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Evaluation of the relationship between major dietary patterns and uninvestigated reflux among Iranian adults

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ABSTRACT

Objectives: The etiology of uninvestigated reflux is largely unknown. Although diet has been associated with uninvestigated reflux, the role of dietary patterns is not clear yet. The aim of this study was to investigate dietary patterns in relation to uninvestigated reflux among Iranian adults.
Methods: This cross-sectional study was carried out within the framework of SEPAHAN (Study on the Epidemiology of Psychological, Alimentary Health and Nutrition) among Iranian adults. Dietary data were collected using a self-administered, 106-item, dish-based, semiquantitative food frequency questionnaire. Uninvestigated reflux was considered to be present when an individual reported to be suffering from heartburn sometimes or frequently in the preceding 3 mo. Specific dietary patterns were identified using factor analysis.
Results: Complete information from 3846 individuals was available for statistical analysis. We identified four major dietary patterns: fast food, traditional, vegetarian, and Western. After controlling for potential confounders, no overall significant associations were found between these dietary patterns and uninvestigated reflux. However, participants in the third quintile of the traditional dietary pattern had greater odds of uninvestigated reflux, either in the crude (odds ratio [OR], 1.37; 95% confidence interval [CI], 1.09–1.74) or the adjusted (OR, 1.52; 95% CI, 1.16–2.00) model taking into account different confounders. After controlling for age, men in the second (OR, 1.64; 95% CI, 1.10–2.45) and women in the fourth (OR, 1.47; 95% CI, 1.02–2.11) quintiles of the fast food dietary pattern were more likely to have uninvestigated reflux. Moreover, in the age-adjusted model, men in the second (OR, 1.72; 95% CI, 1.14–2.59) and fourth (OR, 1.56; 95% CI, 1.03–2.35) quintiles, and women in the second (OR, 1.48; 95% CI, 1.08–2.04) quintile of the traditional dietary pattern were at higher risk for being diagnosed with uninvestigated reflux.
Conclusion: Although the present study showed no statistically significant associations between major dietary patterns and the risk for uninvestigated reflux, relative positive associations were found between uninvestigated reflux and adherence to either fast food or traditional dietary patterns, suggesting that these contribute to the risk for developing reflux.

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Introduction

Gastroesophageal reflux disease (GERD) is a common and chronic disease in both developed and developing countries and probably the most common disease encountered by gastroenterologists [1]. GERD results from abnormal reflux of acidic contents from the stomach into the esophagus [2]. Heartburn and regurgitation are the two most typical symptoms of GERD. Heartburn is defined as the painful retrosternal burning sensation of fairly short duration, and regurgitation as the backflow of gastric content into the mouth, not associated with nausea or retching [3]. In a systematic review, the approximate prevalence for GERD, defined by at least weekly heartburn and/or acid regurgitation, was estimated to be 10% to 20% in the Western world, whereas in Asia it is <5% [4]. The prevalence of GERD in Iran has been reported to range from 1.9% to 52 % in different studies [5], possibly due to wide variations in methodologies or definition criteria that were used.

The pathophysiology and etiology of gastroesophageal reflux is complex and poorly defined [6–8]. Genetic, environmental, anatomic, hormonal, and neurogenic factors are related to the development of GERD [6,9,10]. Lifestyle changes, including dietary modification, are usually recommended for the prevention or treatment of GERD [8,11]. Several food items have been suggested to worsen GERD-related symptoms, thus, recommendations, including the reduction of fat, chocolate, peppermint, and coffee intake, may be beneficial for patients with GERD [12]. Nevertheless, the results of studies in relation to these recommendations are inconsistent [10,13–16]. Some of the studies have examined associations between GERD and dietary composition (total energy, macronutrients, and micronutrients) [17]. A direct association between consumption of cholesterol, saturated fatty acids and calories from fat, and likelihood of having reflux symptoms has been suggested [18]. Although it was shown that dietary fat content is related to increased frequency of reflux symptoms [19,20], other studies indicated no association, or even an inverse association, between dietary fat intake and GERD symptoms [21,22]. Patients with uninvestigated reflux (based on patient complaints of increased heartburn) often are told to avoid fat, chocolate, peppermint, and onions because these food items decrease lower esophageal sphincter (LES) pressure or increasing transient LES relaxations [23–27].

Table 1
Food groupings used in the dietary pattern analyses

Food groups	Food items
Meat	Red meats
Processed meat	All types of sausages
Organ meats	Heart, liver and kidney, intestine, and viscera
Fish	All types of fish
Poultry	Chicken
Eggs	Eggs
Butter	Butter
Low-fat dairy products	Dough (yogurt drink), yogurt, Kashk (curd), milk, cheese
High-fat dairy products	Cream, ice cream, pizza cheese
Tea	Tea
Coffee	Coffee
Fruit	Apple, cherries, apricots, plum, fresh figs, kiwi, strawberry, grapes, fresh berries, date, barberry, banana, pomegranate, melon
Citrus fruits	Oranges, naringin, grapefruit
Fruit juices	Lemon juice, all types of juice
Onions	Onions, fried onions
Nonflatulent vegetables	Mushrooms, carrots, vegetable, green beans, mixed vegetables, lettuce, eggplant, non-chili pepper
Flatulent vegetables	Cucumber, cabbage, green peas
Legumes	Chickpeas, beans, pea, lentil, mung beans
Whole grains	Whole bread, diet breads, whole wheat
Refined grains	White bread, baguette bread, rice, flour, macaroni, noodle, biscuit
Snacks	Chips, puff
Nuts	Walnut, all types of nuts
Mayonnaise	Mayonnaise
Dried fruit	Raisins, dried berries, dried limes
Sweets and desserts	Pastries, cake
Chocolate	All types of chocolate
Hydrogenated fats	Tail, hydrogenated fats
Vegetable oils	Nonhydrogenated oils
Sugars	Candy, sugar, tamarisk
Condiments	Jam, honey
Tomatoes	Tomatoes, tomato paste, red sauce
Carbonated drinks	Soft drinks
Pickles	Pickles
French fries	French fries
Salt	Salt
Chili peppers	Green and red chili peppers
Cocoa milk	Cocoa milk
Potato	Baked potato
Soy	Soya

Table 2
Factor-loading matrix for major dietary patterns*

Foods	Dietary patterns			
	1	2	3	4
French fries	0.84	–	–	–
Vegetable oils	0.78	0.43	–	–
Meat	0.72	0.45	–	–
Pepper	0.71	–	–	–
Salt	0.60	0.60	–	–
Onions	0.56	0.20	0.26	–
Soy	0.51	–	–	–
Egg	0.47	–	–	–
Refined grains	0.37	–	–	–
Legumes	0.33	0.59	–	–
Nonflatulent vegetables	0.29	0.44	0.52	–
Tomato	0.22	–	0.54	–
Potato	0.21	0.20	–	–
Poultry	–	0.50	–	–
Tea	–	–	–	–
Coffee	–	–	–	0.20
Sugars	–	–	–	0.32
HVO	–	0.51	–	–
Dried fruits	–	0.43	0.32	–
Pickles	–	–	0.20	0.34
Citrus fruits	–	–	0.61	–
Whole grains	–	–	–	–
Flatulent vegetables	–	–	0.61	–
Mayonnaise	–	–	–	0.34
Processed meats	–	0.29	−0.20	0.38
Fruits	–	–	0.64	–
Low-fat dairy products	–	–	0.41	–
Carbonated drinks	–	–	–	0.42
Sweets and desserts	–	–	–	0.53
Fish	–	0.50	–	–
Butter	–	–	–	0.28
Chocolate	–	–	–	0.46
Nuts	–	–	0.27	0.28
High-fat dairy products	–	–	–	0.43
Fruit juice	–	0.30	0.26	0.24
Condiments	–	–	–	–
Organ meats	–	0.50	–	0.20
Snacks	–	–	–	0.46
Cacao milk	–	–	–	0.26
Percent of variance explained	10.5	7.7	6.3	5.6

HVO, hydrogenated vegetable oil
* Values <0.20 were excluded for simplicity.