ORIGINAL ARTICLE

The Prevalence of Risk Factors of Non-Communicable Diseases in Fars Province

Marzieh Akbarzadeh[1], Amir Almasi-Hashiani[2], Mahin Farahmand[3]*

[1]Department of Community Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
[2]Department of Public Health, School of Health, Arak University of Medical Sciences, Arak, Iran
[3]Social Medicine Specialist, Shiraz University of Medical Sciences, Shiraz, Iran

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ABSTRACT

Background: Although a significant success has been achieved in prevention and control of non-communicable chronic diseases, the incidence and prevalence of these diseases have significantly increased. The aim of the present study was to assess the prevalence of risk factors of non-communicable chronic diseases in Fars Province, in 2008.
Methods: Using the database of the Iranian Post Company, selected samples were recruited systematically by using multi-stage cluster sampling method (50 clusters of people, each cluster consisted of 20 persons totally 920 individuals) from the whole province. Selected individuals were approached in designated days and related questionnaires were filled. Data entering were done using the EPI-info version 6 software and were analyzed using the STATA version 10.
Results: Obesity was seen in 20.3% and 9.4% of the female and male participants. The mean systolic and diastolic blood pressure was estimated to be 120.8 and 75.3 mmHg. Daily intake of fruit and vegetables was 1.3 and 1.2 servings. And 14.1% of the participants were cigarette smokers.
Conclusion: We conclude that risk factors of non-communicable chronic disease are not equally distributed in men and women. Overweight, obesity, abdominal obesity, and inactivity are more prevalent in women, while smoking and high blood pressure are more prevalent in men.

Introduction

Despite the successes achieved in the last decades in control and prevention of communicable diseases, the incidence and prevalence of non-communicable diseases have been increased dramatically (1-4). Cardiovascular diseases and cancers are among the most frequent causes of mortality and morbidity in some countries (5, 6). In Iran too, the most frequent causes of mortality are cardiovascular diseases followed by trauma and accidents, and cancers (7).

Cardiovascular diseases are the main cause of mortality, morbidity, and disability (8, 9). They cause half of the total annual deaths (10). Although cardiovascular related mortality and morbidity have decreased in many industrialized countries during the last 20 years, the disease has increased in Iran and its age standardized rate of mortality and morbidity has increased by 20-45% (11).

According to the world health organization (WHO), cancer related mortality and morbidity increased from 6 million in 2000 to 7.6 million in 2005, and to 7.9 in 2007 showing 32% increase

during that period. Also in 2007, 13% of total global death was caused by cancer, of them 72% happened in developing countries (12).

Non-communicable diseases are mostly related to controllable risk factors such as smoking, unhealthy diet, and low physical activity (13). According to WHO, eight controllable risk factors of cardiovascular diseases in 2009 were; smoking, physical activity, hypertension, hyperglycemia, hypercholesterolemia, alcohol consumption, high BMI, and low intake of fruits and vegetables (14, 15). Such factors play important roles in other non-communicable diseases.

As the incidence and prevalence of non-communicable diseases are increasing and as their risk factors are controllable, we aimed to assess the prevalence of the diseases in Fars province in 2008 to propose suitable preventive measures.

Materials and Methods

This was a cross-sectional study as a part of a national project organized by the Iranian Ministry of Health and Medical Education to attain reliable and comparable data to be used at national and international levels to control risk factors of non-communicable diseases as recommended by the WHO.

Using the database of the Iranian Post Company, selected samples were recruited systematically by using multi-stage cluster sampling method (50 clusters of people, each cluster consisted of 20 persons, totally 920 individuals) from the whole province. One of the characteristics of this sampling method is that the distribution of main clusters is correlated with urban to rural population ratio and the dispersion of family numbers in various postal regions of the province. Selected individuals were approached in designated days and related questionnaires were filled. The questionnaire contained questions about personal information as well as the information about all risk factors related to non-communicable diseases.

Height was measured using a tape meter installed on the wall and the individuals were asked to stand up in front of the meter without shoes while looking forward and their head and ankles were stuck to the back wall.

Weight was measured using a digital scale. The participants were asked to stand on the scale without shoes and with the least clothing. BMI was calculated by dividing weight (kg) by square height (m^2). Waist circumference was measured using a non-elastic tape meter between the iliac crest and the lower part of the last rib. Waist circumferences more than 102 cm in men and more than 88 cm in women were considered as abdominal obesity.

Severe activity is considered as a continuous activity that lasts at least for 10 minutes leading to highly increased breathing and heart rate. Moderate activity is defined as an activity that lasts for at least 10 minutes but leads to mild increase in breathing and heart rate. Severe and moderate sport activities were also defined in the same way.

Data entering were done using the EPI-info version 6 software and were analyzed using the STATA version 10. Chi- squared, Fisher exact, and independent t tests were used as appropriated and P values less than 0.05 were considered as statistically significant. The results were presented as numbers (percents) and mean±standard deviations.

Results

Table 1 shows that mean(±SD) age of the participants was 39.7±14.2 years with no significant difference between men and women. But mean demographic values (weight, height, and waist circumference) were significantly more in men compared with women. 14.6% of the participants had BMI>30 (9.4% in men vs 20.3 in women). Waist circumference in 27.3% of the individuals was more than standard. Central obesity was significantly more in women than men (P<0.001).

Mean systolic blood pressure was more in men compared with women but there was no significant difference between the diastolic blood pressure in both men and women. Totally, 12.9% of the population had systolic hypertension and 7.1% had diastolic hypertension. There was also no significant difference between men and women in consuming vegetables and fruits. In 85.6% and 90.9% of the participants fruits and vegetables were consumed less than two units per day, respectively (table 2). The participants used both saturated and unsaturated oil for cooking (34.1% saturated and 65.9% unsaturated).

There were also no significant differences

Table 1: Comparison of mean (± SD) quantitive variables in men and women in Fars province, 2008

Variable	M (471)	F (449)	Total (920)	*p*-value
Age	40±14.4	39.3±14	39.7±14.2	0.4
Height (cm)	170.7±7.9	157.3±7.7	164.2±10.3	<0.001
Weight (kg)	71.5±14.8	63.9±12.8	67.8±4.4	<0.001
BMI (kg/m^2)	25.5±4.4	25.9±4.8	25.1±4.6	<0.001
Waist circumference (cm)	88.5±12.9	86±13.3	87.3±13.1	0.004
Systolic blood pressure (mmHg)	122.4±18.9	119.2±19.4	120.8±19.2	0.013
Diastolic blood pressure(mmHg)	75.8±11.4	74.7±11.8	75.31.6	0.14
Fruit consumption (unit/day)	1.3±1.2	1.2±1.1	1.3±1.1	0.6
Vegetable consumption (unit/day)	1.1±0.9	1.2±0.9	1.2±0.97	0.1
Fruit and vegetable consumption (unit/day)	2.3±1.8	2.3±1.7	2.3±1.7	0.7
Business days with severe activities	4.4±1.9	3.2±2	4.1±2	0.02
Business days with moderate activities	4.6±2.1	4.3±2.3	4.5±2.2	0.3
Days with hiking or bicycle riding	4.9±2	4.1±2.1	4.5±2.1	<0.001
Days with severe recreational activities	2.5±1.8	3±2.3	2.6±1.9	0.2
Days with moderate recreational activities	3.2±2.1	3.6±2.1	3.4±2.1	0.1

BMI: Body mass index

Table 2: Distribution of studied variables in men and women in Fars province, 2008

Variables		Men (471=n)	Women (4498=n)	All (920=n)	*p*-value
Consumed oil	Saturated oil	146(31.4)	164(37)	310(34.1)	0.08
	Unsaturated oil	319(68.6)	279(63)	598(65.9)	
Fruit consumption	Lower Than 2 units	376(84.3)	358(87.1)	734(85.6)	0.3
	2-3 units	44(9.9)	37(9)	81(9.5)	
	Higher than 3 units	26(5.8)	16(3.1)	42(4.9)	
Vegetable consumption	Lower Than 2 units	394(91.4)	375(90.4)	769(90.9)	0.8
	2-3 units	22(5.1)	25(6)	47(5.6)	
	Higher Than 3 units	16(3.5)	16(3.6)	30(3.5)	
Severe activity	Yes	69(14.8)	20(4.5)	89(9.7)	<0.001
	No	398(85.2)	426(95.5)	824(90.3)	
Moderate activity	yes	127(27.2)	123(27.5)	250(27.3)	0.9
	no	340(72.8)	325(72.5)	665(72.7)	
Hiking or bicycle riding	yes	310(66.1)	305(68.1)	615(67.1)	0.5
	no	159(33.9)	143(31.9)	302(32.9)	
Severe sport or recreational activities	yes	97(20.6)	25(5.6)	122(13.3)	<0.001
	no	373(79.4)	421(94.4)	794(86.7)	
Moderate sport or recreational activities	yes	108(23.3)	91(20.3)	199(21.8)	0.2
	no	356(76.7)	357(79.7)	713(78.2)	
Cigarette smoking	yes	123(26.1)	7(1.6)	199(14.1)	<0.001
	no	348(73.9)	441(98.4)	713(85.9)	
Water pipe smoking	yes	22(4.7)	15(3.3)	37(4)	0.3
	no	448(95.3)	433(96.7)	881(96)	
BMI (kg/m^2)	Lower than 18.5	35(7.5)	18(4.2)	53(5.9)	<0.001
	24.9-18.5	235(50.3)	174(40.6)	409(45.6)	
	29.9-25	153(32.8)	150(35)	303(33.8)	
	Higher than 30	44(9.4)	87(20.3)	131(14.6)	
Waist circumference	Lower than standard	412(87.7)	246(56.6)	658(72.7)	<0.001
	Higher than standard	58(12.3)	189(43.4)	247(27.3)	
Systolic blood pressure (mmHg)	Lower than 140	403(85.7)	397(88.6)	800(87.1)	0.2
	Higher than 140	67(14.3)	51(11.4)	118(12.9)	
Diastolic blood pressure (mmHg)	Lower than 90	440(93.8)	412(92)	852(92.9)	0.3
	Higher than 90	29(6.2)	36(8)	65(7.1)	

BMI: Body mass index

between men and women in the mean days with moderate and severe sport or recreational activities and business days with moderate activities. But mean business days with severe

activities and mean days of bicycle riding or hiking were significantly more in men.

14.1% of the studied population were cigarette smoker (26.1% in men and 1.6% in women), which showed a significant difference between men and women (P=0.001). But only 4% of the population (4.7% in men and 3.3% in women) were water pipe smoker with no significant difference between the both sexes (P=0.3).

Discussion

The incidence and prevalence of non-communicable diseases have increased during the last decades (1-4). Such diseases are the most important causes of mortality and morbidity in developed and developing countries (16). According to the report by WHO in 2009, eight controllable risk factors (smoking, inactivity, hypertension, hyperglycemia, hypercholesterolemia, alcohol consumption, high BMI, and low intake of vegetables and fruits) are responsible for 60% of cardiovascular related mortality (14, 15). In our cross sectional study, we evaluated the risk factors of non-communicable diseases in 920 inhabitants of Fars province in 2009.

Overweight and obesity is correlated with cardiovascular diseases, and some types of cancers as by increasing obesity and overweight, the rate of mortality and morbidity increases (13). In our study 93.4% of men and 20.3% of women had BMI>30. Also 32.8% of men and 35% of women were overweight, which shows a high prevalence of obesity and overweight in the studied population.

In the southeastern Asian countries, the highest prevalence of obesity has been reported from Brunei (16.6% in men and 29.7% in women) followed by Laos with the prevalence of 12.6% in men and 3.3% in women (4). In the Middle East, such prevalence was reported to be 30% and 16.6% in women and men, respectively (9).

We found that the prevalence of obesity in Fars province is high, which may lead to increased prevalence of chronic diseases. It should also be noted that the prevalence of overweight is more than obesity. As overweight people may shortly be obese in case of inactivity and improper diet, they should be considered along with obese people while planning for control of obesity and overweight in the province.

In a study done in 2001 on Muslim people living in urban areas of Palestine, the prevalence of obesity

in women was more than men (49% vs 30%) but the prevalence of abdominal obesity in women was less than men (25% vs 59%) (9). In our study, the prevalence of abdominal obesity, similar to total obesity, was more in women compared with men (43.4% vs 12.3%). In Healthy Heart Study in Isfahan, the prevalence of abdominal obesity in women was 6 times more than men (71.7% vs 12%). There was also a positive correlation between abdominal obesity and other metabolic disorders such as low high density lipoprotein, and hypertriglyceridemia (17).

So in addition to the weight and BMI, the model of fat distribution and abdominal obesity are among important risk factors, which should also be noted. As we found more prevalence of total obesity and abdominal obesity in women compared with men, women should be monitored more rigorously to control such risk factors.

Hypertension is one of the predisposing factors of atherosclerosis, coronary artery disease, and cerebrovascular diseases. By prompt diagnosis and effective control of hypertension in high risk patients, cerebrovascular accidents can be prevented (13). Hypertension is responsible for about 12.8% of the total global mortality (8).

In our studied population, mean systolic blood pressures were 122.4 and 119.2 mmHg in men and women, respectively. In comparison with our findings mean systolic blood pressure in most southeastern Asian countries were reported to be less than ours. The only exceptions were in Singapore and Indonesia where the mean systolic blood pressures were more than what we found (4).

Reports from the Middle East showed that the prevalence of hypertension in women was more than men (23% vs 20%) (9, 18). In Iran, the prevalence of hypertension in women during 2004-2005 was reported to be 26.9% (18). In a study the prevalence of hypertension in men and women were 15.6% and 18.8%, respectively (19). In our study, mean systolic hypertension in men was significantly higher than women.

Inappropriate food pattern including high saturated fat and energy consumption, and low intake of fruits and vegetables are among the other risk factors of chronic non-communicable diseases (4). In all countries, especially the low income ones traditional food pattern containing the high amount of fruit and vegetables is alternating by high calori diet containing animal fat with lower amount of complex carbohydrates.

Such changes are correlated with the increased rate of many non-communicable diseases (16).

Low intake of vegetables and fruits is responsible for 4.9% of global mortality and morbidity (8). In our studied population fruit and vegetable consumptions were 1.3 and 1.2 unit per day, respectively. 85.6% of the participants consumed vegetables and fruits less than 2 units per day. And 90.9% of them consumed vegetables less than 2 units per day.

American Heart association and other international associations recommended consuming vegetables and fruits more than 5 units per day to prevent cardiovascular diseases (20, 21). In our study only 2.3 units per day of fruits and vegetables were consumed, which is almost half of the recommended amounts. In southeastern Asian countries, 80 % of people also consume less than 5 units per day of vegetables and fruits. Such inadequate intake of vegetables and fruits are seen more in low income percentiles compared with high income ones (4).

There are some hypotheses about the low intake of fruits and vegetables. Cultural issues including food habits and knowledge of people about the benefits of fruits and vegetables, as well as people's income are among the important factors. On the other hand, Iranian traditional foods containing various vegetables have been largely replaced by foods containing high simple carbohydrates and saturated fats. So promotion of the culture of Iranian traditional foods can be effective in increasing the intake of vegetables by people.

65.9% of our population used unsaturated oil and 34.1% used saturated oil. This shows that despite extensive informative programs about the hazards of saturated oils, they are still highly consumed.

Tobacco is one of the eight main causative factors of global mortality (8). Tobacco kills half of the smokers and leads to about 5 million deaths annually (8). Cigarette and tobacco are responsible for about 88% of global mortality (8). In our study 26.1% of men and 1.6% of women were smokers. 4.7% of men and 3.3% of women were water pipe smokers.

Current prevalence of tobacco smoking in southeastern Asian countries varies from 36% in Singapore to 64% in Laos. However in women the prevalence varies from 2% in Vietnam to 15% in Thailand, Laos, and Myanmar (4). In such countries the prevalence had a reverse correlation with the socioeconomic status as it is twice in countries with the lowest income compared with the rich countries and also it was more in men compared with women (4).

In a study done in Syria in 2004, the prevalence of tobacco smoking was 38.7% (63.6% in men and 19.2% in women). In the whole Middle East, cigarette smoking is lower in women compared with men. The same fact is true about our country (9). WHO reported in 2008 that 4.5% of the Iranian women were smokers (9).

During the economical developments, changes in food patterns have been accompanied by decreased physical activity and low activity life style (13). Physical activity is one of the determinants of body weight. Third National Evaluation of Risk Factors of Non-communicable Diseases in Iran showed that the prevalence and risk of metabolic syndrome (which includes some of the risk factors of cardiovascular diseases), were considerably higher in individuals with lower physical activities compared with people with high physical activity (22).

Unhealthy food regimen and inactivity lead to increased prevalence of obesity. About 40% of the world populations do not participate in sport activities to improve health. In 2002, about 1.9 million deaths were attributed to inactivity (8). It is responsible for 3.4% of global mortality (5). We found that only 21.8% of our studied population had moderate sport or recreational activities and 13.3% had severe such activities. Men were significantly more engaged in severe activities compared with women. But in other activities the differences were not significant.

More engagement of men in severe activities can be explained by the nature of their jobs, which may need more activities. However regarding the sport and recreational activities, lack of knowledge about the importance of sport and physical activity as well as lack of suitable sport clubs for women can be among the contributing factors leading to lower activities in women.

Having considered the high prevalence of risk factors of non-communicable diseases in Fars province, control of such factors is one of the health priorities. As some risk factors are more prevalent in different provinces suitable measures should be used to address these risk factors in order to prevent and control of non-communicable diseases.

Finally, it can be concluded that the distribution of risk factors of non-communicable diseases

in sexual subgroups is not equal as overweight, obesity, abdominal obesity, and inactivity were more prevalent in women compared with men but cigarette smoking and hypertension were more prevalent in men.

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Conflict of Interest

None declared.

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