

## A Quick Review of DASH Diet and its Effect on Mental Disorders

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Mental disorders and the related symptoms such as depression, anxiety, and aggression are related to increased mortality and higher risk of chronic diseases. The number of people with depression and anxiety as two common mental disorders has increased by 18.4 and 14.9%, respectively between 2005 and 2015<sup>1</sup>. Therefore appropriate strategies to prevent psychological disorders and decrease their burden to the society and healthcare system is an important issue<sup>2,3</sup>. Diet as a lifestyle factor can contribute to developing mental disorders. Most studies that examined the relationship between mental disorders and nutritional factors are more on B vitamins, folate and omega-3 fatty acids<sup>4,5</sup>. It has been shown that focused a diet high in olive oil and monounsaturated fatty acids was negatively associated with depression<sup>6</sup>. Also, the inverse linear association was detected between fruit and nut consumption and the prevalence of depression. It has been seen that the Mediterranean diet was associated with lower risk of depression<sup>7</sup>. Previous studies have shown positive effects of dietary approaches to stop hypertension (DASH) on various diseases such as diabetes, metabolic syndromes, hypertension and cardiovascular diseases<sup>8-12</sup>. There are limited studies on association of such diet and mental disorders.

DASH diet was originally designed by US National Institutes of health to decreasing blood pressure and prevention hypertension<sup>13</sup>. Advantageous influence of DASH is related to its food group and nutrients ingredients including fruits and vegetables, low-fat dairy, whole grains, nuts, limited salt, sweets and red meat, limited fat intake, high fiber, potassium, and magnesium. This diet is a low-glycemic index and low-energy-dense dietary pattern regarding its emphasis on carbohydrate quality. Individuals should make an effort to reduce high sodium snacks, salted chips, and processed food. DASH diet provides less than 2400 mg sodium a day from all foods. Base on a 2000 kcal of a DASH diet, 6 serving of whole grains, 3-4 serving of vegetables, 4 serving of fruits, ½ to 1 serving of nuts, 2-3 servings of nonfat or low-fat milk, 3 serving of oils and 1-2 serving of meat, fish and poultry are suggested<sup>14</sup>. There is potential interaction among various nutrients and foods,

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**Received:** 13 May 2018

**Accepted:** 18 Jun 2018

**Citation to this article:** Daneshzad E, Azadbakht L. A Quick Review of DASH Diet and its Effect on Mental Disorders. *JIMC*. 2018;1(1):45-48.

therefore evaluating the whole diet as a dietary pattern is preferable than a single nutrient or food.

Torres and Nowson reported that DASH diet improved depression and its mood in postmenopausal women<sup>15</sup>. Also, Valipour *et al*<sup>16</sup> and Khayatzadeh *et al* on women and girls<sup>17</sup> found that an inverse association between adherence to the DASH diet and prevalence of depression. However, that study by Valipour *et al* showed it only in moderate adherence to and they failed to demonstrate a strong linear relationship<sup>16</sup>. Khayatzadeh *et al* found no significant association between adherence to the DASH diet and aggression<sup>17</sup>. Despite limited studies about DASH diet and mental health status, several studies had shown such an association with the DASH dietary ingredients and depression. A systematic review and meta-analysis had shown a reduced risk of depression by high intake of whole grains, vegetables, fruits, and reduced-fat dairy products, which DASH diet as a healthy dietary pattern is rich in these groups of food<sup>18</sup>.

There are several nutrients and foods such as folate, B vitamins, n-3 PUFAs, and fish that have shown beneficial effects on psychological improvement. Also, reducing inflammation<sup>19</sup> and oxidative stress<sup>20</sup> as well as managing metabolic syndrome<sup>10</sup> can play a potential role in controlling the pathogenesis of these diseases. Inflammation and oxidative stress can promote depressive symptoms by insulting autonomic nervous systems and destroying neurons<sup>21</sup>. Higher amount of added sugar and sugar-sweetened beverages were associated with depression risk and other mental stress<sup>22-24</sup>. Diets high in sweets can increase glycemic response and induce oxidative stress<sup>25</sup>. Artificial sweeteners in beverages such as aspartame, may have neurological effects and may modulate brain neurotransmitters such as serotonin and dopamine<sup>26,27</sup>. Moreover, diets which are high in sodium can increase cortisol and insulin resistance<sup>28</sup> as well as lead to hypertension and increasing endothelial dysfunction which can trigger the onset of inflammation<sup>29</sup>. Therefore restricted consumption of sweets, sugar-sweetened beverages and salt in DASH diet may

have a beneficial effect on mood too.

DASH diet recommends lower amount of dietary fat, however it appreciates the omega-3 fatty acid which has a beneficial effect on depressive symptoms<sup>5,6</sup>. Based on previous studies, omega-3 as an anti-inflammatory nutrient can down-regulate inflammatory cytokines such as TNF- $\alpha$ , NF-kB, IL-1 and IL-6 which are a response to inflammatory status and insulin resistance among mental patients<sup>30</sup>. The anti-inflammatory potent of omega-3 may alleviate the overactivity of the immune system which is associated with depression<sup>31</sup>. Also, levels of some neurotransmitters that are associated with depressive symptoms such as serotonin and dopamine may be affected by omega-3<sup>31</sup>. It seems that it is better to follow dietary sources of omega-3 in our diet rather than other sources of fats if we tend to improve depressive symptoms.

High consumption of fruit and vegetables which are rich in magnesium, folate, B vitamins, zinc, and antioxidants are suggested to help with mental disorders through a DASH diet<sup>32</sup>. Folate and other B vitamins are essential for neuronal function and proper methylation cycle and their deficiency is link to depression, anxiety, memory malfunction, and dementia<sup>33</sup>. As mentioned above, inflammatory cytokines and immune system are linked to the nervous system. B vitamins are implicated in regulating immune responses, reducing inflammatory cytokines, and improving mental symptoms<sup>34</sup>. Moreover, DASH diet which includes a high amount of fruit and vegetables have a lower Dietary Acid Load (DAL)<sup>29</sup>, which plays a potential role in a maintaining healthy diet followed by reduce risk of blood pressure. Blood pressure is associated with endothelial dysfunction, inflammation and also with increased risk of mental disease<sup>29,35</sup>.

Previous studies suggest that the DASH diet might be an effective approach to improve psychological disorders, however limited number of researches and lack of investigations on association between DASH and age and gender make it unclear for the potential mechanisms and the exact relationship between DASH diet and psychological disorders.

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