



Adherence to a Dash-style diet in relation to depression and aggression in adolescent girls



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ABSTRACT

The aim of this study was to assess adherence to the Dietary Approach to Stop Hypertension (DASH) dietary pattern in relation to depression and aggression in adolescent girls. The study was carried out among 580 girls aged between 12 and 18 years of age. DASH scores were determined according to the method of Fung et al. A Persian version of the Beck Depression Inventory and Buss-Perry questionnaire were used for the assessment of depression and aggression. We analysed our data using crude and adjusted models. Adjustments were made for age, energy intake, mother's job status, passive smoking, start of menstruation, parental death, parental divorce, physical activity level and body mass index, using three different models. A high adherence to a Dash-style diet (for individuals in the upper quartile) was associated with a lower odds of depression compared with subjects with lower adherence (those in the lowest quartile) (OR 0.47; 95% CI 0.26–0.84, P-value = 0.009); these associations remained significant after adjustments. However, we did not obtain any significant relationship between a DASH-style diet and aggression. We observed a significant inverse relationship between greater adherence to a DASH diet and lower odds of depression. Further prospective studies are needed to confirm these findings.

1. Introduction

Recent reports indicate that mental health disorders and substance misuse are an important cause of disability adjusted life years and the leading cause of all non-fatal diseases globally (Whiteford et al., 2013). Depression is one of the most common mental health conditions (Meyer, 2004; Üstün et al., 2004). It is a heterogeneous disorder with behavioural, psychological, and somatic symptoms (Joynt et al., 2003). Depression has a lifetime prevalence approaching 17%, and is likely to become the second largest disease burden globally by 2020 (Whiteford et al., 2013). In Iran, it has been reported that 43.5% of the adolescent

population is afflicted with depression (Sajjadi et al., 2013). Aggression is a behaviour which is characterised by violent and agonistic behaviour (Gorman et al., 1998). Aggression and violence have several adverse outcomes. Violent behaviour has been proposed to be in the top 20 causes of disability adjusted life years and predicted to increase by 2030 (Rutherford et al., 2007). In a recent systematic review, the prevalence of aggression was reported to be between 40% and 89% in Iranian adolescents and youth (Sadeghi et al., 2014). The prevention and management of these psychological disorders would be of considerable importance.

Several life style factors, including diet, are thought to contribute to

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these psychological disorders (Sacks et al., 2001). Studies have previously assessed the association between several nutrients and foods and psychological disorders. It has been reported that dietary intakes of fish, n-3 poly unsaturated fatty acids (PUFAs), folate, and B vitamins may prevent depressive symptoms (Murakami and Sasaki, 2010). A direct relationship was reported between “junk food” consumption and risk of violent behaviour in Iranian children and adolescents (Zahedi et al., 2014); while Amelia et al. have suggested that a healthy lifestyle is related to a reduced risk of violence in adolescents. A healthy life style includes good nutrition, hygiene practices and being physically active (Turagabeci et al., 2008).

Nutritional epidemiologists have stressed the importance of using an overall dietary pattern approach, rather than individual nutrients or foods, to investigate diet–disease relationships. Using this approach would allow a reduction in the co-linearity confounding that may result when assessing foods and nutrients intake (Hu, 2002). Although, some studies have evaluated the association between various dietary patterns and depression status (Lai et al., 2014), there appear to be no studies on their relationship with aggression.

Findings from a meta-analyses have indicated that adherence to a healthy pattern with high intakes of vegetables, whole grains, fruit and fish, may be related to a reduction in depression risk (Lai et al., 2014). The Dietary Approaches to Stop Hypertension (DASH) pattern is an a priori healthy pattern that contains high intakes of whole grains, fruits, vegetables, legumes and nuts; moderate amounts of low-fat dairy; low amounts of red or processed meats, desserts, and sweetened beverages, and was originally designed to reduce blood pressure (Sacks et al., 2001). Although the beneficial effects of DASH-style diet on other metabolic conditions such as metabolic syndrome (Azadbakht et al., 2011), and cardiovascular disease (Salehi-Abargouei et al., 2013) have been reported, there are limited data available on the association of DASH-style diet and psychological disorders especially in children and adolescents. To the best of our knowledge only a handful of studies have been undertaken between adherence to DASH-style diet and risk of psychological disorders (Torres and Nowson, 2012; Valipour et al., 2015). In one randomized controlled clinical trial, it was concluded that in postmenopausal women, a moderate-sodium DASH-style diet with the consumption of lean red meat on most days, improved mood and depression (Torres and Nowson, 2012). Valipour et al. (2015) reported an inverse association between higher adherence to DASH dietary pattern and depression prevalence among general public adults. Given the potential importance of DASH-style diet in health and high prevalence of psychological disorders, we conducted a cross-sectional study to assess the relationship between adherence to DASH-style diet and depression and aggression presence in 535 adolescent girls.

2. Methods and materials

2.1. Study population

The current cross-sectional study was carried out during 2015, within a sample of adolescent girls living in Iran, that aimed to investigate the association between adherence to DASH dietary pattern and risk of depression and aggression. Participants were recruited using a stratified-cluster random sampling method. The total population included 535 girls aged between 12 and 18 years. We excluded those with any autoimmune diseases, cancer, metabolic bone disease, hepatic or renal failure, cardiovascular disorders, malabsorption or thyroid, parathyroid, adrenal diseases and anorexia nervosa or bulimia. In addition, individuals with taking anti-inflammatory, anti-depressant, anti-diabetic, or anti-obesity drugs, vitamin D or calcium supplement use and hormone therapy within the last 6 months were not included. All study participants completed written informed consent forms prior to study enrolment. The Ethics Committee of Mashhad University of Medical Sciences, Mashhad, Iran, approved this study.

2.2. Demographic and anthropometric assessments

General demographic and socioeconomic data were collected by trained interviewers. Family socioeconomic status (SES) was collected using a standard questionnaire that was previously approved in the Progress in the International Reading Literacy Study (PIRLS) for Iran (Martin et al., 2007). The questionnaire including some variables such as parents' job, possessing private car, school type (public/private), parents' education, type of home (private/rental). SES score was categorized into tertiles, in which the first tertile was defined as low, second tertile as moderate, and third tertile as high SES.

In our study, the majority of mothers were housewife. All of the employed mothers had a full-time job. Therefore, we divided mother job status to just two categories: employed and housewife. Also, educational level of our participants was categorized into middle and high school levels.

Physical activity information was obtained by using the validated Modifiable Activity Questionnaire (MAQ) (Delshad et al., 2015). The participants reported their physical activity over the past year. Specifying the frequency, duration, and thus intensity was determined for physical activity. Physical activity level was calculated based on metabolic equivalent task minutes per week (1 MET = 3.5 mL kg⁻¹ min⁻¹ of O₂ consumption).

Weight, height and waist circumference were measured using standard protocols. Body Mass Index (BMI) was calculated as weight in kilograms divided by height in meters squared.

2.3. Dietary assessment

A 168-item food frequency questionnaire was used assess dietary intakes. The assessment of the validity and reliability of this has been previously reported (Asghari et al., 2012; Hosseini Esfahani et al., 2010). The questionnaire was completed by face-to-face interview. To estimate energy and nutrient intakes, the reported portion size in food frequency questionnaire was converted to grams using household measures and then was entered to the Nutritionist IV software. We assessed under or, over reporting in our population and individuals with an under, or over-reported energy intake (n = 20) were excluded. These subjects reported an energy intake to estimated energy requirement ratio outside the ± 3 SD limits (Table, 2005). The effect of energy intake was controlled by calculating the food group intakes per 1000 Kcal.

2.4. Adherence to Dash-style diet

DASH scores were determined according to the method of Fung et al. (2008). The DASH score includes a measure of high intake of nuts and legumes, fruit, vegetables and low-fat dairy products and whole grains according to quintile categories (i.e., lowest quintile is considered 1 point and highest quintile is considered 5 points). Participants with lower quintile of intake of sweetened beverages, sodium, and red and processed meats were assigned higher points (i.e., the highest quintile received a score of 5 and the lowest quintile received a score of 1). Finally, all component scores were integrated to obtain the overall DASH score, ranging from 8 to 40 points.

2.5. Assessment of psychological health

A Persian version of the Beck Depression Inventory (BDI) was used for the assessment of depression in the current study. The BDI is a self-administered questionnaire of 21 items with various options. The score for the BDI ranges between 0 and 63 points. If the BDI score was < 16, the person was considered as not depressed, and if the subject's score was > 16, they were categorized as depressed. The validity and reliability of BDI were assessed in previous studies (Cronbach's $\alpha = 0.87$ and acceptable test-retest reliability ($r = 0.74$) (Ghassemzadeh et al.,

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