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Research Article

Hypertension in Iranian Urban Population: Prevalence, Awareness, Control and Affecting Factors

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Abstract

Aim: Hypertension is one of the major public health problem and an important modifiable risk factor for cardiovascular diseases .Because of weak health systems in low and middle income countries, the number of people with hypertension who are undiagnosed, untreated and uncontrolled are very high. Iran has become increasingly modernized.

Methods and Materials: This was a community base cross sectional study in a representative sample of urban population (2076 adults aged 18-79 years) from 16 cities in northern Iran. Blood samples were drawn for biochemical testing. The participant's blood pressure was measured two times by specially trained medical staff. Persons who were aware of having hypertension, who were taking antihypertensive medication, and/or who had blood pressure of 140/90 mm Hg or higher at baseline were defined as having actual hypertension.

Results: One thousand nine hundred fifty three persons fulfilled all necessary data [886 male (45.4%) and 1067 female (54.6%)] with mean age of 39.3± 16.2 years old. 506 hypertensive patients were fund in this population (25.9% ,CI 95%: 24%-27.8%). Three hundred ten patients (61.3%) were known case of hypertension and they were aware of their disease that 257 patients (82.9%) were under treatment but only 129 patients (50.2%) was controlled (Blood pressure under 140 /90).

Conclusion: This study showed that not only prevalence of hypertension is high in north of Iran but also awareness and control of it is very low. These findings indicate that a comprehensive national program for screening and management of this disease is urgently needed to avert the cardiovascular disease epidemic in this area.

Keywords: Hypertension, Awareness, Control, Urban Area

Introduction

Globally cardiovascular disease accounts for approximately 17 million deaths a year, nearly one third of the total. One of the key risk factors for cardiovascular disease is hypertension, complications of it account for 9.4 million deaths worldwide every year. Hypertension already affects one billion people worldwide, leading to heart attacks and strokes. Hypertension is responsible for at least 45% of deaths due to heart disease and 51% of deaths due to stroke [1,2].

Not only hypertension is more prevalent in low- and middle-income countries, there are also more people affected because more people live in those countries than in high-income countries. Further, because of weak health systems, the number of people with hypertension who are undiagnosed, untreated and uncontrolled are also higher in and middle income countries compared to high-income countries [1].

Most hypertensive people have no symptoms at all, many people go undiagnosed. Those who are diagnosed may not have access to treatment and may not be able to successfully control their illness over the long term. There are significant health and economic gains attached to early detection, adequate treatment and good control of hypertension. If hypertension is detected early it is possible to minimize the risk of heart attack, heart failure, and stroke and kidney failure [3].

Most studies in developing and developed countries revealed that high proportion of hypertensive patients were unaware of their disease and only lower than one third of patients had appropriated control [4-14].

The annual loss of approximately US $500 billion due to major non-communicable diseases amount to approximately 4% of gross domestic product for low- and middle-income countries. Cardiovascular disease including hypertension accounts for nearly half of the cost [15].

The demographic and social transition has been associated with the emergence of hypertension during the last decade in Iran, as in other East Mediterranean countries [16].

Iran has implemented cardiovascular risk factors screening especially diabetes and hypertension in rural area from 2009 but limited data in urban area showed high prevalence and low awareness and control of hypertension [17-24]. Guilan is one of the 30 provinces of Iran, with population of 2.3 millions, in the north of Iran. It is along of the Caspian Sea which is located between Iran and Azerbaijan. Salted sea foods are very popular in this area and this is first study that aimed to determine the prevalence of undiagnosed and diagnosed hypertension and its control situation in urban adults in north of Iran.

Materials and Methods

The data were derived from the population-based cross sectional study conduct in 16 cities of Guilan province, Iran, with a population of 2.2 million (65% urban) from June 2009 to March 2010 (Iranian National Bureau of Statistics 2006) [24]. The research protocol was approved by the Research Committee of Guilan University of Medical Sciences. For the aims of this study only participant older than 18 years old were included and analyzed.

Participants were selected by multistage cluster random sampling methods. At the first stage, Quota sampling was done according to the ratio of the total number of inhabitants in every city to the total number of population in province. At the second stage, stratified sampling was performed in every city according to health care centers size and at the third stage; persons to be enrolled in the study were selected through random sampling based on household numbers.

Finally, two thousand–seventy six persons equal or over 18 years (961 men (46.3%) and 1115 women (53.7%)) were selected in study. Informed consent was obtained from all participants. Baseline information on socio-demographic variables, smoking habits, physical activity level, medication use, family history of disease were gathered by trained medical staff during a standardized face-to-face interview. Questionnaires were administered by two trained research assistants. In addition, all participants underwent an extensive standardized medical examination.

A standard mercury sphygmomanometer was used. Participants were advised to not eat or drink anything before measurements, and we ensured that the participants had not consumed alcohol, tea or coffee before coming to the study that may affect blood pressure measurements.

The participant's blood pressure was measured two times with an interval of ten minutes by specially trained medical staff and the mean value of two times measuring blood pressure was used for each person. Blood pressure was measured following World Health Organization (WHO) normative [25] in a comfortable environment and allowing a 2–3 minute period of rest before blood pressure was measured Persons who were aware of having hypertension, who were taking antihypertensive medication, and/or who had blood pressure of 140/90 mm Hg or higher at baseline were defined as having actual hypertension. A systolic blood pressure measurement greater than 140 mm Hg with a diastolic blood pressure less than 90 mm Hg was called isolated systolic hypertension [26].

Physical activity

The Baecke Questionnaire [27] is administered by interviewer to evaluate work activity, sport activity and leisure-time activity, over the last 12 months with score from zero to five. Frequency, intensity and duration of activities that were performed over the past year were assessed.

Blood sample was drawn in the morning after an overnight fasting for analyzing of necessary biochemical profile.

The distribution of categorical socio-demographic, behavioral and correlates of cardiovascular disease [CVD] risk factors was compared across gender by using the χ^2 test for the difference between proportions. Means and standard deviations were used to summarize the characteristics of the study sample. Continuous variables were compared using ANOVA. In all the analyses, a p-value of < 0.05 was considered statistically significant. Data analysis was carried out with the SPSS Software, version 18.

Results

In this cross sectional study, one hundred twenty three person did not attend for blood sampling, therefore 1953 persons fulfilled all necessary data (Figure 1) [886 male (45.4%) and 1067 female (54.6%)] with mean age of 39.3 ± 16.2 years old. 506 hypertensive patients were fund in this population therefore prevalence of hypertension was 25.9% [CI 95%: 24%-27.8%]. Hypertension was more prevalent in women than in men [29.9% vs. 22.3%, $\rho < 0.001$]. Three hundred ten patients (61.3%) were known case of hypertension and they were aware of their disease that 257 patients (82.9%) were under treatment but only 129 patients (50.2%) were controlled (Blood pressure under 140 /90). Isolated systolic hypertension was seen in 101 participants (5.2%) (Table 1).
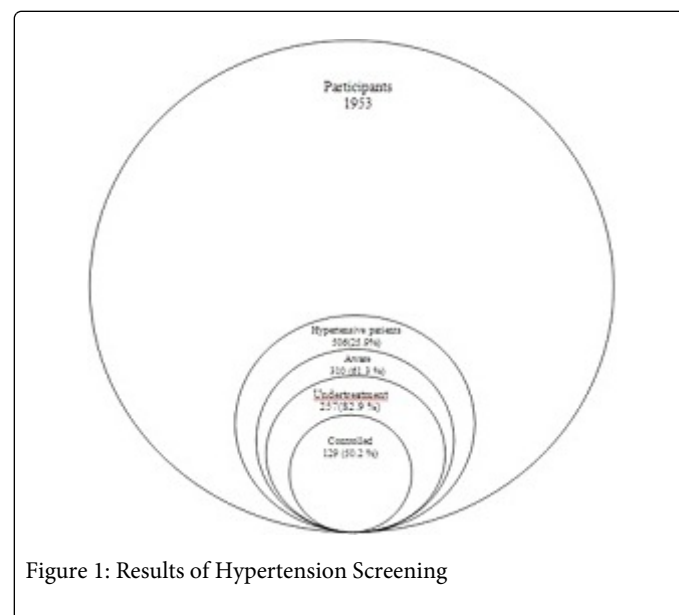

Figure 1: Results of Hypertension Screening

Variable	Study Population	Normotensive	Hypertensive	ρ value
Gender (%)				
Male	886(45.4)	688(77.7)	198(22.3)	χ^2 test
Female	1067(54.6)	759(71.1)	308(29.9)	0.001
Age groups (years) (%)				
18-29	503(25.7)	484(96.2)	19(3.8)	
30-39	433(22.2)	388(89.6)	45(10.4)	
40-49	441(22.6)	325(73.7)	116(26.3)	
50-59	297(15.2)	160(53.9)	137(46.1)	χ^2 trend test
≥60	280(14.3)	91(32.5)	189(67.5)	0.000
BMI (kg/m^2) (%):				
<18.5	58(3.1)	53(91.4)	5(8.6)	

18.5-24.9	624(32.9)	548(87.8)	76(12.2)	
25-29.9	685(36.1)	490(71.5)	195(28.5)	χ^2 trend test
≥ 30	529(27.9)	316(59.7)	213(40.3)	0.000
Education Level (%):				
Illiterate	214(11)	82(38.3)	132(61.7)	χ^2 trend test
Low grade(≤5)	357(18.4)	221(61.9)	136(38.1)	0.000
5-12 grade	994(51.3)	815(82)	179(18)	
Academic	372(19.2)	317(85.2)	55(14.8)	
Family History of HTN (%):				
No	1115(57.7)	892(80)	223(20)	χ^2 test
Yes	816(42.3)	539(66.1)	277(33.9)	0.000
Cigarette Smoking (%):				
No	1679(87.8)	1244(74.1)	183 (25.9)	NS
Yes	246(12.8)	183 (74.4)	63 (25.6)	
Baeck Indices (mean ±SD):				
Work index	2.89 ± 0.51	2.91 ± 0.53	2.77 ± 0.52	NS
Sport index	2.69 ± 0.53	2.71 ± 0.52	2.67 ± 0.5	
Leisure-time index	2.46 ± 0.5	2.47 ± 0.49	2.45 ± 0.51	

Table 1: Distribution of hypertension by demographic and family history

Awareness of hypertension was lower in men than women [53.8% vs., 66.2 $\rho<0.000$] also women were more than men under medication (58.9 vs. 47.2, $\rho<0.000$).

There were significant differences between hypertension with gender, BMI, age and educational level and positive family history of hypertension but there were not any difference between hypertension with physical activity and cigarette smoking (Table 1).

After logistic regression, age [Odds ratio 15.7,CI 95% 5.2-46.5], positive family history[Odds ratio 1.6,CI 95% 1.2-2.8], central obesity [Odds ratio 31.5,CI 95% 2.4-40.8],Diabetes [Odds ratio 2.1,CI 95% 1.5-4.2] were significantly independently related to hypertension.

Other modifiable cardiovascular risk factors [except HDL-cholesterol in both gender and LDL-cholesterol in women as borderline difference] were more prevalent among hypertensive patients in comparison to normal group (Table 2).

Variable	Healthy participants (%) means ± SE	Hypertensive Patients (%) means ± SE	ρ value
Total			
Age(years)	37.2 ± 0.3	54.6 ± 0.5	0.000
BMI (kg/m^2)	26.3 ± 0.1	29.5 ± 0.2	0.000
WC(cm)	86.9 ± 0.6	96.9 ± 0.6	0.000
FBS(mg/dl)	95.8 ± 0.9	115.2 ± 2.5	0.000
Total Cholesterol(mg/dl)	172.7 ± 1.2	186.7 ± 2	0.000
LDL-C(mg/dl)	104.7 ± 1	111.6 ± 1.9	0.002
HDL-C(mg/dl)	37.9 ± 0.3	40.7 ± 0.4	NS
TGs(mg/dl)	145.7 ± 3.1	179.1 ± 5.8	0.000
Men			
Age(years)	39.2 ± 0.3	54.1 ± 1	0.000
BMI (kg/m^2)	25.2 ± 0.1	28.2 ± 0.3	0.000
WC(cm)	87.6 ± 1.2	96.5 ± 1	0.000
FBS(mg/dl)	98.5 ± 1.5	116 ± 4.4	0.000
Total Cholesterol(mg/dl)	170.8 ± 1.8	184.9 ± 3.2	0.000
LDL-C(mg/dl)	102.4 ± 1.5	110.9 ± 2.8	0.01
HDL-C(mg/dl)	37.7 ± 0.4	38.5 ± 0.8	NS
TGs(mg/dl)	159.9 ± 5.1	191.8 ± 11.4	0.01
Women			
Age(years)	35.4 ± 0.4	54.9 ± 0.7	0.000
BMI (kg/m^2)	27.3 ± 0.2	30.3 ± 0.3	0.000
WC(cm)	86.2 ± 0.5	97.2 ± 0.7	0.000
FBS(mg/dl)	93.6 ± 1	114.7 ± 3	0.000
Total Cholesterol(mg/dl)	174.3 ± 1.6	187.8 ± 2.6	0.000
LDL-C(mg/dl)	106.6 ± 1.3	112 ± 2.4	0.044
HDL-C(mg/dl)	41.3 ± 0.4	41.9 ± 0.5	NS
TGs(mg/dl)	134.3 ± 3.9	171.7 ± 6.4	0.000

Table 2: Anthropometric indices and metabolic profiles of participants WC: Waist Circumference, SBP: Systolic blood pressure, DBP: Diastolic blood pressure, LDL-C: Low density lipoprotein–Cholesterol, HDL-C: High density lipoprotein –Cholesterol, TGs: Triglycerides.

Discussion

This study showed that more than one quarter of adults in this area are hypertensive. Other studies in Iran have reported heterogenic proportion of hypertensive patients from 6.9% to 47% [17-24,28-31]. Also wide range of hypertension prevalence were reported in different geographical area of the world [5,6,7,9,10,11,13,14,28]. This difference may be due to many factors such as the age of the subjects, race, and environmental, cultural, behavioral and socioeconomic factors.

Hypertension was more prevalent in women than men in our study. It was consistent with previous studies in Iran [17,18,20,29,32] and India [14] but was inconsistent with studies in Portuguese [6], Romania [9], Saudi Arabia [10], Jordan [9], and Turkey [28]. After logistic regression there was not any relation between gender and hypertension. The higher prevalence of other risk factors such as central obesity and dyslipidemia in women population may be the underlying cause for this sex difference.

In this study 61.3% of hypertensive patients were aware of their disease. This finding was consistent with reports of USA[5], Portuguese [6], Canada[7] and Turkey[28] but Some studies from low-middle income countries have reported awareness rate in hypertensive patients from 33%-51% [9,10,11,13,14]. Comparison of this study with other reports from Iran revealed increasing level of awareness in recent years. It may be related to improvement of public education and access to medical care, reform of health system to family physician in last 5 years and stimulating of general physicians to hypertension diagnosis in addition to high level of education in our participants.

The association between awareness of hypertension and gender has been the focus of several studies with inconsistent results [7,9,10,11,13,14,31].We found that awareness and treatment of diabetes were lower in men than women .It seems that women seek medical treatment and check up more than men in our area.

More than 80% of known cases were on antihypertensive medication that this rate was comparable with the results of other studies [7,13]. Although this finding, not satisfactory, showed improvement in treatment coverage of patients in comparison to previous studies in Iran [28,30,31]. Half of these patients were well controlled. Control was achieved from 8-65% according to studies in developed and developing countries [5,6,7,9,10,11,13,14,28]. Reported from Iran showed 2.1%-40% controlled rate. Close relationship between physician and patient, access to medical care and medication, self-monitoring, healthy lifestyle, socioeconomic situation and insurance coverage are affecting factors on well control of hypertension. Increase in awareness and control of blood pressure is a welcome finding but more efforts are needed for decreasing of unawareness and increasing control rate.

Our finding showed that prevalence of hypertension was higher among older age groups totally and in both gender. Iran is a country that will faced with aging phenomenon therefore urgent actions about education for healthy lifestyle and control of other cardiovascular risk factors also screening, diagnosis and treatment of middle age patients highly recommended.

Hypertension was significantly associated with educational level, more education lower hypertension. This finding was in agreement with studies in Saudi Arabia [10], Vietnam [33] and Jamaica [34]. This finding may be due to psychological stress or socioeconomic situation.

We found that cardiovascular risk factors are more prevalent among hypertensive group than normal group. The accumulation of these factors together increase complications. Therefore screening of this group, control and follow up them simultaneously may prevent of cardiovascular events in future.

Limitation

The results should be interpreted in the context of certain limitations. The cross-sectional study design prevents causal inference to be made about the relationship between risk factors and hypertension. The strength of our study includes having a large sample size, representative of urban population of Guilan and this research was the first study in Guilan to determine the prevalence of hypertension.

Conclusion

In conclusion, about one forth of Guilanian urban adults had hypertension that only 25% of them were control. We recommend implementation of screening program among high risk group in urban area as rural area.

Acknowledgement

Conflict of interest

Authors have not any conflict of interest.

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