

COMPARISON OF FOOD HABITS AMONG SMOKER AND NON-SMOKER INDIVIDUALS: ISFAHAN HEALTHY HEART PROGRAM

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Abstract

BACKGROUND: Cigarette smoking is an important risk factor of various chronic diseases. Smokers also seem to make a lifestyle which is different from those of non-smokers. This study was conducted to compare dietary habits of smoker and non-smoker individuals.

METHODS: This cross-sectional study was conducted in 2000-2001 in Isfahan and Najaf-Abad counties. Sample size was 6300 individuals aged ≥ 19 year old. The individuals' food habits were assessed by using a food frequency questionnaire.

RESULTS: Smokers' consumption of some foods, including whole dairy products, was higher than that of non-smokers ($P = 0.001$). Also, the frequency consumption of hydrogenated oil and liquid oil in smoker men and non-smoker ones was 6.9 ± 4.2 , 6.5 ± 4.3 , 2.2 ± 2.6 and 2.7 ± 2.4 , respectively ($P = 0.001$). Mean consumption of fast food in smoker men was higher than non-smokers (1 ± 1.4 vs. 0.8 ± 1.5 , respectively, $P = 0.01$). Non-smoking men's mean intake of fruit and vegetables was higher than that of smokers (11.7 ± 6 vs. 11 ± 6 , respectively, $P = 0.01$).

CONCLUSION: The results showed that smokers have an unhealthier dietary pattern than non-smokers; so, this is reflected in their unhealthy food choices, e.g. greater consumption of food products with high levels of saturated fat and cholesterol. Smoking and unhealthy dietary behavior have synergistic effects on incidence of non-communicable diseases. Broad interventions are required in the community towards tobacco consumption control and lifestyle modification in smokers.

Keywords: Smoking, Food Habits, Cardiovascular Disease.

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Introduction

Cigarette smoking is an important risk factor of various chronic diseases, such as cardiovascular disease (CVD) and cancer.¹⁻³ Unhealthy lifestyle - especially regarding food habits - seems to account at least partly for smokers' higher risk of developing CVD and cancer. A number of studies have highlighted significant differences between food habits of smokers and non-smokers.⁴⁻⁶ A study

conducted in Canada demonstrated that smokers' had lower intake of fruit and vegetables and higher intake of saturated fat compared to non-smokers.⁴ In the National Health and Nutrition Examination Survey (NHANESII), smokers consumed more saturated fat, and less unsaturated fat and fibers than did non-smokers.⁶ Moreover, the smokers' food habits were found to be different from those of non-smokers.⁶ A meta-analysis of 51

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studies on the possible link between smoking status and dietary behavior conducted by Dallongeville et al concluded that smokers' food habits are less healthy than those of non-smokers;⁷ hence smokers are exposed to higher risk of CVD.⁵ In Iran, smoking constitutes an important and growing health challenge.⁸ This study used data from phase I of Isfahan Healthy Heart Program (IHHP)⁹ to evaluate and compare dietary patterns of smokers and non-smokers.

Materials and Methods

This is a cross sectional study that was conducted on phase I of IHHP participants in 2000-2001⁹ Using a stratificated cluster random sampling, 6300 individuals were selected from Isfahan and Najaf-Abad counties, according to age, sex, rural and urban population distribution. The samples were aged ≥ 19 years old, had no hemorrhagic diseases and mental retardation, had Iranian nationality, and were living in their current address at least for 6 months. The ethical approval was obtained by the Research Council of Isfahan Cardiovascular Research Center. A questionnaire was designed to obtain demographic information, i.e., age, sex, education, occupation, marital status, income and smoking status. Another questionnaire was used to assess the subjects' knowledge, attitude and practice towards nutrition. The individuals' food habits were ascertained using a 48-item food frequency questionnaire (FFQ). The assessed food items included hydrogenated oil, liquid oil, whole dairy products (butter, cream/clotted cream and

whole milk), organ meats (liver, heart, kidney), fast food (pizzas, hamburgers, sausage), red meet, chicken and fish, nuts (walnut ,pistachio, almond, filbert), junk food (cheese puffs and potato chips), sweets (sweets, cookies, cake, pies, biscuits) and cola. The validity of the questionnaire was confirmed by the Center for Research and Development of Isfahan University of Medical Sciences.⁹ The subjects' level of education was determined according to number of years spent at school. Smokers were defined as individuals smoking at least one cigarette daily.¹⁰ Anthropometric indicators (body height and weight) were measured and the body mass index (BMI) was calculated as weight (kg) divided by the square of height (m).

Statistical analysis

Data were analyzed using SPSS statistical package version 11.5 (SPSS Inc., Chicago, USA). T-test was used to compare mean differences of age, BMI and education in smokers and non-smokers and also to assess the differences in mean consumption of various food items in smokers and non-smokers. Chi-square test was used to determine the frequency distributions in men and women.

Results

Mean and standard deviation of the anthropometric variables and the frequency of sex according to smoking are presented in table 1. It shows a significant difference between frequency of smokers and nonsmokers in both men and women ($P = 0.001$).

Table 1. Demographic and anthropometric characteristics according to smoking

Variable	Non-smokers	Smokers	P*
	Mean \pm SD**	Mean \pm SD	
Age(y)	38.5 \pm 15.0	39.2 \pm 12.8	NS***
Body Mass Index	25.8 \pm 5.5	26.0 \pm 6.3	NS
Education(y)	7.3 \pm 4.9	7.4 \pm 4.5	NS
	Number (%)	Number (%)	
Women	3131 (58.8)	38 (4.5)	0.001
Men	2196 (41.2)	810 (26.9)	0.001

* P-value

** SD: Standard deviation

*** NS: Non-significant

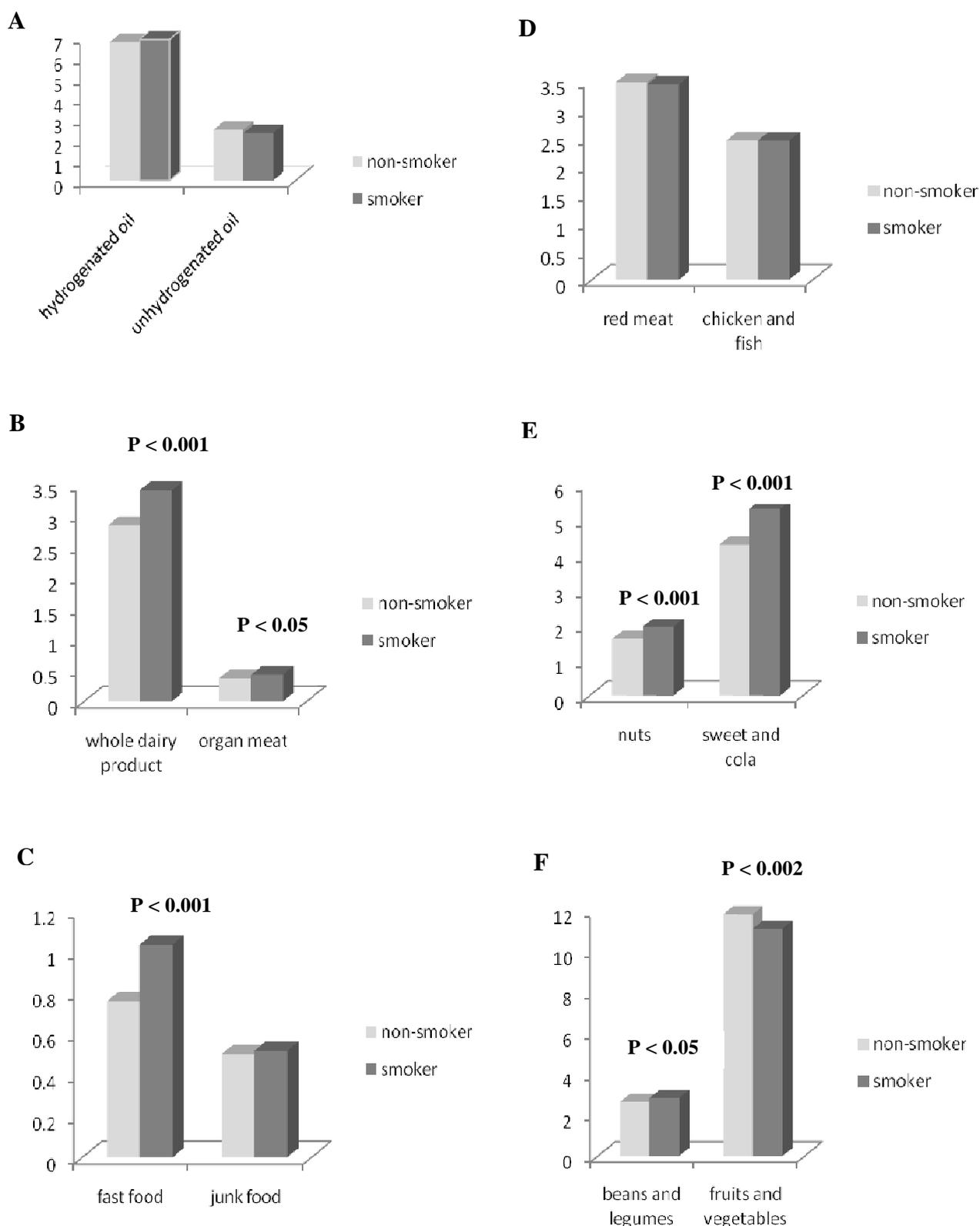


Figure 1. Mean frequency consumption (per week) of some food items

Mean age, BMI and education were not significantly different in smokers and non-smokers (Table 1). Figure 1 presents frequency of consumption of some food items in smokers and non-smokers. Consumption of organ meats, fast food, and sweets in smokers and non-smokers was significantly different ($P < 0.05$). The frequency of consumption of hydrogenated oil and liquid oil in smoker men and non-smoker men was 6.9 ± 4.2 , 6.5 ± 4.3 and 2.2 ± 2.6 , 2.7 ± 2.4 , respectively ($P = 0.001$). Mean consumption of fast food in smoker men was higher than in non-smoker ones (1 ± 1.4 vs. 0.8 ± 1.5 , respectively, $P = 0.01$). Non-smoker men and women consumed higher amounts of red meat compared to smoker men and women (3.6 ± 2.3 , 3.5 ± 2.4 vs. 2.9 ± 2.1 , 3.3 ± 2.3 , respectively, $P = 0.02$). Nonsmoker men consumed higher fruits and vegetables than smokers (11.7 ± 6 vs. 11 ± 6 , respectively, $P = 0.01$).

Discussion

Smokers' food habits seem less healthy than those of non-smokers. This is in concordance with findings of some of other studies.¹¹ Mean consumption of food items with high fat content including whole dairy products and organ meat in smokers is significantly higher than in non-smokers. Epidemiological studies have established a link between consumption of foods with high content of saturated fat and cholesterol and risk of CVD and cancer.

In the present study, we attempted to eliminate the influence of confounding factors on dietary habits of smokers and non-smokers. Our study demonstrated that non-smoking men consumed significantly more liquid oil and less hydrogenated oil than smoking men.

Some studies have shown smokers' lifestyle to be consistently less healthy than those of non-smokers; this is reflected in food habits of the two groups.¹² Smokers tend to use more fast food than non-smokers. A study in the US found unhealthy food habits (e.g. low fruit and vegetable intake and high intake of foods with high content of fat, especially of the saturated type) to be associated with low physical activity and being single, but

not with smoking.⁷ Low intake of fruit and vegetables in smokers has been borne out by a number of other studies as well.^{13,14}

Mean daily frequency of fruit and vegetable intake has been found to be lower than recommended (< 2 times vs. 4 times recommended daily) not only in smokers, but also in non-smokers.¹⁵ In Iran, the difference between men and women in the frequency of intake of fruit and vegetables and fast food can be largely accounted for by the differing lifestyles of men and women. Unlike men, most women (even those in employments) spend more hours at home and have meals with the rest of the family members; hence, by comparison, men's access to fruit and vegetables is lower than women's and their consumption of fast food is higher. Interestingly, no significant difference was observed between smoking and non-smoking women in the latter respect. Smoking status in men had greater influence on food choices than in women. Mean frequency of red meat intake in non-smokers was significantly greater than in smokers, although consumption in both groups fell within recommended guidelines.¹⁶ Mean consumption of various meat types in non-smokers was higher than in smokers; this may be partly explained by non-smokers' apparently higher awareness of basic nutritional requirements.

One of the limitations of this study was the unreliable answers to identify smokers which can increase the possibility of under reporting by the smokers. Another usual limitation is over estimate in report of FFQ questionnaire.

As demonstrated by our study, smokers seem to follow food habits which are less healthy than those of non-smokers. Smoking and unhealthy dietary have behavior synergistic effects on incidence of non communicable diseases. Our findings warrant programs for encouraging healthy lifestyle choices, with a focus on non-smoking.

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Conflict of Interests

Authors have no conflict of interests.

References

1. Thun MJ, Day-Lally CA, Calle EE, Flanders WD, Heath CW. Excess mortality among cigarette smokers: changes in a 20-year interval. *Am J Public Health* 1995; 85(9): 1223-30.
2. WHO. Draft action plant for the global strategy for the prevention and control of non-communicable diseases [Online]. 1997; Available from: URL: <http://www.who.int/nmh/NCDActionPlanResolution.pdf>.
3. Diana JN, Pryor WA. Tobacco smoking and nutrition: influence of nutrition on tobacco-associated health risks. New York: NY Academy of Sciences; 1993.
4. Palaniappan U, Jacobs SL, O'Loughlin J, Gray-Donald K. Fruit and vegetable consumption is lower and saturated fat intake is higher among Canadians reporting smoking. *J Nutr* 2001; 131(7):1952-8.
5. Nestel PJ, Baghurst K, Colquhoun DM, Simes RJ, Mehalski K, White HD, et al. Relation of diet to cardiovascular disease risk factors in subjects with cardiovascular disease in Australia and New Zealand: analysis of the long-term Intervention with pravastatin in ischaemic disease trial. *Am J Clin Nutr* 2005; 81(6): 1322-9.
6. Satia JA, Galanko JA, Siega-Riz AM. Eating at fast-food restaurants is associated with dietary intake, demographic, psychosocial and behavioural factors among African Americans in North Carolina. *Public Health Nutrition* 2004; 7(8): 1089-96.
7. Dallongeville J, Marecaux N, Fruchart JC, Amouyel P. Cigarette smoking is associated with unhealthy patterns of nutrient intake: a meta-analysis. *J Nutr* 1998; 128(9): 1450-7.
8. Sadri GH, Nikmaram MR, Amani A, Rezaee Ashtiani AA, Moattarian A, Heidari S, et al. A survey of CVD risk factors in smokers, non-smokers and passive smokers. *Isfahan Medical School* 2004; 71: 41-8.
9. Sarraf-Zadegan N, Sadri G, Malek AH, Baghaei M, Mohammadi FN, Shahrokhi S, et al. Isfahan healthy heart programme: a comprehensive integrated community-based programme for cardiovascular disease prevention and control. Design, methods and initial experience. *Acta Cardiol* 2003; 58(4): 309-20.
10. Cutter J, Tan BY, Chew SK. Levels of cardiovascular disease risk factors in Singapore following a national intervention programme. *Bull World Health Organ* 2001; 79(10): 908-15.
11. Margetts BM, Jackson AA. Interactions between people's diet and their smoking habits: the dietary and nutritional survey of British adults. *BMJ* 1993; 307(6916):1381-4.
12. Kelishadi R, Sadry G, Zadegan NS, Hashemipour M, Sabet B, Bashardoust N, et al. Smoking, adolescents and health: Isfahan healthy heart programme-heart health promotion from childhood. *Asia Pac J Public Health* 2004; 16(1): 15-22.
13. Wallstrom P, Wirfalt E, Janzon L, Mattisson I, Elmstahl S, Johansson U, et al. Fruit and vegetable consumption in relation to risk factors for cancer: a report from the Malmo diet and cancer study. *Public Health Nutr* 2000; 3(3): 263-71.
14. Ma J, Hampl JS, Betts NM. Antioxidant intakes and smoking status: data from the continuing survey of food intakes by individuals 1994-1996. *Am J Clin Nutr* 2000; 71(3): 774-80.
15. United States Dept of Health and Human Services. Healthy People 2000: national health promotion and disease prevention objectives. Washington: DHHS; 1994.
16. WHO. World health organization regional office for Europe [Online]. 1998; Available from: URL: <http://www.euro.who.int/Document/E70041.pdf> .