ORIGINAL ARTICLE

The effect of unhealthy snacks on incidence of hypertension in adults during 3 years follows up: Tehran Lipid and Glucose Study

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ABSTRACT

Hypertension is one of the cardiovascular disease risk factors and its prevalence in our country is increasing due to ongoing nutrition transition to a westernized diet pattern. Using salty snacks may prepare a situation for incidence of hypertension and using sweets and carbonated drinks will increase blood pressure via inducing over weight and obesity. The aim of this study is to investigate the effect of unhealthy snacks on the risk of incidence of hypertension in Tehranian adults after 3 years follow up.This longitudinal study was conducted in the frame work of Tehran Lipid and Glucose study, on 1878 Tehranian adults, between 2006-2008 and 2009-2911. Dietary intakes of participants were measured using a validated semi-quantitative food frequency questionnaire at baseline and after 3 years. The amount of various kind of industrial and homemade cake, cookies, biscuit, candy, cracker, ice cream, potato chips, cheese snack and carbonated drinks in gram, were considered as main exposure factors. Hypertension was defined as having systolic blood pressure equal or more than 140 mmHg and diastolic blood pressure equal or more than 90 mmHg. Multiple logistic regression models with adjustment for confounding factors were used to estimate the occurrence of hypertension in each quartile of unhealthy snacks. The mean±SD age of males and females at baseline were 37.14±10.77 and 36.25±10.77 respectively. A non significant increase in risk of incidence of hypertension was shown in highest quartile of consumption of salty snacks (odd ratio: 1.26, confident interval 95%: 0.79-2.00) and in third quartile of consumption of sweet (odd ratio: 1.30, confident interval 95% 0.81-2.08). 61% increase in the risk of incidence of hypertension was shown in subjects with highest consumption of carbonated drinks.
High consumption of salty snacks, sweets and carbonated drinks could be a dietary risk factor for development of hypertension.
Key words: unhealthy snacks, salty snacks, sweets, carbonated drinks, hypertension.

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INTRODUCTION

Hypertension eventually leads to development of cardiovascular disease which is a main cause of death; and it can lead to cerebral vascular disease; so hypertension is considered as one of the most important health problems in the communities. In order to reduce the prevalence of hypertension in a community, it is necessary we know the risk factors and the preventing factors relate to it. In definition, there is not any certain borderline between normal and high blood pressure; so hypertension is defined on the base of its risk for inducing CVD or according to useful effects of its treatments.

Diastolic hypertension is defined as: mild hypertension 90-99 mmHg (first stage), moderate hypertension 100-109 mmHg (second stage), severe hypertension which is equal or more than 110 mmHg (third stage). Systolic hypertension is defined as: mild hypertension 140-159 mmHg (first stage), moderate hypertension 160-179 mmHg (second stage), severe hypertension which is equal or more than 180 mmHg (third stage) [1]. Hypertension is a risk factor for cardiovascular disease and its prevalence is increasing in our country due to ongoing nutrition transition to a westernized eating's pattern. In Iran, we have a few studies about this topic. It has been reported the prevalence of hypertension is more than 88.20% in Gonabad [2], 14% in Kermanshah [3], 82.20% in Tabriz [4] and 32% in Tehran [5] ;taking care and treatment of these patients is an economic burden on government.

MATERIAL AND METHODS

This longitudinal study was conducted in the frame work of Tehran Lipid and Glucose study, on 1878 Tehranian adults, between 2006-2008 and 2009-2911. Information about age, educational level and smoking status was obtained by some expert questioners, using a valid questionnaire and via a face to face interview.

Weight was measured to the nearest 100 gr using digital scales while the individuals were minimally clothed, without shoes. Height was measured to the nearest 0.5 cm, in a standing position without shoes, using a tape measure [6] all of the measurements were done by only one person. BMI was calculated as weight (kg) divided by square of the height (m²).

Dietary intakes data were collected using a validated semi-quantitative questionnaire (FFQ). Intake of various kind of industrial and homemade cakes, cookies, Biscuits, candies, chocolates, cracker, ice cream, potato chips, snack cheese and carbonated drinks (in gram) was considered as main exposure factors. Trained dietitian asked participants to designate their intake of all foods and drinks during past 24 hours. Portion size of consumed foods reported in household measures were then converted to grams [7]. Each food had been coded according to the Nutrition 3 (N3) program and then entered to N3 software in order to calculating its energy and macronutrients contents. Hypertension was defined as having systolic blood pressure equal or more than 140 mmHg and diastolic blood pressure equal or more than 90 mmHg. The educational level of participants was classified as: illiterate or low literacy, intermediary school, and high school and university graduates.

Smoking habit of participants was determined and defined as non-smokers, those who had quit smoking, individuals who smoked occasionally and individuals who smoked daily.

All statistical analyses were conducted using spss (version 16.0; Chicago, IL, USA). . Multiple logistic regression models with adjustment for confounding factors were used to estimate the occurrence of hypertension in each quartile of unhealthy snacks' consumption. Results have been reported as mean ± SD and in some cases, have been reported as percentage of participants.

RESULTS

The mean age of participants was 37.14±10.77 years for men and 36.25±10.77 years for female at the baseline. A non significant increase in risk of incidence of hypertension was shown in highest quartile of salty snacks consumption (odd ratio: 1.26, confident interval 95%: 0.79-2.00) and in third quartile of sweet consumption (odd ratio: 1.30, confident interval 95%: 0.81-2.08). 61% increase in risk of incidence of hypertension was shown in subjects with highest consumption of carbonated drinks (table 1).

Table1: Odds ratio and 95% confidence interval for occurrence of hypertension in each quartile categories of consumption of salty snack, sweets and carbonated drinks.

Quartiles of consumption	Salty snacks					sweets					Carbonated drinks				
	Q1 n=440	Q2 n=440	Q3 n=437	Q4 n=438	P Trend	Q1 n=440	Q2 n=440	Q3 n=437	Q4 n=438	P Trend	Q1 n=440	Q2 n=440	Q3 n=437	Q4 n=438	P Trend
Occurrence of hypertension	1	1.26 (0.79-2.00)	1.14 (0.72-1.80)	1.08 (0.65-1.80)	0.1	1	0.97 (0.61-1.54)	1.30 (0.81-2.08)	1.10 (0.68-1.78)	0.6	1	1.44 (0.89-2.31)	1.19 (0.73-1.95)	1.61 (1.00-2.64)	0.7

DISCUSSION

As given in the result of this study, higher intake of salty snacks, sweets and carbonated drinks is associated with higher risk of hypertension.

Most studies agree that higher intake of dietary salt and higher levels of urinary sodium intake is strongly associated with metabolic syndrome and its components, especially abdominal obesity, insulin resistance and hypertension [8].

Some studies have investigated the effect of caffeinated drinks and carbonated drinks (cola) on hypertension and they reported some undesirable effects of carbonated drinks in relation to increasing

risk of hypertension [3, 9]. Results from a prospective study among American women about habitual consumption of coffee and risk of hypertension showed that although habitual drinking of coffee was not associated with increased risk for hypertension, but a dietary pattern high in carbonated drinks was associated with hypertension regardless of whether it is sugar-sweetened cola or dietetic cola [3].

One cross-sectional study among Iranian adults showed that Western dietary patterns including high consumption of soda, sweets, cookies, and simple sugars was associated with greater odds of having increased TGs and blood pressure [8].

This study also showed a non significant association between incidence of hypertension and using sweets. It has been suggested that energy density is an independent predictor of overweight and obesity in people, so this second factor can prepares a situation for incidence of hypertension.

CONCLUSIONS
High consumption of salty snacks, sweets and carbonated drinks could be a dietary risk factor for development of hypertension.

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