beriberi, polyneuropathy and Wernicke’s encephalopathy. Vitamin B3 (Niacin) with RDA of 15 mg is required, its deficiency causes dementia and depression. The deficiency of Vitamin B6 (Pyridoxine) causes Polyneuropathy. Vitamin B12 (Cobalamine) deficiency causes the sensory disturbance in legs and the folate (RDA= 180 µg) deficiency causes the neural tube defects in fetus. The

iron deficiency has been observed to cause delayed mental development in children, whereas, the zinc deficiency causes delayed motor development in children, depression and anxiety in adults.

The contribution of epidemiological studies suggested that the intake of fish, green vegetables and fruits can reverse back the adverse condition associated with these disorders. The Mediterranean diet is beneficial to prolong the quality life survival of an Alzheimer’s patient.

The Neurological Complications Associated With Malnutrition

Macronutrient deficiency

The macronutrient deficiency involves the deficits caused due to protein, carbohydrate and fats. The under nutrition consequences can estimate by the body weight measurements. The body weight measurements along with the aspects of age and sex can evaluate the energy stores of the individual. The stunted growth is observed as a wide spread consequence in underprivileged populations. The global standard for stunting amongst children in low income countries is 32% (Rimel RW et al, 1982).

Long-term effects of malnutrition

Malnourished people lacks energy, so they become less curious and communicate less with the people, this weakens their physical, mental and cognitive development. Literature depicts the long term neurological deficits has been caused by malnutrition (Masson F et al, 2003; Tagliaferri F et al, 2006). Several studies concluded that stunting in younger age causes a cognitive decline; these studies proved their results by evaluating the cognitive decline of school going children by testing their IQ level, reading, arithmetic calculations, reasoning questions, vocabulary, and visual-spatial working memory, simple and complex working memory (Masson F et al, 2003).

Micronutrient deficiency

The micronutrient serves as cofactors for enzymes and is engaged in various biochemical reactions.



Vitamin A regulates two important functions of body, the systemic functions and the visual functions. Vitamin A is being an important element for the production of mucopolysaccharides and helps to protect against infections. The wetness of mucous membrane is diminished with the deficiency of Vitamin A; this can be observed as xerophthalmia (dry eye). Vitamin A deficiency develops rapidly in children with measles, as in infections the body utilizes its vitamin A stores immediately.

The vitamin D deficiency has been associated with multiple sclerosis. Vitamin B1 deficiency causes beri-beri and the main symptom is a polyneuropathy in the legs (Berg J, Tagliaferri F, Servadei F, 2005). The Wernicke's encephalopathy has been observed with the prolong use of alcohol, it has been characterized by confusion, unsteadiness and eye movement disorders. It can be reversed if treated with accurate dosage at right time (Berg J, Tagliaferri F, Servadei F, 2005). Vitamin B 3 deficiency leads to "pellagra", it represents the roughness of skin, occasionally it has been appeared along with the with three Ds: dermatitis, diarrhoea and dementia. Vitamin B6 (pyridoxine) regulate the mental functions, the neurological disorders associated with Vitamin B6 deficiency are seizures, migraine and depression.

Conclusion

Nutrition plays an important role in our lives to fight against any certain chronic state and its deficiency creates a noticeable damage to the health status. A strong relationship has been found between the nutritional deficiency and neurological disorders. These nutritional factors may contribute to the pathogenesis of neurological diseases. The intake of fish, green vegetables and fruits can reverse back the adverse condition associated with these disorders.

References

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