Hypertension Awareness, Treatment, Control and Prevalence in Zanjan Province, Iran

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Abstract

Background- Hypertension is a frequent and treatable risk factor for cardiovascular, cerebrovascular, renal and peripheral arterial disease. There are simple criteria for its diagnosis and no expensive equipment is needed. This article aims to determine how many hypertensive subjects are aware of their disease, how many of them actually treat it, what they utilize to treat it, and finally how many complete treatments successfully.

Method- A cross-sectional descriptive study was conducted on 1000 people in Zanjan Province in 2007. Random stratified cluster sampling based on postal code was used to enroll people aged between 15 to 67 years old. Their blood pressures were measured three times by automated device in the sitting position from the right arm at home. Hypertension was defined as recorded blood pressure above 140/90mmHg or taking anti-hypertensive medications.

Results- Two hundred seventy-eight (27.8%) hypertensive patients were detected in our sample. The prevalence of hypertension after age adjustment was 18.7% (95% CI, 16.1% - 21.3%) in Zanjan. Only 101 (36.3%) patients were aware of their disease, 38 (13.6%) of all hypertensives took medication, and the blood pressures of only 6 (2.1%) of all hypertensives were controlled. 70 (25.1%) used non-pharmacologic treatment and 27 (9.7%) used traditional medications.

Conclusion- The potential for both better detection and treatment would appear to be huge in our region. Implementation of health care systems for this purpose is needed (***Iranian Heart Journal 2010; 11 (1):10-16).***

Hertension is a very common and important risk factor for cardiovascular disease.[1] It is the most important modifiable risk factor for cerebrovascular accidents.[2] Hypertension and diabetes are the two main causes of chronic renal failure worldwide.[3-4] There are simple criteria for the detection of high blood pressure and it does not require long and complex training or expensive equipment.

On the other hand, reduction of blood pressure is achievable with both non-pharmacologic and drug treatment[5]. This reduction with new or old drugs or with non-pharmacologic treatment is quite effective in the reduction of total cardiac mortality, hospital admissions for acute coronary events, heart failure, coronary artery bypass surgery, percutaneous coronary interventions, myocardial infarction and cerebrovascular ccidents.[6-7] Hypertension treatment also reduces progression of chronic renal failure[3] and peripheral artery disease.[7] All of the above-mentioned benefits can be obtained through timely detection, treatment and appropriate follow-up of a hypertensive patient.

Actually awareness, treatment and finally control of this disease determine the amount of real risk reduction achievable by modern medical progression, but it seems that there is a considerable delay in its detection and treatment. During our clinical practices, a large number of patients are visited who suffer from even severe hypertension and have not done anything for its treatment, and some of them were not aware of their disease. At the same time, we have developed a health care system which interacts with different subjects. In this research, we aimed at estimating hypertension prevalence in our province, determining how many of the patients knew about their disease and how many patients (and with what method) treated it. We also attempted to pinpoint differences in different subgroups of the patients in terms of their awareness, treatment, and control. Finally we compared the results obtained with those in other parts of the country and those in other regions in the world.

Methods

In 2007, a survey was conducted in all Iranian provinces by the Ministry of Health on non-communicable diseases. It was done in our region by Zanjan University of Medical Sciences, and we used the data obtained with the prior permission of this university. A detailed method of the survey has been reported elsewhere,[8] but briefly, according to WHO stepwise approach,[3] stratified cluster random sampling method was used based on postal code. One thousand people were selected in 50 clusters within the age range of 15 to 67 years old, males and females enjoying an equal number. Blood pressure measurements and data collection were done, after obtaining the subjects' consent, by specially-trained general practitioners in the subjects' homes. Automated digital devices based on oscillometric blood pressure measurement were used (Omron 7). Blood pressures were measured, after a five-minute rest, from the right arm in the sitting position on an armchair. In 92.6% of the cases, measurements were repeated three times and for the rest, it was repeated two times. Hypertension was defined as a recorded average pressure equal to or more than 140/90 mmHg, or the use of antihypertensive medication for treating hypertension. Hypertensive awareness was defined as providing the patients with information regarding their disease by health professionals or usage of antihypertensive medication. Non-pharmacologic treatment was defined as taking one or more of the following measures for treating high blood pressure based on the participants' self report: attempt for weight reduction, limitation in caloric or salt intake, attempts for smoking cessation or increasing physical activities. Controlled hypertension was defined as a recorded blood pressure lower than 140/90 mmHg associated with drug consumption. Statement of relative frequency of treatment and control in all sections of this article is based on all hypertensive patients regardless of their awareness. We used JNC7[9] for classification of blood pressure. Beside this, we determined patients with stage 2 and stage 3 hypertension based on ISH/WHO[10] and ESH[11] classifications.

Statistical analysis

Data was analyzed by frequency distribution tables, measures of central tendency and variability and diagrams. Chi-square test was used to determine if the observed differences in the proportions were statistically significant. All analyses were done using SPSS software.

Age and sex-specific hypertension was shown in this study. Due to the study design, the weight of different age groups in our samples was different from the real population in this province, so we adjusted this for the real prevalence estimation in this region. Also for

comparison of hypertension prevalence in our region with the whole country, we again adjusted age. Prevalence of different levels of blood pressure (including pre-hypertensive state) was also shown. Prevalence, awareness percentage (ratio) and treatment percentage (ratio) with increasing age have been showed separately, and the combination of all were shown in a single diagram so trends can be compared easily.

Results

One thousand people between 15-66 years old were enrolled in this study, half of whom were male. Two men and one woman were excluded due to lack of blood pressure measurement data. Mean participant age was 41.1 years old (standard deviation 14 yrs.). 272 subjects had high recorded blood pressure and six had normal recorded blood pressure with antihypertensive medication so there were 278 hypertensive cases (27.9%, 95% CI 25.1% - 30.6%) in our study. Among the hypertensive patients, there were 132 men (26.5%) and 146 women (29.3%) without a significant difference of proportion between men and women (p=0.33). Age and sex-specific prevalence, awareness and treatment are shown in Table I, and relative frequency of blood pressure classes are shown in Table II.

Only 101 (36.3%) persons were aware of their hypertension, from whom 65 were women (64.6%) and 36 were men (35.6%); the proportion of awareness was significantly greater in women than men (44.5% versus 27.3%, P=0.003).

Hypertension awareness proved to have a high correlation with increasing age, but with different incremental rates in men and women (Figs. 1, 3).

Awareness also had a correlation with severity of hypertension (Spearman index, Table III); however 10 out of 28 patients with severe hypertension were yet unaware of their condition (Table III).

Table I. Age /sex specific prevalence, awareness ratio and treatment ratio

	Age	Prevalence N (%)	Awareness N (%)	Treatment N (%)
Male	15-24	11.8%	10.0%	.0%
	25-34	10.0%	11.1%	.0%
	35-44	23.2%	13.0%	.0%
	45-54	37.4%	30.0%	.0%
	55-64	40.6%	33.3%	7.7%
	>65	52.4%	54.5%	36.4%
Female	15-24	6.6%	.0%	.0%
	25-34	7.3%	25.0%	.0%
	35-44	25.0%	28.0%	12.0%

45-54	42.1%	32.5%	5.0%
55-64	59.1%	61.5%	36.9%
>65	33.3%	100.0%	66.7%

Table II. Distribution of different blood pressure classes

	Number	Percent
Optimal	284	28.5%
Per hypertensive	441	44.2%
Stage 1	188	18.9%
Stage 2	56	5.6%
Stage 3	28	2.8%
Total	997	100%

Table III. The frequency distribution of awareness by different stages of hypertension

Classification	Total	Aware (%)	Treatment (%)
Stage 1	188	42 (22.3%)	9 (4.8%)
Stage 2	56	35 (62.5%)	17 (30.4%)
Stage 3	28	18 (64.3%)	6 (21.4%)
Controlled	6	6 (100%)	6 (100%)
Total	278	101 (36.3%)	38 (13.6%)

Awareness vs. hypertension severity Spearman coefficient=.37
Treatment vs. hypertension severity Spearman coefficient=.26

Forty-three out of 997 subjects (4.3%) had normal recorded blood pressure without drug consumption (normotensive by definition), but they had been told that they were hypertensive. Some of them reported non-pharmacologic treatment (15 out of 43, or 34.8%).
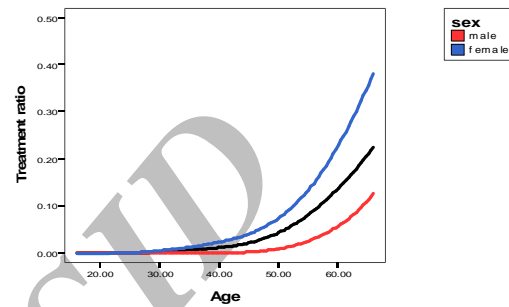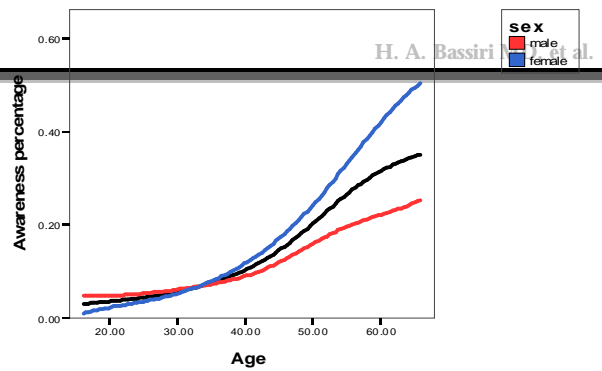
Fig. 1. Hypertension awareness with aging.

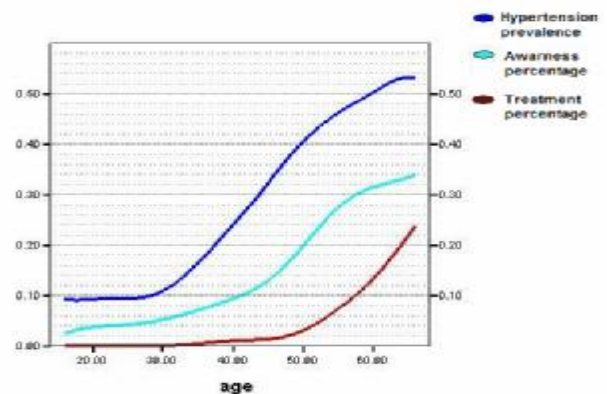**Fig. 2.** Pharmacologic treatment ratio with age.

Fig. 3. Hypertension prevalence, awareness ratio and treatment ratio with age.

Pharmacologic treatment was observed in 38 out of 278 cases (13.6%). From these, there were seven men (out of 132 or 5.3%) and 31 women (out of 146 or 21.2%). There was thus a quite large and significant difference between the proportion of men and women who received treatment (5.3% versus 21.2%, P<0.0001). In other words, from among 101 people who were aware of their disease, 37.6% actually took medications for their treatment.

Treatment rate increased with increasing age (Figs. 2, 3), again with a different slope in men (maximum 36.4%) and women (maximum 66.7%). This rate also increased with severity of hypertension (Table III). Non-pharmacologic treatment was reported in 85 subjects, but 15 cases did not have high recorded blood pressure. Based on our definition of hypertension, 70 hypertensive cases (25.2%) received this treatment. This means that from among 101 hypertensive subjects

who were aware of their disease, 69.3% or two-thirds used this method. Again, non-pharmacologic treatment proved to be more frequent in women (similar to drug treatment) than men (31.5% vs. 18.2%, p=0.01). A kind of medical diet change (84.7%), attempt for weight reduction (41.2%), attempt for increasing exercise (40%) and attempt for smoking cessation (14.1%) were the most frequent forms of non-pharmacologic treatment, respectively. Traditional therapies were used in 27 (9.7%) hypertensive subjects. It means 26 (25.7%) hypertensive people who were aware of their disease used traditional therapies for their treatment. Traditional therapies frequency did not turn out to have a significant difference in men and women (11.6% women vs. 7.5% men). Only 6 had controlled hypertension (2.2% of hypertensive cases or 5.9% of hypertensive cases who were aware of their disease).

Discussion

Hypertension prevalence in this study was 27.8%, but if we consider the real weight of different age groups based on Zanjan population survey conducted in 2005,[12] and its latest changes in 2007, the actual prevalence of hypertension in this province would turn out to be 18.7% (95% CI -16.1% - 21.3%). Compared to the prevalence of hypertension in Iran (Table IV), the age-adjusted prevalence was 23.8% (95% CI, 21.0% - 26.5%) which is not significantly different from the average of the whole country[13] (25.2%, 95% CI 24.8%-25.5%), and is compatible with that of[13] the Middle East.[14] The high prevalence of hypertension (18.8 %) along with the common unawareness of it can be considered to be of great concern for health care providers. In 1990 Smith et al. confirmed the "rule of half", which means half of the patients are aware of their disease, half of aware patients receive treatment and again half of treated patients are under control. However, the situation is changed now; although the unawareness rate in our region enjoys the same frequency as that of the whole country (66%),[13] hypertension treatment rate is half and controlled hypertension is even less than half[13] compared to the rest of the country.[14] Hypertension unawareness rate in our study in comparison to other regions of the world is shown in Table IV.

Hypertension awareness in our study was higher in women than in men. Also treatment rate was twice as high in women (21.2%) as in men (5.3%).

Hypertension awareness and treatment rates were found to be higher in women than men in all other studies worldwide.[19-20]

Unity of this phenomenon in different studies carried out in different continents from Africa to the Middle East, Asia[22] and Western countries is interesting and requires a special survey.

Table IV. Hypertension prevalence, awareness, treatment, and control in different populations in the world

	Prevalence (Crude)	**Awareness**	Treatment	Control
Zanjan(2008)	18.8%	**33/3%**	7.3%	2/2%
Iran(2008)	25%	**34%**	25%	6%
Tehra[55](2000)	22%	**50%**	36%	14%
Egypt[6] (1995)	26.3%	**37.5%**	23.9%	8%
China[7](2002)	27.2%	**44.7%**	28.2%	8.1%
Africa[8] (2004)	28.7%	**22%**	11.3%	2.8%
Portugal[9](2007)	42.1%	**46.1%**	39%	11.2%
West European[18](2004)	44/2%	**60%**	26.8%	8%
Canada[17](2003)	27%	**63.2%**	36.4%	17.2%
USA[20] (2003)	25%	**69.3%**	52.5%	28.6%

Could it be due to some discomfort with hypertension on the part of women that causes their careful attention and follow-up?

In our study, awareness and treatment rate were found to be higher in older ages when hypertension itself becomes more prevalent, but this could not be directly related to higher prevalence of hypertension in the elderly. It seems that after several years (about 10-15 years in our study, Fig. 3), patients become aware of their situation and after some more years (about 10 years in our study, Fig. 3) they would finally be convinced to treat it with medication. The main point is that these delays are unduly long and cause a large number of patients to miss out on the benefits from treatment. So we believe the new nomenclature in blood pressure classification in JNC7 (pre-hypertensive) may be a useful strategy for shortening this delay.

Non-pharmacologic treatment in hypertensive people, aware of their disease, was relatively common (70/101) or 69.3% but pharmacologic treatment in the same subgroup was only (38/101) or 37.6%. It seems that following delay in awareness, delay in starting medication after failure of non-pharmacologic treatment is the second most frequent difficulty in hypertension treatment. On the other hand, traditional medications which have not been adequately studied were used by a relatively high frequency of the cases (27.8% of hypertensive people who were aware or 9.7% of all hypertensive people).

Thirty-seven out of 144 people who had been told that they had hypertension had normal recorded blood pressure without pharmacologic treatment (25.6%). This has also been seen in other studies[21] and may have several origins. In all studies, controlled hypertension is defined to be limited to drug consumers with normal recorded blood pressure so hypertensive people who had already been treated through non-pharmacologic treatment would be a part of this group.

On the other hand, labile hypertension and white coat hypertension can be regarded as other causes of this condition. As mentioned in the method section, in this study we measured blood pressure at home. Misunderstanding and also measurement error might be the other causes.

Conclusion

Detection and treatment of hypertension is absolutely unsatisfactory in our province. We should encourage people and health providers to pay more attention to hypertension, while increasing people's knowledge about hypertension and its treatment

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Conflict of Interest

No conflicts of interest have been claimed by the authors.

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