Original Article

Sex differences in conventional and some behavioral cardiovascular risk factors: Analysis of the prevention clinic database

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Abstract

Background: An increase in Cardiovascular Disease (CVD) frequency was observed over the past three decades in low- and middle income countries, especially in Iran. The purpose of the present study was to review and compare the frequencies of conventional and some non-conventional CVD risk factors between men and women in a tertiary level referral cardiovascular teaching hospital in a six month period in the North of Iran.

Methods: A descriptive cross-sectional study was conducted using medical databases including conventional risk factors: opium consumption, physical inactivity, high salt diet, and serum vitamin D level. The chi-square and independent t tests were used to assess the differences between groups.

Results: A total of 740 (55% women) who had available full medical history data were recruited in the study. Approximately 62% of the participants were older than 45 years with the mean age of 54 (14.2) years old. Percentages of hypertension, diabetes, dyslipidemia, and obesity in women were significantly higher than those of men ($P<0.05$). A total of 50% of all the participants were physically inactive. Men had higher frequency of opium and saltshaker use than women ($P<0.05$).

Conclusion: The current study indicated that despite the importance of conventional CVD risk factors like diabetes, hypertension, dyslipidemia, and obesity, educational programs should be considered to improve physical activity and reducing salt consumption and awareness about opium use complications.

Keywords: Cardiovascular Diseases; Physical activity; Opium; Obesity; Risk Factors

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Introduction

The past three decades witnessed an increase in Cardiovascular Disease (CVD) frequency. World Health Organization Reported an estimated 17.3 million death of CVD in 2008 a majority of which occurred in low- and middle-income countries (1). The results of Framingham study suggested several risk factors as traditional or conventional risk factors like diabetes, smoking, abnormal total and HDL cholesterol levels, hypertension, and overweight for CVD development (2). Men and women with ≥2 risk factors have a greater risk of developing CHD, stroke and cardiovascular death before 80 compared with persons without any risk factor (3, 4). Also, according to the evidence, men without risk factors are at greater risk for developing CVD compared with women, especially before menopause (4). However, during the recent years, more importance is given to CVD in women and the necessity of preventive strategies (5). Studies have shown greater prevalence of some cardiovascular risk factors, such as diabetes, obesity, and depression, in women than in men (6).

It is generally accepted that having cardiovascular risk factors at a younger age accelerates the rate of atherosclerosis progression in adulthood (7). Consequently, implementing prevention programs during childhood is the obligatory strategy to delay atherosclerosis.

Other factors like physical inactivity (8), high salt diet (9), opium usage (10), prehypertension status (11), and vitamin D deficiency (12) are also proposed as risk factors for CVD development. Similar to many other developing countries, Iran is in the lifestyle transition stage. Hence, we expect an increase in the prevalence of obesity and chronic disease as a result of unhealthy lifestyle (13). CVD is the leading cause of mortality, morbidity, and disability in Iranian population (14). Rapid increase of CDSs has urged the need of assessing NCDs risk factors at the local level in order to design lifestyle modification programs (15). The purpose of the present study was to review and compare frequencies of some conventional, behavioral, and laboratory cardiovascular risk factors between men and women based on outpatient prevention clinic database in a tertiary level referral cardiovascular teaching hospital within six months.

Methods

Study design and setting

The current cross-sectional study was conducted using outpatient clinic database as the dissertation of a general physician. The study was carried out in a cardiovascular teaching hospital in the North of Iran from February 2016 to June 2016. The study design was approved by Vice-Chancellor for Research at Guilan University of Medical Sciences and Interventional Cardiovascular Research Center.

Participants

The sampling frame was medical record of all the patients with CVD or without CVD but the minimum of one risk factor who were referred to the preventive clinic for lifestyle modification. All recorded information was selected for the study following convenience sampling if all the required information were completed. Each and every patient was informed about probable future study.

Data Collection

The database included demographic, clinical information, and health related behaviors for 740 patients visited in the prevention clinic. The demographic information included age, sex, education level, job, living location, and insurance type. The clinical information included height, weight, BMI, medical history, such as diabetes, hypertension, and dyslipidemia, blood pressure level, family history of CVD, and serum vitamin D level. In addition, health related behaviors were included, such as physical activity level, table salt usage, cigarette, and opium use. Data was collected in an outpatient prevention clinic by a preventive medicine specialist.

All the patients were asked to report the table salt usage per meal by a question, “Do you use saltshaker at the table?” For this question, patients could respond “Yes usually”, “Yes, occasionally”, and “No”.

Physical activity was assessed asking one question, “Are you engaged in any regular physical activity three times per week lasting for 30 minutes?” The possible answer could be 1) Yes or 2) No.

Patients with a history of regular opium consumption were considered as opium users. They were then asked about the mode of opium consumption. The possible answers were: 1) Orally, 2) Smoking, or 3) Both. Serum 25-OHD level was assessed for those patients who did not have laboratory test results. The results of laboratory data were saved in the medical database. According to US Endocrine Society guidelines (16), vitamin D deficiency is defined as 25-OHD levels less than 20 ng/mL, and vitamin D insufficiency as 25-OHD levels between 21and 29 ng/ml.

Blood pressure was measured using a calibrated Omron M7 sphygmomanometer (HEM-780-E). Patients with baseline office Systolic Blood Pressure (SBP) of 140 mm Hg or higher and 90 mm Hg or higher diastolic despite antihypertensive treatment were defined as uncontrolled blood pressure. Also, those with SBP of 120-139 mm Hg or DBP of 80-89 mm Hg were considered as prehypertension state (17). Height and body weight were measured according to the protocols using a pre-calibrated digital SECA scale and portable stadiometer. For all the measures, patients were wearing light clothes with their shoes removed. Body Mass Index (BMI) was classified according to the guidelines (18) as follows: underweight (BMI<18.5 kg/m^2), normal weight (BMI 18.5–24.9 kg/m^2), overweight (BMI= 25–29.9 kg/m^2), and obese (BMI≥30 kg/m^2). All anthropometric and blood pressure measurements were measured by an experienced nurse working in the prevention clinic.

Data analysis

The Statistical Package for the Social Sciences (SPSS) software version 16 was used for data analysis. Frequency (percent) and mean (standard deviation) were used to report qualitative and quantitative variables, respectively. The chi-square test was run for comparing the frequency of qualitative variables between men and women. Also, independent t test was used to report the mean of the numerical variables based on the sex. A *P* value of ≤0.05 was used as the criterion of statistical significance.

Results

A total of 757 medical records were reviewed and 740 (55% women) had full data available for medical history, laboratory data, and healthy behavior history. More than 74% of the study population were married, and mostly had education level as of primary to high-school (68.1%). Nearly 98% of the patients were covered by government insurances. Also, more than half of them (64%) lived in rural areas. More than 58% of women and 46% of men were farmers.

Table 1 summarizes the frequency of conventional cardiovascular risk factors among study population. The mean age of study population was 54 (14.2) years old. The frequency of men older than 45 was 81% and 47% of the women were older than 55 years.

The prevalence of hypertension, diabetes, and dyslipidemia in all the patients was 37.8%, 30%, and 29.2%, respectively. The percentage of hypertension, diabetes, and dyslipidemia in women were significantly higher than those in men (P<0.05). There were no significant differences in the frequency of uncontrolled systolic HTN or Pre-hypertension stage between the two sexes (P>0.05).

Overall, 75% of the study population were overweight or obese and female patients were significantly more obese than men (P<0.001). The frequency of diabetes, hypertension, and dyslipidemia was significantly highest among the obese followed by the overweight patients.

More than 70% of the study population had deficiency or insufficiency in serum vitamin D, while only 29% of them had optimal vitamin D levels. There was no statistically significant difference in the vitamin D status between the two sexes (Table 2).

Table 1 Frequency of traditional risk factors and blood pressure state in study subjects

variable	Total population (N=740)	Men N(%)=332 (44.9%)	Women N(%)=408(55.1%)	*P*
Age (mean±SD)[a]	54(14.2)	52.5(13.9)	56.4(14.2)	0.001
Conventional CAD risk factors				
Male, N (%)	332 (44.9)	-	-	
Age				
Male >45 years old	-	270(81)	-	
Female >55 years old	-	-	195(47.9)	
Family history of CAD, N (%)[b]	105(14.2)	39(11.7)	66(16.2)	0.08
HTN, N (%)[b]	278(37.8)	112(33.7)	166(40.7)	0.04
DM, N (%)[b]	222(30)	78(23.5)	144(35.3)	0.002
Dyslipidemia, N (%)[b]	216(29.2)	85(26.6)	131(32.1)	0.04
BMI[b]				
<24.9	180(24.3)	117(35.6)	63(15.4)	0.000
25-29.9	300(40)	141(42.4)	159(38.4)	
≥30	260(35)	74(22.5)	186(45.5)	
Blood pressure state				
uncontrolled HTN[b]				
Systolic BP>140	112(40)	44(39)	68(40)	0.8
Diastolic BP>90	90(32)	34(30)	58(34)	0.9
Pre hypertension stage, N (%)[b]	203(27.4)	96(28.9)	107(26)	0.4

[a] independent t test, [b] chi square test

As seen in Table 2, overall, 12% and 16.8% of participants reported opium use and smoking, respectively. The frequency of opium users was significantly higher in men than in women (15.6% vs. 9.3%) (*P*= 0.01). Opium consumption prevalence constantly increased with age to the maximum of 14% in people over 50 years (*P*=0.01) (Table 3). The mode of opium consumption in the majority of the individuals (87%) was orally and in 13% smoking.

An average of 23%, for the total group, usually used table salt in every meal, and the percentage of men who used table salt was significantly higher than that in women (*P*<0.001). About 53% of the patients reported that they did exercise less than three times per week with duration of 30 minutes. No significant difference was observed between men and women regarding physical activity (Table 2).

Discussion

In the present study, we analyzed the prevalence of some conventional and other new proposed risk factors of CVD among attending outpatients of the prevention clinic.

Age, as a nonmodifiable cardiovascular risk factor, was reported by more than 50% of both sexes. Despite the general belief, half of the patients with CAD or risk factor were female. Based on the Global Burden of Disease, mortality from cardiovascular disease was greater in women than in men (32% vs. 27%) (19). In the current study, women reported the history of metabolic risk factors like hypertension, DM, and dyslipidemia more than men did. American Heart Association report (2010) states that hypertension is more common in women than in men over

Table 2 Frequency of non-traditional CVD risk factors studied

CAD risk factors	Total population (N=740)	Men N (%)=332 (44.9%)	Women N (%)=408 (55.1%)	*P*
Insufficient physical activity N (%)[a]	392(52.9)	160(48)	232(57)	0.4
Table salt usage [a]				0.001
yes usually	176(23.7)	115(34.6)	61(14.9)	
yes sometimes	310(41.8)	214(64.4)	96(23.5)	
vitamin D (mean± SD)[b]	9.7(3.6)	11.2(4.2)	8.2(3.1)	0.2
Vitamin D deficiency, N (%)[a]	412(55.7)	174(52.5)	238 (58.3)	0.06
Vitamin D insufficiency, N (%)[a]	108(14.5)	46(13.8)	62(15.2)	
Normal Vitamin D, N (%)[a]	220(29.8)	112 (33.7)	108(26.5)	
Opium use, N (%)[a]	90 (12)	52(15.6)	38 (9.3)	0.01
Cigarette smoking, N (%)[a]	124(16.8)	106(31.9)	18(4.4)	0.001

[a] chi square test, [b] independent t test,

Table 3 Frequency of opium consumption by age category

Age group [a]	Total (N=740) N (%)	Opium non user(N=650) N (%)	Opium user(N=90) N (%)	*P*
<30	46(6.2)	44(6.8)	2(2)	0.001
30-50	234(31.7)	210(32.2)	24(26)	
>50	460(62.1)	396(61)	64(71)	

[a] chi square test

the age of 55 years (20). Several studies estimated that, in 2025, 1.5 billion adults, 29% of men, and 30% of women will have hypertension (21, 22). In many lower and middle-income countries, SBP levels rose with 0.8-1.6 mmHg per decade in men and 1.0-2.7 mmHg per decade for women (23). However, opposite trends were seen in people living in higher-income countries, most likely due to implementation of lifestyle and therapeutic managements (24). In the Third Iranian National Report of Non-Communicable Disease Risk Factors, the prevalence of metabolic risk factors like diabetes, hypertension, and hypercholesterolemia were higher among females (13). Moreover, similar to our findings, in Sharon Saydah et al study (25), it was stated that the frequency of these risk factors increase as individuals gain weight and move from overweight category to obese category. More than 27% of all study population were in prehypertension stage. A recent meta-analysis (26) proposed prehypertension as a coronary heart disease in different parts of the world with superiority in western countries. Evidence showed that diabetes is a stronger risk factor for Congestive Heart Disease and stroke in women than in men (27, 28). However, Appelman, et al. in a review of literature, suggested that the impact of hypertension, obesity, and hypercholesterolemia on CVD incidence and mortality were similar between women and men, but cigarette smoking was considerably more harmful for women than for men (5).

According to a recent systematic review, a majority of Iranian population had vitamin D deficiency or insufficiency (29). This is in line with findings of the present study which revealed that the frequency of vitamin D deficiency or insufficiency was 70%. Also, serum vitamin D level was found to be slightly higher in men than in women though the difference was not significant. Evidence has identified that serum 25-Hydroxy-Vitamin-D is independently associated with future CVD (30). In the present study, men reported opium consumption more than women did (15.6% vs. 9.3%). This is in line with the findings reported in Kerman Coronary Artery Disease Risk factors Study (10). However, the prevalence of opium consumption among women in our study was greater than that in Kerman study. It is worth noting that more than 50% of women in the present study were rice farmers. Similarly, Meysamie et al. in a study conducted in the North of Iran reported that most of opium users were farmers (31). The pain relief effect of opium might be the reason for opium consumption in farmers. However, further study is necessary to investigate the prevalence of opium consumption among farmers, especially in northern part of Iran with its humid climate.

Excessive intake of dietary salt (32) and physical inactivity (8, 33) are the major contributors to CVD.

In our study, 77% of study population at least sometimes used table salt in every meal and high salt diet was more common in men than in women. The key solution to lower salt intake seems to be modification of consumer behavior in cooking and at the table, since other sources of dietary salt are natural or processed foods (34). According to the findings of the present study, half of the studied patients had no exercise whatsoever even regular walking to work. Physical inactivity was similar in both men and women. As evidence proposed walking as a near perfect physical activity (35, 36), it can be incorporated into everyday life, especially in older ages, as it is cheap and convenient and does not necessarily require going to the gym.

In the present study, even though all the traditional CVD risk factors were studied, only some of non-traditional risk factors were analyzed due to the nature of our retrospective study. Additionally, serum vitamin D was assessed in different laboratories, which might have influenced the reliability of the results.

In conclusion, the present study showed that some conventional risk factors are higher in frequency rate in female patients. Furthermore, the importance of some behavioral and laboratory risk factors were highlighted in the study. Yet, undoubtedly, more attention needs to be paid to opium consumption, especially in women. Additionally, primary and secondary prevention of cardiovascular risk factors, particularly blood pressure and obesity, should be highlighted in preventive measures.

Conflicts of Interest

Authors declare no conflict of interests.

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