Risk Factors for Chronic Disease: A Population Based Study in Mashhad (IRAN)

ABSTRACT

Aims: Nowadays, non-communicable diseases accounts for 55% of global disease burden and it is supposed to make 73% of all death causes by 2020. There are few studies performed on chronic diseases in developing countries and most of them have been done in other developed countries. Considering the health care system priority (prevention and control of non-communicable diseases), this study was aimed to compare the risk factors for chronic disease in two genders in a metropolitan in IRAN (Mashhad).

Study design: Cross-sectional study

Place and Duration of Study: This cross-sectional study was done in Mashhad (Iran) as a part of national survey to assess the risk factors for non-communicable diseases in 2007.

Methodology: One thousand participants with the age ranged between 17 and 67 years were included and the standardized national questionnaire was completed for them. Height, weight, waist circumference, blood pressure and blood biochemical factors were measured. Informed consent was obtained from all participants. Chi square test, T test and Mann-Whitney U tests were used for statistical analysis and p<0.05 was considered as statistically significant. SPSS version 11.5 was used for statistical analysis.

Results: Half of the participants were male and 46.4% out of them lived in rural areas. 36% were housewives and 0.04% were unemployed. BMI, smoking, waist circumference and physical activity were statistically different in two genders (All with p value <0.001). Only HDL was different between two genders in lipid profile (p value<0.001). The most important risk factors for chronic diseases were higher BMI and waist circumferences in women, smoking in men, systolic and diastolic hypertension and hyper cholesterolemia in both sex, and low level HDL-Cholesterol in women.

Conclusion: The risk factors for chronic diseases were different between two genders that need different approach to control them.

Keywords: Risk Factor, Chronic Disease, Prevention

1. INTRODUCTION

As we know, over decades the disease patterns have changed due to epidemiologic and demographic transition. Many Infectious agents have been controlled, removed or
eradicated, but non-communicable disease risk factors have been increased due to westernized lifestyle and industrialization of communities.

Nowadays, non-communicable diseases, such as cardiovascular, cancer, chronic respiratory system diseases and diabetes are the main causes of death and burden of disease. Today's, 55% of the global burden of diseases are due to non-communicable diseases; and the chronic diseases are accounted for 60% of total disease burden and 73% of all causes of death by 2020 [1]. The most important risk factors for non-communicable diseases in developed countries are hyperglycemia, hypertension, alcohol consumption, hypercholesterolemia, increased BMI, low intake of fruits and vegetables, physical inactivity, illegal drugs, underweight and Iron deficiency. Where as on the other side in developing countries these risk factors include underweight, unprotected sex, unsanitary water, air pollution in enclosed environments, deficiency of Zinc, Iron and vitamin A, hypertension, tobacco, hypercholesterolemia, alcohol consumption, increased BMI and low intake of fruits and vegetables [2].

Several studies have assessed the non-communicable diseases risk factors [3-7]. In a study done in 2000 in Iran, the main results showed that 11.1% of men and 11.9% of women had high blood pressure "more than 160/95mmHg" and the prevalence of cholesterol over 240mg/dl in men and women, was 9.4% and 12.4%, respectively. The obesity prevalence (Body Mass Index (BMI)>30) was 14.2% in women, whereas 5.6% in men. Smoking prevalence was reported about 23.9% in men and 1.7% in women [8]. The Diabetes Prevention and Control Program which began in 2000 in rural areas of 17 provinces covering 730,000 people with the age above 30 demonstrated that 25% of people had at least one risk factor of obesity, hypertension or positive family history for diabetes [9].

Various review articles have been conducted in the context of chronic disease risk factors [10-11]. In a review article about the numbers and types of studies were performed in different parts of the world, researchers have shown that a few numbers of studies were done in low income and developing countries of the world, while most of the studies about chronic diseases were done in developed countries. Authors have suggested that more studies are needed to be done in this field in developing countries [12].
According to the above discussion, at present, prevention and control of non-communicable diseases is the most important priority in our country’s health system. The efforts of Public Health System to collect accurate data on chronic disease risk factors appear to be a big step for better health planning. This study was aimed to compare chronic diseases risk factors in two genders in 2007 in a big city of Iran, Mashhad.

2. MATERIAL AND METHODS

This cross-sectional study was performed as a part of national survey for the assessment of risk factors of non-communicable diseases in Mashhad (The second most populated city and the capital of Razavi Khorasan Province of Iran located in the north east of country. Its population was 2,772,287 in 2011 population census) in 2007. One thousand participants with the age ranged between 17-67 years who were referred to different urban health centers of Razavi Khorasan Province were included in this study and a national standardized questionnaire was filled for them by trained questioners. Height, weight, waist circumference and blood pressure were measured with standard protocols and by using same devices. Blood pressure was measured by an OMRON-M7 digital sphygmomanometer twice. All the instruments were calibrated daily. If the difference between two blood pressures was more than 10 mmHg, this variable was measured for the third time and the mean of three measurements was recorded as the final blood pressure. Blood samples for biochemical tests were obtained after 10 to 12 hours of fasting. These tests were performed by standardized automatic devices in the laboratory of Razavi Khorasan province health center under the supervision of central national laboratory. BMI was calculated by using formula, the weight (kg) divided by the square of height (m^2). Body weight was measured by using an analogue scale and participants only had one uniform layer and height was measured by using stadiometer. Waist circumference was measured by using a flexible tape, in the standing position and in midway between the lowest rib and the superior border of iliac crest.

We have used special definitions in this study as follow:

- Any form of smoking was considered as a risk factor.
- Participants who consumed fruits or vegetables less than 5 times a week were considered as high risk group.
- Body Mass Index (BMI) ≥25 kg/m^2 and BMI≥30kg/m^2 was considered as overweight and obese, respectively.
- Waist circumference more than 90 cm in men and more than 85 cm in women was considered abdominal obesity.
- Hypertension (HTN) was considered as high systolic blood pressure above 140 mmHg or diastolic blood pressure above 90 mmHg or being under treatment for hypertension.
- Cholesterol level ≥ 200 mg/dl, High Density Lipoprotein (HDL) ≤ 40 mg/dl in men or less than 50 mg/dl in women and triglyceride (TG) ≥ 150 mg/dl were considered as high risk groups for lipid profile.

- Fasting blood sugar (FBS) of more than 125 mg/dl was considered as elevated blood sugar.

- Physical activity was categorized in to three groups:
  - Not active: subjects who were inactive in work place, during traveling and recreational time.
  - Sever active: subjects who were rigorously active in work place, transportation and recreational time.
  - Moderate active: other subjects were categorized in this group.

It was explained to the subjects that, high physical activities mean that require extreme body movements and increases respiratory rate and heart beat. Moderate active group includes those activities that require moderate body movements, causing low elevation of respiratory and heart rate.

An informed consent was obtained from all the participants. This study was approved by National Ethic Committee. Data analysis was performed by Statistical Package for the Social Sciences (SPSS) version 11.5 and P<0.05 was considered as statistically significant. Frequency and percentage were used for description of qualitative variables. If quantitative data had normal distribution, mean±standard deviation would be used and if data had not this prerequisite, median and interquartile range would be reported. We used chi square test, T test and Mann–Whitney U tests for comparison of variables between two genders.

### 3. RESULTS AND DISCUSSION

Demographic characteristics of the studied population are shown in Table 1.

<table>
<thead>
<tr>
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<th>Male(n)</th>
<th>Female(n)</th>
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</thead>
<tbody>
<tr>
<td>Gender</td>
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<tr>
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<td>41(30-54)</td>
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<td>Unemployed</td>
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<td>Employee</td>
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<td>53</td>
</tr>
<tr>
<td>Worker</td>
<td>2</td>
<td>13</td>
</tr>
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</table>
BMI, as one of the important risk factors for chronic diseases was significantly different in two genders. \((P<0.001)\) This is shown in figure 1-A.

Smoking status between men and women is shown in Figure 1-B. The statistical analysis showed a significant difference in two genders. \((P<0.001)\)

Figure 1-C shows the waist circumference in two genders. A statistically significant difference was found between men and women. \((P<0.001)\)

Fruit and vegetable consumption was primarily categorized to less than 5 units per week (high risk) and more than 5 units per week (low risk). As it can be seen in figure 1-D, no significant difference was found between two genders. \((P=0.66)\)

Physical activity was statistically different in men and women. \((P<0.001, \text{ Figure 1-E})\)

Systolic and diastolic blood pressures were primarily categorized to normal and elevated groups, as shown in figure 2-A and 2-B, respectively. There were no significant differences between two genders in both of them. \((P=0.58, P=0.31)\)

Triglyceride levels were primarily categorized to normal and elevated groups, as shown in figure 2-C. No statistically difference was found between two genders. \((P=0.32)\)

HDL levels were primarily categorized to normal and elevated groups, as shown in figure 2-D. There was a significant difference between two genders. \((P<0.001)\)

Figure 2-E shows the cholesterol levels in two genders based on high risk and low risk categories. No statistically significant difference was found between men and women. \((P=0.24)\)

FBS levels are shown in figure 2-F. No statistically significant difference was observed between men and women.\((P=0.53)\)
Median(Interquartile Range) BMI, as one of the important risk factors for chronic diseases, was significantly different between two genders. \((P < 0.001)\)

This is shown in Figure 1-A.

Smoking status between men and women is shown in Figure 1-B. Statistical analysis showed a significant difference between two genders. \((P < 0.001)\)

Figure 1-C shows the waist circumference in two genders. A statistically significant difference was found between men and women. \((P < 0.001)\)

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**Figure 1:** A- BMI in two genders, B- Smoking in two genders, C- Waist circumference in two genders, D- Fruit and vegetables consumption in two genders, E- Activity level in two genders
Figure 2: A- Systolic blood pressure in two genders, B- Diastolic blood pressure in two genders, C- Triglyceride levels in two genders, D- HDL levels in two genders, E- Cholesterol levels in two genders, F- Fasting blood Sugar (FBS) in two genders
Discussion:

The most important risk factors for chronic diseases were higher BMI and waist circumferences in women, smoking in men, systolic and diastolic hypertension and hypercholesterolemia in both genders, and low level HDL-Cholesterol in women.

These findings are in agreement with previous studies, that assess the chronic disease risk factors [13-17]. Results of the Diabetes Prevention and Control Program, which began in 2000 in rural areas of 17 provinces of Iran, showed that from 730,000 people older than 30 who were covered by the program; 25% had at least one risk factor such as obesity, hypertension or positive family history for diabetes [9].

Results of a study conducted in 2000 in Iran, showed that 11.1% of men and 11.9% of women had high blood pressure more than 160/95 mmHg, the hypercholesterolemia prevalence (total cholesterol level > 240 mg/dl) was 9.4% in men and 12.4% in women, and also obesity prevalence (BMI ≥ 30 kg/m²) was 2.14% in women and 6.5% in men. The smoking prevalence had been reported about 9.23% in men, and about 7.1% in women[8].

CARMEN project was carried out in a city of Pelotas in southern Brazil was carried out to investigate the chronic non-communicable disease risk factors, the results showed that the most common risk factors were physical inactivity (2.73%) and overweight (1.48%). Women had less physical activity than men and more than 50% of the cases had two or three risk factors [18]. So it seems that changing the lifestyle affected all the populations and the risk factors of chronic diseases had increased.

Another study was performed in Isfahan (Iran) in order to examine the modifiable risk factors of chronic diseases. The investigators defined 8 risk factors prevalences as following: sedentary lifestyle (47.2%), overweight and obesity (BMI ≥ 25 kg/m²) (60.8%), hypertension (systolic or diastolic blood pressure) (22%), low level of HDL (27.6%), high level of total cholesterol (16.9%), high level of triglyceride (22.1%) and high fasting blood sugar (7.6%) [19].

In a study performed in India in order to assess the risk factors of chronic diseases, the results showed the high burden of these risk factors and prevalence of these risk factors increased with age [20].

In SURFNCDO a study was performed on 89000 people, Askari et al. assessed the chronic diseases risk factors in IRAN and concluded that smoking prevalence was 14.2%, 32.5% of participants with the age ranged between 15-64 years had at least 10 minutes physical activity in their recreational time, in addition 25.2% had HTN[21].

In another study aimed to determine the coronary disease risk factors in patients with hypertension compared with normotensive patients, Akbarzade et al. demonstrated that strong predictors in hypertensive patients were male gender, diabetes mellitus, hyperlipidemia and increased age while about normotensive patients, these risk factors included male gender, smoking, family history and increased age[22].

All the studies showed major risk factors for chronic diseases. So the best approach to overlook chronic disease is primary prevention through focusing on the major risk factors.
in this regard, WHO suggested stepwise framework as an essential strategy to prevent chronic
disease[23], (Fig. 3)

<table>
<thead>
<tr>
<th>Policy implementation steps</th>
<th>Population wide intervention</th>
<th>Individual intervention</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Local level</td>
<td>National level</td>
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<tr>
<td>Implementation step 1</td>
<td>Interventions that can be implemented in short term with existing resources</td>
<td></td>
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<tr>
<td>core</td>
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<tr>
<td>Implementation step 2</td>
<td>Interventions that can be implemented in intermediate term with estimated real increase of resources or reallocation them</td>
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<td>Implementation step 3</td>
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</table>
4. Conclusion

The risk factors were different between two genders and it is necessary to implement different approach to deal with these risk factors.

It seems that Comprehensive and integrated approach is required to prevent and control the chronic diseases. It is obvious that inter-sectoral approach should be considered at all levels of policy making and its implementation.

According to the result of this present study and the epidemiological transition of disease, the following interventions are recommended:

1. To provide comprehensive information resources on risk factor’s burden, trends and distribution.
2. Supportive interventions to change the knowledge of policy makers and the community about risk factors and way to control them.
3. Primary interventions to change life style, perform regular exercise and have healthy diet management through decreased consumption of processed foods and high fat contents and also increased recreational facilities.

COMPETING INTERESTS

The authors declared no conflict of interest.
ETHICAL APPROVAL

This study was a part of national survey and was approved in national ethical board; an informed consent was obtained from all participants.

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