

The Incidence of Hypertension and the Follow-Up Rate in A Sample of Population Over 30 Years Old in Kashan 2013

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ABSTRACT

Introduction: Studies indicate that hypertension is prevalent in Iran, however, the reports are heterogeneous. The aim of this study was to estimate the incidence of hypertension and the rate of follow-up in a sample of population over 30 years old in Kashan city.

Methods: A descriptive study was conducted on people screened for hypertension in the project of "monitoring the health of Iranian population" in Kashan city at April 2013. Among all completed screening forms, 5000 forms were selected randomly. Required data were extracted from these forms and were recorded on a checklist that was consisted of 9 questions on demographics characteristics and 10 questions about follow-up. Descriptive statistics, independent sample t-test, paired t-test and Pearson correlation coefficient was used to analyze the data.

Results: Totally, 5% of the enrolled people had a systolic blood pressure over 140 mmHg and a diastolic pressure over 90 mmHg. Only 92 subjects with high blood pressure were available via telephone. Also, 42.42% of cases refused to answer. From all subjects who were available and answered the study questions, 50% had been referred to a physician after 5.17 (6.05) days. Of these, 52.2% were diagnosed as being hypertensive. Lacking time was the main reason for non-referral.

Conclusion: The incidence of hypertension was less than other studies but the rate of follow-up was low. Nurses and Iranian nursing organization are suggested to conduct a nationwide screening and follow-up project to improve the rate of early diagnosis and help people in better management of hypertension.

Introduction

Hypertension (HTN) is one of the most common cardiovascular disorders. If untreated, it may result in complications such as stroke, coronary artery disease, heart failure, kidney failure and even death. It is one of the main causes of mortality worldwide and has referred to as the silent killer. Although hypertension is dangerous, it could easily be identified and treated.¹ HTN is a major health problem worldwide, especially in developing countries. Studies show that hypertension kills more than 40 thousand Americans each year and is also involved in the death of more than 200 thousand people.¹ Studies

in Iran have also shown a high prevalence of the disease.^{2,3} But the reported rates are heterogeneous. A study in urban and rural areas of Isfahan, Najaf Abad and Arak has reported that 15.6% of men and 18.8% of women in those areas suffered of HTN.⁴

But another study on epidemiology of HTN in Iran has reported that the prevalence of HTN in middle age and old age was around 23% and 49.5%, respectively.⁵ Some other studies also have reported this rate to be between 12.3% to 35.4% in Iran.⁶⁻⁸ The prevalence of HTN is also different in different countries so that it is 11 - 30% in Latin America, 20 - 33% in Africa, 18 - 22% in the U.S, 44% in some European countries, and 25 - 30% in China,

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Korea, and Taiwan.⁹⁻¹³ Reports are not only are different in relation to the rates of HTN, but also are inconsistent in relation to the magnitude of its risk factors in different areas.⁶⁻⁸

Among the many risk factors of hypertension some are modifiable (such as diet, obesity, smoking, stress, Hyperlipidemia [high blood cholesterol levels, high LDL levels], low HDL levels, physical inactivity and Lack of sleep) and others are non-modifiable (such as gender, race, increased age and positive family history), classified as.¹

Although diagnosis, treatment or control of hypertension is achievable by modern medicine, however, it seems that there is a considerable delay in its detection and treatment, largely because people with hypertension are often symptom free and unaware of their elevated blood pressure.¹

Treating HTN and modifying the risk factors not only need the patients to follow the health care and therapeutic recommendations, but also it needs to an effective system to follow the patients.

Some studies have shown that patients with chronic problems such as diabetes do not follow their treatment and do not adhere well to the self-care regimens after the diagnosis of their chronic disorders.¹⁴

It is also reported that managing HTN is challenging in low income countries for a variety of reasons, such as drug availability and costs, as well as inadequacy of health services.¹⁵ Although several studies was conducted on patients with HTN, and it is reported that hypertension is prevalent in Iran, however, few large scale studies are available on the incidence of this health care problem in Iran and the reports are also heterogeneous. Also no Iranian studies are available on the rate and quality of follow up treatments of patients with HTN.

Along with the suggestion of World Health Organization for attention to HTN in 2013, the project of "monitoring the health of Iranian population" with an

special focus on screening for high blood pressure was conducted countrywide by Iranian Nursing Organization and the Ministry of Health and medical education in April 2013. The present study was conducted on a sample of the population in Kashan city who were screened in the mentioned project. The aim of the study was to estimate the incidence of new cases of HTN and the rate of follow-up in a sample of population over 30 years.

Materials and methods

This descriptive study was conducted on patients who screened for hypertension in the project of "monitoring the health of Iranian population" in Kashan city at April 2013.

Sample size was calculated using Cochran formula. Then, 4421 samples were estimated to be needed in the present study based on the following parameters: Type I error of 0.01, P= 0.50, and sampling error equal to 0.2. However, we selected 5000 forms (among 15000 ones) for sure and compensation of possible attrition of 10%.

Random sampling was conducted among all the exiting screening forms. Readability of forms, not having any missing data and not having a previous diagnosis of hypertension were selected as the inclusion criteria.

In the screening project, peoples' blood pressure was measured using an ALP K2 sphygmomanometer (sensitivity±3 mm Hg), in sitting position, from the right arm and after 15 minutes of resting. The measurement was repeated if the people's systolic and diastolic blood pressures were higher than 140 and 90 mmHg respectively.

Then all people with systolic and diastolic pressures equal or higher than 140 and 90 mmHg were advised to refer to a physician. All these patients were given a recommendation letter to be visited without payment. In the screening program, measurement of blood pressure

was carried out by 40 senior nursing students. All the students were specially trained by a cardiologist and a nursing faculty member and then were tested one day before the project start.

Required data were extracted from the screening forms and were recorded on a checklist. This checklist was consisted of two parts. The first part was included of 9 questions on demographics characteristics such as gender, age, marital status, education level, family history of hypertension, blood pressure in first and second measurements, body mass index ($BMI = \frac{Weight (Kg)}{Height^2 (M)}$), and the subject's telephone number, respectively. To calculate the BMI, the subjects' weight was measured using digital scales with precision weighting of $\pm 100g$ (Terraillon®, USA). Weight was measured while the subjects removed their shoes and coat/tent. Also the subjects' height was measured using a flexible 150 cm tape measure vertically fixed on the wall with its zero 50 cm from the floor. Each subject removed its shoes and anything from its head, stood on the floor, against the wall, looked straight ahead with its feet together and heels, butt, shoulders, and head back touching the wall. Then a ruler was placed on top of the subjects' head so that it forms a 90 degree angle with the wall and the point was marked on wall. Then, the space from the floor to the marked place was measured in cm. Then, 50 were added to the result to obtain the subjects' height.

Measurement of weight and height and calculating BMI were performed by the aforementioned 40 nursing students and all of them were trained by a nursing faculty member and tested accordingly. The second part consisted of 10 questions including referring to a doctor for follow up, the specialty of the doctor (general practitioner or specialist), presenting the special recommendation form to the doctor, the reason for follow up, the cause

of not performing the follow up (for those who did not performed a follow up), the physician's medical diagnosis, recommended treatment, the subject's satisfaction of the project and him/her perception of the quality of project implementation. The second part of the questionnaire was completed 4 weeks after the screening program via a telephone contact. If a subject was not available in the first contact, the telephone contact was repeated for three times in three consecutive days. Although the first part of the checklist was based on the instrument used in the screening project, the content validity of all two parts were confirmed by 10 nursing faculty members in the Kashan's nursing school. Reliability of the instrument was checked through inter-raters' method.

To do this, two researchers completed the checklist for 20 cases and the agreement rate was calculated as 0.96.

This study was approved by the institutional review board and the Research Ethics Committee in nursing school of Kashan University of Medical Sciences. The research objective was explained to all the study subjects. All the participating individuals were assured of the confidentiality of their personal information, being free to participate in the study and gave the researchers a verbal consent for participation in the study.

Ethical issues (Including plagiarism, Informed consent, misconduct, data fabrication and falsification, double publication and submission, redundancy, etc.) have been completely observed by the authors.

Data analysis was performed using the Statistical Package for Social Sciences (SPSS Ver.13.0; SPSS Inc., Chicago, USA). All data were described using frequency tables, central tendency measures, and variability indices. Moreover, independent sample t-test was used to examine the gender differences in mean blood pressure. Paired t-test was employed to examine the

pressure difference between the two times of measurement. Also, Pearson correlation coefficient was used to examine the correlations between age and also body mass index and blood pressure. The incidence rate was calculated by dividing the new cases of HTN by the total at risk subjects (i.e. the total samples). P- Value of less than 0.05 was considered as significant level in all testes.

Results

Of the 5000 subjects, 250 ones had a blood pressure higher than 140/90 mmHg, that represents an incidence rate of 5% or 50 cases in each 1000 adult subjects. These subjects 58.4% (n=146) were male and 41.6% (n=104) were female, respectively.

From the total sample, 99.6% were married. 14.8% were illiterate, 40.4% had elementary education, 33.6% had intermediate or high school education and 4.4% had higher educations. Moreover, 35.6% had a family history of hypertension.

The mean (SD) age of the subjects was 53.99 (11.28) and it was in the range of 31 to 86 years old. The mean (SD) age was 55.33 (11.94) and 52.10 (10.02) for males females, respectively (P=0.021, t=2.26).

Pearson correlation coefficient showed a significant association between the mean systolic blood pressure and age at first and second measurement ($r=0.143$, $P=0.024$ at first time and $r=0.158$, $P=0.031$). However, no significant correlation was found between age and diastolic pressure. Also, no significant correlation was found between the mean body mass index and mean (SD) of systolic or diastolic blood pressure (Table 1).

Mean systolic and diastolic pressures were 150.18 (11.67) and 93.28 (10.4) mmHg in the first and second measurements, respectively. No significant differences were found between the mean systolic and diastolic blood pressures in men and women in any of the two measurements

($P > 0.05$). The mean BMI was significantly higher in men than women ($P=0.028$) (Table 2).

The paired t-test was applied and significant differences were found between the mean systolic and diastolic blood pressures in the two measurements at 15 minutes intervals ($P=0.001$) (Table 3).

Only 92 subjects (36.8%) with high blood pressure were available via telephone contacts. The main reasons for the lack of contact were: not recording the people's contact number by the screening team 17.72%, incorrectness of the recorded phone number 5.69%, lack of response to calls 34.17% (due to being turned off, being blocked, inaccessibility of the contact number and not answering to the call).

Also, in 42.42% of cases, the subjects responded the call but refused to answer.

From the total subjects who were available and answered the study questions, only 46 ones (50%) had been referred to a physician after 5.17 (6.05) day and 24 ones (52.2%) have been diagnosed as being hypertensive. Lack of time was the main reason for not referring in 80.4% of the participants (Table 4). From the total subjects who replied to the study, 87 subjects (94.6%) were satisfied of the project implementation and also 88 subjects (95.6%) believed that the project was implemented with acceptable quality.

Discussion

In the present study the rate of new cases of undiagnosed hypertension was 5% in the enrolled subjects. According to Hajjar, the overall incidence of hypertension is ranging from 3 to 18% in the general population.¹⁶ However, this rate was reported to be over 9.27%¹⁰ to 19.9% in France,¹⁷ 2.4% to 3.2% in Canada,^{18,19} 2.1% in united state²⁰ and 34.5% in Barbados.²¹ In Iran, Amini et al., have studied the 5-year incidence rate of hypertension in type 2

Table 1. Correlation matrix between age and body mass index, mean systolic and diastolic blood pressure in two measurements

Variables	Age	First systolic blood pressure	First diastolic blood pressure	Second systolic blood pressure	Second diastolic blood pressure	Body mass index
Age	1					
First systolic blood pressure	0.143*	1				
First diastolic blood pressure	-0.82	0.393*	1			
Second systolic blood pressure	0.158*	0.638**	0.481**	1		
Second diastolic blood pressure	0.032	0.425**	0.657**	0.550**	1	
Body mass index	-0.0960	-0.0290	0.004	0.07	0.055	1

*Level of significance 0.001, **Level of significance 0.05

Table 2. The mean and standard deviation of blood pressure and body mass index of the participants in both genders

Variables	Total	women	men	t [†]	95% CI		P
	Mean (SD)	Mean (SD)	Mean (SD)		upper	lower	
First time							
Systolic blood pressure	150.18 (11.68)	148.67 (9.56)	151.26 (12.90)	1.820	5.527	-0.352	0.070
Diastolic blood pressure	93.28 (10.40)	92.69 (10.05)	93.63 (10.68)	1.820	1.638	-1.625	0.452
Second time							
Systolic blood pressure	146.30 (15.23)	146.41 (12.88)	146.23 (16.60)	-0.083	4.287	-4.663	0.934
Diastolic blood pressure	91.13 (12.22)	90.79 (13.04)	91.34 (11.73)	0.083	4.134	-3.045	0.765
BMI	30.35 (13.78)	32.63 (5.18)	28.72 (5.30)	-2.216	-0.434	-7.387	0.028

SD: Standard Deviation, CI: Confidence Interval, †t-test

Table 3. The mean systolic and diastolic blood pressure in the first and second measurements

Variables	First time	Second time	t	95% CI		P
				Upper	Lower	
Systolic blood pressure, Mean (SD)	150.18 (11.68)	146.30 (15.23)	1.820	5.598	2.380	0.000
Diastolic blood pressure, Mean (SD)	93.28 (10.40)	91.13 (12.22)	0.720	3.826	1.137	0.000

SD: Standard Deviation, CI: Confidence Interval

Table 4. Patients follow up performance and its related factors

Variables	N (%)
Having the referral form in follow up visit	
Yes	31 (68.1)
No	15 (31.9)
Physician's expertise	
General	28 (60.9)
Specialist	18 (39.1)
Visit site	
Public clinics	29 (63.0)
Doctor's office	17 (27.0)
Reasons for seeking treatment	
Fear of disease	37 (80.4)
Visiting free of charge	1 (2.2)
Other reasons	8 (17.4)
Causes for not referring	
Uncertainty about the outcome of the screening	8 (17.4)
Do not care about the disease	4 (8.7)
Lack of time	24 (52.2)
Other reasons	10 (21.7)
Medical treatment recommended	
Drug therapy	22 (47.8)
Exercise	1 (2.2)
Dietary regiment	1 (2.2)
Drug therapy and dietary regiment	22 (47.8)

diabetic patients and this rate was reported to be about 41.5%.²²In another study, Taraghi et al. have studies the prevalence of hypertension in truck drivers and this rate was reported as 36.9% while 77% of the truck drivers were unaware of their disease.²³ One possible explanation for the low rate of new cases of high blood pressure in this study is that the screening project was active only in official hours and a large number of employees and workers could not refer to the screening sites in these hours. In this study, the majority of new cases of high blood pressure were men but the mean systolic and diastolic blood pressure did not significantly differ between the two genders. In a 10-year study in Canada, the incidence of hypertension was higher in women at baseline but at the end of the study, the rate was equal in both genders.¹⁸ Also, the incidence of hypertension was higher in

women in a study on 9-Year incidence of type 2 diabetes and hypertension in a predominantly African-origin population.¹⁹

Studies have been shown that the incidence of hypertension is lower in women before menopause but the incidence as the same of men after the menopause.¹ The lack of significant differences between the mean systolic and diastolic pressures on the two genders in the present study may be attributed to the fact that most of women participated in this study were post menopause. Then, the risk of hypertension was nearly equal in both genders.

In the present study, a significant correlation was observed between age and the incidence of high blood pressure, so that more cases of high blood pressure were found in higher ages. This finding was consistent with the findings of previous studies.^{5,9-14}

Obesity, atherosclerosis and arteriosclerosis, and kidney disorders are factors affecting the prevalence of hypertension in old ages.^{1,23}

In the present study, no significant correlation was found between BMI and the incidence of HTN. This finding was incompatible with the findings of previous studies.^{19,24-26} This unexpected finding may be attributed to the small sample number of the subjects with HTN in the present study. However, obesity is a major risk factor for HTN. Because with increasing of BMI, the cardiac workload would be increased and the process of atherosclerosis would intensified. Then, blood pressure will be increased.¹

In the present study, a significant statistical difference was observed between the two measurements of systolic blood pressure. However the difference between the two measurements was only about 3.88 mmHg and such a difference could not be clinically important. The same point is also should be pointed about the difference between the diastolic pressures in the two measurements.

The current study showed that only half of those who advised for follow-up and for home a recommendation letter were issued made a visit to a physician. This finding is consistent with the report of Etzioni that only a few patients perform the necessary follow-ups after the screening tests.²⁷

Although the rate of follow-up is a criterion for the quality of screening tests,²⁸ this rate seriously depends on the peoples' knowledge and awareness about the disease entity and the importance of follow up.²⁹ Then, the low rate of follow-up after the hypertension screening program may somehow be attributed to the inadequate and inappropriate information passed to the community through mass media. The low rate of follow-up may also be related to the treatment oriented structure in the existing health system in the country that does not emphasize on prevention.³⁰

Conclusion

The incidence of HTN was 5% in the present study. Also the rate of follow-up was very low. This low rate of follow-up may put the people at risk of complications of HTN. The authorities in the national healthcare system should put their pressure on screening and preventive measure. Tracking the results of screening would not only prevent severe complications, but it can also reduce the healthcare costs. Considering the existing capacities in nursing profession, establishment of community health nursing system seems to be an appropriate way to improve the health and healthcare and responding to the public health needs.

This study was conducted only in one city, then repeating the similar studies in other areas would help the authorities to see the big picture and obtaining a more valid estimate of the problem countrywide.

Also repeating the screening project with a better time frame so that a more representative sample can be enrolled is suggested.

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Ethical issues

None to be declared.

Conflict of interest

The authors declare no conflict of interest in this study.

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