



9-2019

What, when and for whom model of Nutrition: a health management approach

Muhammad Rafiq

Institute of Clinical Psychology, University of Management and Technology, Lahore, Pakistan

Follow this and additional works at: <https://ecommons.aku.edu/pjns>

 Part of the [Neurology Commons](#)

Recommended Citation

Rafiq, Muhammad (2019) "What, when and for whom model of Nutrition: a health management approach," *Pakistan Journal of Neurological Sciences (PJNS)*: Vol. 14 : Iss. 3 , Article 2.

Available at: <https://ecommons.aku.edu/pjns/vol14/iss3/2>

WHAT, WHEN AND FOR WHOM MODEL OF NUTRITION: A HEALTH MANAGEMENT APPROACH

Dr. Muhammad Rafiq¹

1: Institute of Clinical Psychology, University of Management and Technology, Lahore, Pakistan

Correspondence to: Dr Muhammad Rafiq, Institute of Clinical Psychology, University of Management and Technology, Lahore. E-mail: rafiqdar@hotmail.com ; muhammad.rafiq@umt.edu.pk

Date of submission: March 28, 2019 **Date of revision:** : May 29, 2019 **Date of acceptance:** June 20, 2019

Abstract: Studies have shown that nutrition plays an important role in the pathophysiology of different health issues either physiological, or psychological. Nutrition is implicated in the development of health issues in different ways. The purpose of this mini review was to suggest a comprehensive model of nutrition, “What, When and for Whom Model of Nutrition”, in the light of existing literature. For this purpose, existing literature was explored to study the role of nutrition on mental health in perspective to, what type of nutrition, when it is consumed and/or who consumes it. Researchers concluded that it is not only what we eat affect the mental health, but when and whom it eats also affect the mental health. Author named this 3 Ws (What, When and Whom) Model of nutrition.

Key words: 3Ws model of nutrition, mental health, nutrition, circadian rhythms, proteins, carbohydrates, lipids.

Background: Nutrition is defined as the overall processes that how human obtain, metabolize food and use these food items to carry out their life activities. In other words, nutrition is the quantity and quality of food items that any individual receives. The body actually metabolize these food items to run the different functions of the body. These food items are carbohydrates, proteins, lipids, fiber, vitamins and minerals. Many studies have shown a connection between nutrition and physical health, however, few studies have indicated the connection between nutrition and mental health issues including depression ^[1]. During the last decade, studies have shown that there are significant epidemiological studies on the importance of dietary patterns and mental health. Studies have indicated that diet is necessary for mental health as physical health and studies have also evidenced the role of nutrition in the management of mental health issues ^[2]. Various studies have indicated the importance of what nutrients and who consumes these nutrients on mental health. However, the behavior (when) of consuming these nutrients also impacts mental health. Therefore, there is need to highlight that not only what nutrients and who consumes these nutrients affect health but behavior (when) of the consumption also affects the mental health. Researcher name this, What, When and for Whom model of nutrition, or 3Ws model of nutrition and it is explained with the following literature.

What nutrients and mental health

What we eat is really important for health. The food may contain carbohydrates, proteins, fats, fiber, water, minerals and vitamins. A balance of these food constituents is critical and their alteration may be implicated in certain health issues. Not only physical issues but mental health issues including depression, schizophrenia are also linked with nutrition ^[3]. Data on many Asian and Western countries has shown that people are often deficient in various nutrients including minerals and vitamins and deficiency of these nutrition's is linked with various mental disorders. ^[4]. Researches have evidenced that taking a balanced diet consisting of vital nutrients have shown positive impact on mental health ^[2]. Different nutrients have specific effects in mental health, like proteins have been implicated in brain functioning as many of the neurochemicals are proteins made up of specific amino acids i.e. tyrosine and tryptophan amino acid make neurotransmitters dopamine and serotonin respectively. Deficiency of these amino acids is responsible in low mood in the patients and excess may lead to brain damage ^[5]. Carbohydrates have been implicated in mood and behavior and studies have indicated that carbohydrates trigger the release of insulin hormone letting the sugars in the cells for energy. This also trigger the release of tryptophan amino acid in the brain which affect the level of neurochemical and positively influence performance ^[6]. Studies have shown highest levels of fats in the brain and are present in the neuronal membrane and majority of fats are polyunsaturated which obtain through the diet. Studies have indicated that diets deficient in polyunsaturated fatty acids may lead to effect the function of brain ^[7]. In addition to above mentioned nutrients, vitamins and minerals have also been implicated in physical as well as

mental health. Studies have showed that vitamin B12 is important in delaying the onset of dementia and thiamine is important in cognitive performance ^[8]. Deficiency of folic acid has been observed in the depressive patients ^[9]. Like vitamins, various mineral have also been observed critical in mental health. Low dietary calcium is associated with self-rated depression ^[10] and iodine deficiency may be responsible for brain damage ^[11]. Micronutrients have also been associated with mental health like chromium deficiency has shown link with depression ^[12]. Iron and zinc deficiency is also been associated with depression ^[8, 13]. Importance of Lithium in psychiatry is well known and its use has been implicated in managing depression, aggression, and eating disorders ^[14]. Studies have evidenced that a diet rich in vitamin C may be an effective treatment of anxiety and improve academic performance in university students ^[15].

When we eat and mental health

It is not only important that what we eat but it is also important when we eat. So, the second W represent WHEN we eat. The concept of, "WHEN WE EAT" can be explained in different perspectives. In perspective to circadian rhythms, there is central master clock in hypothalamus responsible in the regulation of circadian rhythms. This clock also regulates different proteins and processes which actually follows daily variations of such proteins and different processes including metabolism. It has been studied that at cellular levels, that different nutrients including glucose, thiamine, caffeine etc. can disturb the circadian rhythms of different processes ^[16]. So, if the food taken at certain circadian time, might have different effect on the physical parameters and may be responsible for development of psychobiological issues. Nutrients may have positive or negative effects on mental health depending on when we eat. Studies have shown that various nutritional components may affect negatively on the circadian system like caffeine may synchronize to new time zones after jetlag. So, circadian system has importance for nutritional science and may help reduce the burden of psychological issues and other chronic disorders ^[17]. This concept is also supported by the animal studies that circadian time of the food intake contributes in weight gain ^[18]. Such studies in human adults have shown that circadian timing also affects meal satiety i.e. food intake during night hours is less satiating and further leads to more caloric intake during the next day ^[19].

Who eat and mental health

In addition to WHAT and WHEN the food is eaten, it is also import WHO eat the specific food. Study on the effect of caffeine in children has shown a remarkable effect on behavior and sleep problems are reported higher as compared to adults ^[20]. Even in pregnancy, higher levels of caffeine may be associated with delivering low birth weight infants ^[21]. Certain variety of fish like swordfish, containing high levels of mercury should be avoided in pregnancy, as it may lead to developmental problems in children ^[22]. Study on animals has shown that despite the beneficial effects of peppermint, its use might be implicated in low libido by decreasing testosterone levels in male rats ^[23] and it is suggested that men should consume peppermint in limited quantity. Certain food additives like sodium benzoate and artificial food colors have been resulted in increasing hyper activity in children ^[24]. It is suggested that phytoestrogens may be implicated in feminizing effects in males ^[25]. Phytoestrogens are present in soy, flaxseeds, peaches, prunes, green beans and strawberries. In addition to above mentioned studies, there are other studies as well which support the 3Ws model of nutrition. Concluding this briefly, it is modeled that it does not only matter what we eat, it is also important when we eat and who eats. This model gives a health management approach in our daily lives. This model can be helpful for general physicians, nutritionists, health counsellors, clinical and nutritional psychologists.

References:

1. Jacka, F.N., et al., Associations between diet quality and depressed mood in adolescents: results from the Australian Healthy Neighbourhoods Study. *Australian and New Zealand Journal of Psychiatry*, 2010. 44(5): p. 435-442.
2. Lakhan, S.E. and K.F. Vieira, Nutritional therapies for mental disorders. *Nutrition journal*, 2008. 7(1): p. 2.
3. Murray, C. and A. Lopez, *The global burden of disease: the World Health Organization and the World Bank*. 1996, Cambridge, Mass: Harvard University Press.
4. SHAPSE, S.N., *THE DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS* i. 2008.
5. Mahan, L.K. and S. Escott-Stump, *Krause's food, nutrition, & diet therapy*. Vol. 11. 2004: Saunders Philadelphia.

6. Markus, C., Effects of carbohydrates on brain tryptophan availability and stress performance. *Biological Psychology*, 2007. 76(1-2): p. 83-90.
7. Sinclair, A.J., et al., Omega 3 fatty acids and the brain: review of studies in depression. *Asia Pacific journal of clinical nutrition*, 2007. 16(S1): p. 391-397.
8. Bourre, J.-M., Effects of nutrients (in food) on the structure and function of the nervous system: update on dietary requirements for brain. Part 1: micronutrients. *Journal of Nutrition Health and*
9. Coppen, A. and J. Bailey, Enhancement of the antidepressant action of fluoxetine by folic acid: a randomised, placebo controlled trial. *Journal of affective disorders*, 2000. 60(2): p. 121-130.
10. Bae, Y.-J. and S.-K. Kim, Low dietary calcium is associated with self-rated depression in middle-aged Korean women. *Nutrition research and practice*, 2012. 6(6): p. 527-533.
11. Delange, F., Iodine deficiency as a cause of brain damage. 2001, *The Fellowship of Postgraduate Medicine*.
12. Docherty, J.P., et al., A double-blind, placebo-controlled, exploratory trial of chromium picolinate in atypical depression: effect on carbohydrate craving. *Journal of Psychiatric Practice*, 2005. 11(5): p. 302-314.
13. Levenson, C.W., Zinc: the new antidepressant? *Nutrition reviews*, 2006. 64(1): p. 39-42.
14. Mohandas, E. and V. Rajmohan, Lithium use in special populations. *Indian journal of psychiatry*, 2007. 49(3): p. 211.
15. Ribeiro, C., Effects of oral vitamin C supplementation on anxiety in students: a double-blind, randomized, placebo-controlled trial. *Pakistan Journal of Biological Sciences*, 2015. 18(1): p. 11-18.
16. Froy, O., The relationship between nutrition and circadian rhythms in mammals. *Frontiers in neuroendocrinology*, 2007. 28(2-3): p. 61-71.
17. Potter, G.D., et al., Nutrition and the circadian system. *British Journal of Nutrition*, 2016. 116(3): p. 434-442.
18. Arble, D.M., et al., Circadian timing of food intake contributes to weight gain. *Obesity*, 2009. 17(11): p. 2100-2102.
19. de Castro, J.M., The time of day of food intake influences overall intake in humans. *The Journal of nutrition*, 2004. 134(1): p. 104-111.
20. Watson, E.J., et al., The Relationship Between Caffeine, Sleep, and Behavior in Children. *Journal of Clinical Sleep Medicine*, 2017. 13(04): p. 533-543.
21. Chen, L.-W., et al., Maternal caffeine intake during pregnancy is associated with risk of low birth weight: a systematic review and dose-response meta-analysis. *BMC medicine*, 2014. 12(1): p. 174.
22. Bose-O'Reilly, S., et al., Mercury exposure and children's health. *Current problems in pediatric and adolescent health care*, 2010. 40(8): p. 186-215.
23. Sampaio, F., Effects of peppermint teas on plasma testosterone, follicle-stimulating hormone, and luteinizing hormone levels and testicular tissue in rats. *Int. Braz. J. Urol*, 2004. 30(4): p. 350-1.
24. McCann, D., et al., Food additives and hyperactive behaviour in 3-year-old and 8/9-year-old children in the community: a randomised, double-blinded, placebo-controlled trial. *The lancet*, 2007. 370(9598): p. 1560-1567.
25. Jargin, S.V., Soy and phytoestrogens: possible side effects. *GMS German Medical Science*, 2014. 12.

Conflict of interest: Author declares no conflict of interest.

Funding disclosure: Nil

Author's contribution:

Muhammad Rafiq; concept, data collection, data analysis, manuscript writing, manuscript review