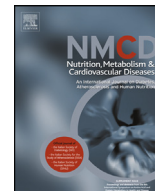


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Dietary patterns and the risk of coronary heart disease among Jordanians: A case–control study

R.F. Tayyem^{a,*}, A.E. Al-Shudifat^b, A. Johannessen^{b,c}, H.A. Bawadi^d, S.S. AbuMweis^e, L.M. Agraib^a, S.S. Allhedan^a, I. Haj-Husein^a, M. Azab^b^a Department of Nutrition and Food Technology, Faculty of Agriculture, The University of Jordan, Amman, Jordan^b The Hashemite University, Faculty of Medicine, Zarqa, Jordan^c Centre for Imported and Tropical Diseases, Oslo University Hospital, Ullevål, PO Box 4956, 0424 Oslo, Norway^d Department of Human Nutrition, College of Health Sciences, Qatar University, Doha, Qatar^e Department of Clinical Nutrition and Dietetics, Faculty of Allied Health Sciences, Hashemite University, Zarqa, Jordan

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Abstract *Background and Aims:* Dietary pattern and lifestyle have been reported to be significant risk factors in the development of coronary heart diseases (CHD). The contribution degree of these dietary risk factors in CHD development in non-westernized countries is unclear. This study aimed to evaluate several dietary choices and their potential association with CHD.

Methods and results: A case–control study was conducted at Prince Hamza Hospital, a referral center for coronary angiography in Amman, Jordan. Four-hundred patients referring for elective coronary angiography with clinical suspicion of coronary artery disease were enrolled. Data was collected using interview-based questionnaires. Dietary patterns were derived using Principal Component Analysis. Multivariate logistic regression was used to estimate the relationship between dietary choices and CHD. Three dietary patterns were identified. The “Healthy Dietary Pattern”, which presented a diet rich in olive oil, fruits, vegetables, legumes, whole grains, fish, and low meat intake, was associated with a significant decrease in the odds of CHD (OR = 0.53, 95% CI = 0.28–0.98). The “High-Fiber Pattern”, which is mainly composed of legumes and bulgur, significantly reduced the odd of CHD (OR = 0.55, 95% CI = 0.27–0.92) for the fourth quartile compared to the first one. No significant association was found between CHD and the “Western Dietary Pattern”, which is loaded with refined grains, sweets and deserts, sugary drinks, and deep fried foods.

Conclusions: The “Healthy Dietary Pattern” and the “High-Fiber Pattern” were associated with a decrease in odds of CHD among Jordanians.

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Introduction

Coronary heart disease (CHD) is a leading cause of mortality and morbidity all over the world. An estimated 17.7

million people died from cardiovascular diseases (CVDs) in 2015, representing 31% of all global deaths [1]. Of these deaths, an estimated 7.4 million was due to CHD and 6.7 million to stroke [1]. More than three quarters of CVD

* Corresponding author. Department of Nutrition and Food Technology, Faculty of Agriculture, The University of Jordan, PO Box 2920, Amman, 11941, Jordan.

E-mail addresses: r.tayyem@ju.edu.jo (R.F. Tayyem), amalmufleh@hotmail.com (A.E. Al-Shudifat), Johannessen.asgeir@gmail.com (A. Johannessen), hbawadi@qu.edu.qa (H.A. Bawadi), suhad.abumweis@hu.edu.jo (S.S. AbuMweis), elonafsh2003@yahoo.com (L.M. Agraib), sabika_1986@yahoo.com (S.S. Allhedan), i_husseini@ju.edu.jo (I. Haj-Husein), azab128@yahoo.com (M. Azab).

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mortalities occur in low- and middle-income countries [1]. In Jordan, non-communicable diseases are estimated to account for 76% of total deaths of which 35% are due to CVDs. Even though the age-standardized death rates of CVD decreased noticeably from 2000 (440/100,000 deaths) to 2012 (360/100,000 deaths), CVD remains the first cause of death among Jordanians [2].

Among modifiable risk factors for CHD are obesity and diabetes. Jordan is a middle-income country situated in the Middle East, a region of the world where the prevalence of obesity is high. Indeed, the prevalence of obesity in the adult Jordanian population is estimated to be 23.7% in men and 39.6% in women, respectively [3]. At the same time, the prevalence of type 2 diabetes mellitus (T2DM) is higher in the Middle East than in any other region of the world, and steadily increasing from 5.9% in 1980 to 13.7% in 2014 [4]. Other established risk factors of CVD include genetic makeup, family history, tobacco use, physical inactivity, and atherogenic diets [5]. Many studies have shown that unhealthy dietary pattern contributes to CVDs [6–9]. A Western diet characterized by increased consumption of refined grains, sweets and desserts, sugared drinks, and deep fried foods has been associated with development of CVD [9]. On contrary, a Mediterranean dietary pattern that is rich in olive oil, fruit, vegetables, legumes, whole grains, fish, and little meat, is considered a healthy pattern [9]. Diets low in trans-fat, saturated fat, refined carbohydrates, and sugar-sweetened beverages and rich in fruits and vegetables, whole grains, and sources of unsaturated fats are associated with reduced risk of CVD [6]. Stewart et al. concluded that higher consumption of healthy foods may be more effective in secondary prevention of CVDs than avoidance of less healthy foods typical of Western diets [9]. Convincing evidence reported by the Nurses' Health Studies indicates that approximately 80% of CHD incidence could be prevented by avoiding smoking, consuming a healthful diet, avoiding western dietary pattern, and engaging in moderate to vigorous physical activity for at least 30 min most days [6]. Nevertheless, little is known about the role of the diet in the development of CHD in non-Westernized countries. Since food habits and traditions vary in different regions of the world, it is important to identify culturally appropriate healthy diets, in order to promote uptake and implementation of nutrition recommendations. The aim of this study was to look for association between major dietary patterns and CHD among Jordanians.

Methods

Study setting and participants

This study was carried out at Prince Hamzah Hospital, a referral hospital in the capital Amman. Participants were recruited from the catheterization section of the cardiology department between January and December 2015. Four-hundred patients referring for elective coronary angiography with clinical suspicion of coronary artery disease were enrolled in the study. Two-hundred cases

with CHD were matched with 200 controls by age and gender; hence, the ratio of cases to controls in this study was 1:1. Patients with acute coronary syndrome were treated elsewhere and therefore not included in the present study. Participants who suffered from kidney disease, liver disease or gastrointestinal diseases were excluded. All patients signed a consent form. The study protocol conformed to the ethical guidelines of the 1975 Declaration of Helsinki, and was approved by the Institutional Review Board Ethics Committee at Prince Hamzah Hospital.

Data collection

Information of socio-demographic factors, previous health issues (hypertension, diabetes mellitus, dyslipidemia), smoking status, and family history of CHD were recorded by trained research assistants using standardized questionnaires. All data were collected from patients on the day before they underwent coronary angiography.

Coronary angiography

Briefly, the catheter was inserted into the radial artery using a Seldinger technique, and the tip was advanced to the aortic sinus cusp. X-ray images of the transient radio-contrast distribution within the coronary arteries were carried out to visualize the arterial tree. The degree of obstruction was estimated as percentage of the arterial lumen by comparing the area of narrowing to an adjacent normal artery. The procedure was performed by trained cardiologists using standard technique. Cases were identified when there is an arterial lumen narrowing or obstruction, while participants with normal angiography were selected in the control group.

Laboratory analysis

Venous blood samples were drawn after 12 h overnight fasting. Serum samples were separated from whole blood and stored at -80°C until subsequent analyses. Fasting blood lipid profile including total cholesterol, low-density lipoprotein (LDL), high-density lipoprotein (HDL) and triglyceride (TG) levels, were measured with the 6305 UV/Visible Spectrophotometer (Jenway Staffordshire, UK) using Commercially available enzymatic kits (Teco Diagnostics, Anaheim, CA, USA). Fasting blood glucose was measured with the ARCHITECT ci8200 assay (Abbott, Abbott Park, IL, USA).

Anthropometric measurements

Body weight and height were measured according to Lee and Nieman [10]. Body weight was measured to the nearest 0.1 kg, with minimal clothing and without shoes, using a calibrated scale (Seca, Hamburg, Germany) [10]. Height was measured to the nearest 0.1 cm with participants in standing position without shoes using a calibrated portable measuring rod (10). BMI was calculated by dividing weight in kilograms to the square of height in meters and was categorized according to the National Institutes of Health: normal body weight, 18.5–24.9; overweight, 25.0 to 29.9;

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