



Original article

Dietary vitamin E and fat intake are related to Beck's depression score



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ARTICLE INFO

Article history:

Received 19 May 2014

Accepted 11 December 2014

Keywords:

Depression
Dietary intake
Micronutrients

SUMMARY

Objective: There is a high prevalence of depressive disorders in all regions of the world. The importance of dietary factors in the causation of depression is suggested from epidemiologic studies in Western countries, but evidence from non-Western populations are lacking. We aimed to assess the relationship between dietary factors with depression scores in a cohort from north eastern Iran.

Methods: A total of 7172 subjects (2725 men and 4447 women) were recruited. Dietary intake was assessed using a 24-h dietary recall questionnaire, and depressive symptoms were assessed using the Beck's depression questionnaire.

Results: The age of the population samples were 49.3 ± 8.2 years for the male and 48.1 ± 8.0 years for the female subgroups. Crude intake of MUFA, SFA and TFA in patients was associated with depression scores. On the other hand, there were significant correlations between depression score and total energy adjusted intake of trans-fatty acid (TFA), cholesterol, vitamin E ($p < 0.01$ for all parameters).

Conclusion: There was an association between diet and depression score among a representative sample of individuals from north eastern Iran, with MUFA intake being inversely related, and vitamin E intake being directly related to Beck's depression score. However it cannot be determined whether this is related to the causation of depression in this cross sectional study.

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1. Introduction

Depression is common in all regions of the world [1]; globally, more than 350 million people have depression which has an important impact on quality of life [1]. Depression is a state of low mood and aversion to activity that can affect a person's thoughts, behavior, feelings and sense of well-being [2,3]. Epidemiological studies have investigated the role of nutrition in depression that evidence indicates that macronutrients such as trans-fatty acids (TFAs), mono unsaturated fatty acids (MUFAs) and poly unsaturated fatty acids (PUFAs) may play an important role in the certain mental

health disorders [4,5]. Deficiency in PUFAs such as linolenic acid, eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA) may have a detrimental effect on depression [5,6] and TFA intake also appears to affect brain function [4,7,8]. Trace elements have long been accepted as essential for optimum health [9]. Zinc is involved in the metabolism of RNA and DNA, signal transduction that enhancing the function of the serotonergic system [10]. Some studies suggest that some fat soluble antioxidant micronutrients, such as vitamin E, protect against neural damage, and a low dietary intake of vitamin E is associated with altered mood [11,12]. Vitamin D plays a role in neuronal and glial cell function [13]. Few epidemiological studies have investigated the relationship between diet and depression outside the western world. Therefore the purpose of this was to investigate the relationship between dietary factors and depression, assessed by the Beck's score in subjects living in north eastern Iran.

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2. Material and method

2.1. Subjects

A total subject sample of 7172 subjects [2725 (40%) males and 4447 (60%) females], were recruited from an urban population in and around Mashhad, northwestern Iran, using a stratified-cluster method and derived from the Mashhad Stroke Heart Atherosclerosis Disorder (MASHAD) study. None of the subjects had a past history of a cardiovascular event (unstable angina, MI and stroke), heart failure, peripheral vascular disease including transient ischemic attack, or a history of any previous cardiovascular interventions or surgery. Persons with any major comorbidity such as cancer, autoimmune, infectious and inflammatory diseases were excluded. All subjects gave informed, written consent to contribute in the survey, which was approved by the Mashhad University of Medical Science Ethics Committee.

2.2. Depression assessment

Symptoms of depression were assessed using the Beck Depression Inventory (BDI) [14]. This questionnaire contained 21 items and measured the severity of several symptoms associated with depression, including: sadness, feelings of hopelessness, crying, fear and appetite loss, and sleep disturbance over the previous 2 weeks [15]. Participants answered each question using a 4-point scale, from 0 to 3. If the total score was under 14, the subject was regarded as non-depressed (normal), 14–19 mild, 20–28 moderate, ≥ 29 as severely depressed respectively [15].

2.3. Anthropometric assessment

Height (in cm), weight (in kg), body mass index (in kg/m^2) and waist circumference were measured in all subjects. Height and waist circumference were measured to the nearest millimeter with a tape measure, and weight was measured to the nearest 0.1 kg with electronic scales.

2.4. Laboratory evaluation

A full fasted lipid profile, comprising total cholesterol, triglycerides, high density lipoprotein cholesterol (HDL-C), and LDL-C, was determined for each patient. Serum lipid and fasting blood glucose (FBG) concentrations were measured by enzymatic methods [16].

2.5. Dietary assessment

Dietary intake was assessed by means of a questionnaire that was designed on the basis of a 24-h dietary recall; dietary analysis was performed using Diet Plan 6 software (Forestfield Software Ltd., Horsham, West Sussex, UK), that can be used to analyze macro- and micronutrient intake. A trained interviewer performed face-to-face interviews, and individuals were asked about all foods and beverages that were consumed [17]. Adjustments of nutrients were made for total energy intake by using the residuals method [18].

2.6. Statistical analysis

Data were analyzed using SPSS 16 software, with descriptive statistics (mean, median, standard deviation [SD], and interquartile range) being determined for all variables. Data were assessed for normality using the Kolmogorov–Smirnov test. Baseline demographic and clinical characteristics were compared between groups using independent samples *t*-test, chi-square and/or Fisher's exact test, as appropriate. Multiple logistic regression analysis was performed to assess the relative importance of selected parameters in determining the presence of moderate and severe depression. Multiple linear regressions analysis was used to determine the association between the independent variable with clinical and biochemical factors *p*-value ≤ 0.05 was considered significant.

3. Results

The means for age were 49.3 ± 8.2 years for the male and 48.1 ± 8.0 years for the female subgroups.

3.1. Clinical, demographic and anthropometric data for subjects in different categories

Table 1 shows the mean and standard deviation for clinical and biochemical parameters in the subgroups; normal subjects, and those with mild, moderate and severe depression. BMI was significantly different between the groups ($p < 0.05$). The proportion of current smokers was significantly higher in moderate compared to the normal and severe depression groups compared to normal and mild groups ($p < 0.05$, Table 1). Depression categories for age have not difference significantly.

Table 1
Clinical and biochemical features' in depression categories.

Variables	Non-depressive (normal),	Mild	Moderate	Severe	P-value
Age (years)	48.6 \pm 2	49.3 \pm 1	50 \pm 4.1	48.9 \pm 8	0.45
BMI (kg/m^2)	27.7 \pm 4.5	28.4 \pm 4.6b	28.5 \pm 4.8b	28.7 \pm 5.2b	<0.01
FBG (mg/dl)	91.2 \pm 35.6	92.2 \pm 37.8	92.5 \pm 39.2	95.2 \pm 42.9	0.12
HDL-C (mg/dl)	43 \pm 1	43.1 \pm 1	42.4 \pm 9.8	42.5 \pm 9.5	0.34
LDL-C (mg/dl)	116 \pm 3.6	116 \pm 3.5	115 \pm 3.5	116 \pm 3.8	0.94
TC (mg/dl)	191.9 \pm 39.1	193.5 \pm 39.5	192.9 \pm 37.5	193.9 \pm 40.1	0.52
TGs (mg/dl)	122 (86–174)	125 (86–179)	125 (90–176)	121 (90–172)	0.15
Current smoking (%)	19%	21.7%	26.6%a	32.4%a*	<0.05
DM (%)	8.3%	9%	8.4%	11%	0.51

Values expressed as mean \pm SD for normally distributed data, and median and interquartile range for non-normally distributed data. ANOVA One-way analysis of variance and Tukey test were used for comparison between groups.

Compared with healthy subjects: a < 0.05, b < 0.01.

Compared with mildly depressed subjects: * < 0.05.

TC = Total cholesterol, HDL-C = High density lipoprotein cholesterol, LDL-C = Low density lipoprotein cholesterol, TGs = Triglycerides, BMI = Body mass index, WHR = Waist to hip ratio, DM = Diabetes Mellitus, WC = Waist Circumference, FBG = Fasting Blood Glucose.

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