

Trends in Blood Pressure Level, Prevalence and Control of Hypertension in Isfahan, Iran

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Abstract

Objectives- This study aimed at evaluating the trends in hypertension prevalence and control during the last decade.

Methods- We drew upon four independent cross-sectional population surveys conducted in 1992, 1996, 1999 and 2001 in Isfahan, Iran.

Results- The prevalence of hypertension had a downward trend from 31.8% in 1992 to 17.5% in 2001. The mean systolic (SBP) and diastolic blood pressure (DBP) decreased in both sexes. The mean SBP decreased from 142.24 to 116.8 mmHg in men and from 143.07 to 113.7 mmHg in women. Regarding DBP, this decrease was from 92.5 to 73.8 mmHg in men and from 92.2 to 72.8 mmHg in women ($P < 0.05$). The proportion of hypertensives who were aware of their condition increased from 46.2% to 50.1% ($P < 0.05$), and the proportion of hypertensive subjects with adequately controlled blood pressure increased from 2.8% to 12% ($P < 0.05$).

Conclusion- Hypertension care has improved significantly during the last decade, which is probably the result of the implementation of different population-based national plans (*Iranian Heart Journal 2004; 5(1,2):33-38*).

Key words: hypertension ■ blood pressure ■ awareness ■ controlled hypertension

Coronary artery disease (CAD) is shown to be the main cause of morbidity and mortality in industrialized countries and 30% of all causes of mortalities every year¹ and is responsible for morbidity and mortality in developing countries as well.² As a major risk factor of atherosclerosis, hypertension has a basic role in CAD³⁻⁴ and is the most variable factor indicating the situation of CAD in a community.

Different studies have demonstrated that hypertension control reduces cardiovascular events to 42% and CAD to 14%.⁵⁻⁷

Given the high prevalence of hypertension in our society⁷, its control is critical to decrease CAD and related problems. Evaluating the hypertension trend not only indicates the situation of this condition in a society as a whole but also provides a valuable practical attitude regarding disease control for future health plans.

In this paper, the 10-year trends in mean blood pressure levels, hypertension prevalence and quality of hypertension care in Isfahan, the second largest city in Iran, are presented.

Subjects and Methods

Four independent cross-sectional population surveys were carried out in 1991, 1995, 1998 and 2001 in urban and rural areas of Isfahan.

In each study, subjects aged more than 19 years were selected by multi-stage random sampling from the same clusters. Trained nurses meeting the standards of the World Health Organization (WHO) performed all the blood pressure (BP) measurements. Standard mercury sphygmomanometers were used in each survey. All the instruments were standardized before the study, and zeros were calibrated.

BP was measured twice in the right arm in the sitting position after 5 minutes of rest. The values were recorded to the nearest 5 mmHg, and the mean of the two measurements was used in the analysis.

A person was considered to have hypertension when his/her average BP was more than or equal to 140/90 mmHg, or was taking at least one antihypertensive drug.

Questionnaires including age, sex and awareness about being hypertensive and the practice and attitude of hypertensive subjects regarding pharmacological treatment were filled in each survey. The data collected during the last ten years was analyzed based on the sex and age indicators using SPSS V₁₁/Win software.

Results

The mean systolic BP (SBP) and diastolic BP (DBP) in men decreased from 142.24 and 92.5 mmHg in 1992 to 116.8 and 73.8 mmHg, respectively in 2000. This level also decreased in women from 143.07 and 93.2 mmHg to 113.7 and 72.8 mmHg, respectively (Fig. 1). This decrease was present in all age groups except in those aged ≥ 70 (Figs. 1-4).

The prevalence of hypertension decreased from 1991 to 2001 without significant difference between men and women (Table I).

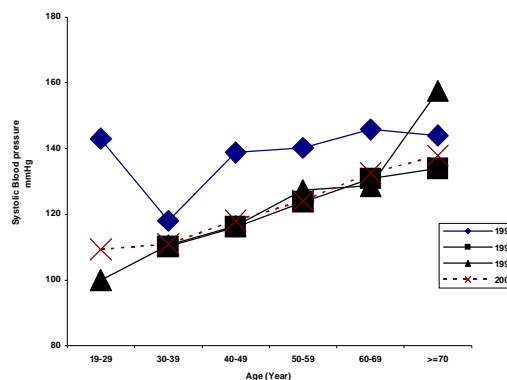


Fig.1. Trend of mean SBP level in different age groups

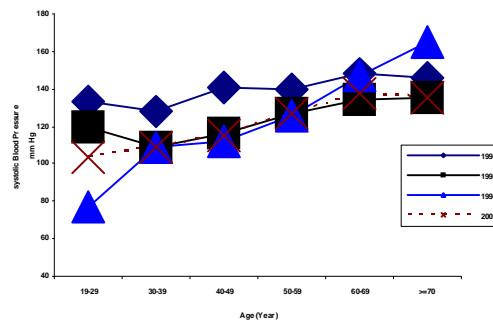


Fig.2. Trend of mean SBP level in men according to age

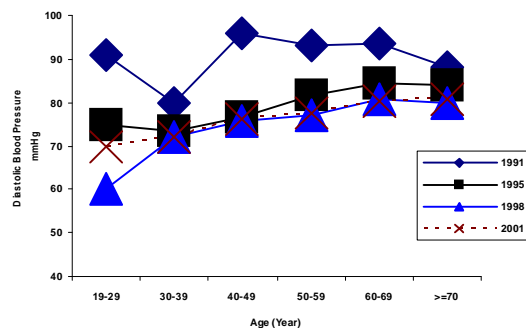


Fig.3. Trend of mean DBP level in men according to age

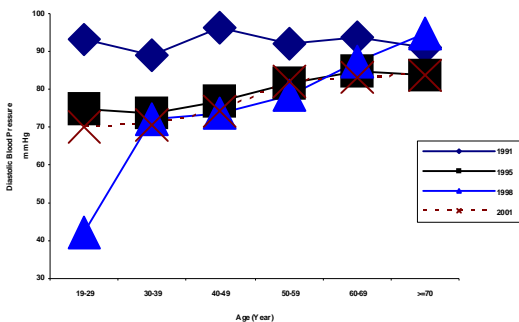


Fig.4. Trend of mean DBP level in women according to age groups

The prevalence of hypertension declined significantly from 30.1% to 23.13% in men and from 31.1% to 22.5% in women. As a whole, the prevalence of hypertension declined from 31.5% in 1991 to 17.5% in 2001, which shows a 13.3 percent decrease.

Studying the proportion of subjects aware of being hypertensive, the proportion of hypertensive subjects being under treatment and those with controlled hypertension showed that awareness increased from 46.2% in 1991 to 50.1% in 2001 ($p < 0.05$), and that the patients under treatment increased from 23% to 33.9% ($P < 0.05$) over these years. Only 2.8% of hypertensive subjects had controlled BP in 1991 increasing to 12% in 2001 ($P < 0.05$), and as depicted in Table I, the level of BP control among women was significantly higher than men (16.4 vs. 6.5%, $P < 0.05$).

Discussion

Information concerning the trend of hypertension as the most prevalent cardiovascular disease (CVD) and the main cause for CVD mortality⁸⁻⁹ can be useful for evaluating the general situation of this disease in the society and also for the planning of community-based interventions in the field of primary and secondary prevention. This trend has been

evaluated in several countries worldwide and for the first time in our society. The present study showed a downward trend in the prevalence of hypertension among men and women aged between 19-50 years in the last decade. The average of SBP and DBP had a linear increase with aging. The proportion of hypertensive subjects aware of their condition, and the proportion of patients with controlled BP showed an increase.

In the US, the 20-year trends from 1960-1962 (NHES) to 1976-1980 (NHANES 2), showed a decrease in the prevalence of hypertension. The amount of reduction in regard to SBP among the Blacks (32% women and 31% men) was more than Whites (19% women and 17% men)¹⁰⁻¹³, but this was not true for DBP.¹⁴ On the basis of JNC standards, the percentage of patients suffering from hypertension ($SBP \geq 140$ or $DBP \geq 90$ or on drug treatment) was reduced from 30% in 1962-1980 (NHANES 2) to almost 26% in 1988-1991 (NHANES 3).¹⁰

In the present study, the increase in the knowledge of people due to the implementation of projects for prevention and control of non-communicable diseases is suggested to be the main cause of such improvement in hypertension care in the last decade.

According to studies performed in the US, the average of BP in both races (black and white) decreased statistically and clinically. From 1960 to 1962 and 1972 to 1980 the average of SBP in men decreased from 133 to 129 mmHg and in women from 129 to 123 mmHg. In black men and women this level was 138 to 130 and 138 to 126 mmHg, respectively, showing more reduction in blacks and in women than in whites and in men. In the present study, the average of SBP reduction was 13.44 mmHg in men and 29.37 mmHg in women. Over these years, the level of decrease in DBP was 9.7 mmHg in men

and 20.4 mmHg in women. In the US, the average of decrease in BP was different in several age groups and was more striking in the elderly. For instance, the average of SBP in 65-74 year olds was reduced by 8 mmHg, but it was only 1 mmHg in 18-24 year olds. This trend was similar in all races and sexes. The present study demonstrates that the SBP reduction was more striking in younger rather than older persons: in women it was 12.30 mmHg in 60-69 year olds and 29.3 mmHg in 19-29 year olds and respectively, 13.3 mmHg and 33.7 mmHg in men. As regards the mean DBP, more decrease was seen in younger men; e.g. women between 19-29 years of age had 23.41 mmHg, and those in the 60-69 age bracket had a 10.51 mmHg decrease, while in men it was 21.2 and 13.26 mmHg, respectively. Teaching and training procedures focusing on younger patients and hypertension preventive measures targeting the young are the factors that could affect such results. More attention should also be paid to older people in order to decrease the mean SBP and DBP. The studies of Apostolides and colleagues¹⁵ and Freeman and colleagues¹⁶ showed a decrease in SBP and DBP as well. In Russia, the level of reduction in BP levels since 1960 has been higher in the elderly.¹⁷ However, some studies like the one by Clovsen and colleagues have shown an increasing trend of SBP and DBP levels in Copenhagen.¹⁸ In different studies the level of knowledge, treatment and control of hypertension has been reported differently: according to the WHO data less than 50% of hypertensive subjects are aware of their disease and less than 25% are under treatment, and as a whole less than 12.5% of hypertensive subjects have

controlled BP.¹⁹⁻²⁰ In some other countries such as Thailand, the proportion of individuals being aware of their disease, those under treatment and those with controlled BP were 42%, 30% and 7%, respectively.²¹ In Egypt it was 37.5%, 24% and 8%²² and in India 48%, 31% and 9%, respectively.²³ In our study, the hypertension control in general had an increasing trend (2.8% vs. 12%, $P < 0.05$). Hypertension is a major CVD risk factor, and the decreasing trends of the mean BP and the prevalence of hypertension in the last ten years are considerable. Therefore, to achieve maximal prevention and lessen the physical and financial burden of CVD it is essential to stabilize this trend and unravel its mechanisms. The findings of the present study indicate that the patients' awareness of their disease and also efforts aimed at treating and controlling hypertension increased from 1991 to 2001, especially among women.

For the people aged 60 or above, owing to the fluctuation of decreasing prevalence in the aforementioned ten-year period of the study and also the levels of mean SBP and DBP, more evaluation is needed in order to assess the causes of hypertension. We, however, hope to be able to succeed in controlling this non-communicable disease.

Conclusion

Much as an evaluation of a ten-year trend of BP levels and the prevalence of hypertension and its control in Isfahan showed considerable improvement, the situation is far from optimal, and further community-based interventions are needed in this regard.

Table I. Prevalence of hypertension based on sex, age and the proportion of awareness in patients under treatment and control for high BP.

1371 (n=8106) %	1373 (n=6781) %	1377 (n=4018) %	1379 (n=6000) %	Sex	Age
Both≥19 Sex Age (years)	31.8	28.3	22.8	17.5	Trend
Male Total	25	30.1	23.13	16.4	3.8
19-29	6.7	7.12	9.4	6.1	
30-39	5.7	21.02	24.6	18.5	
40-49	15.7	35.25	30.3	28.5	
50-59	22.4	47.65	40	40.61	
60-69	36.5	54.8	50	61.51	
≥70	45.2				
Age Female Total	36.3	31.1	22.5	18.6	2.8
19.29	6.3	10.85	8.5	7.2	
30-39	7.7	22.54	14.6	18.9	
40-49	23	40.35	45.6	48.5	
50-59	42.6	56.9	54.2	63.8	
60-69	56.1	61.6	68.2	62.5	
≥70	62				
Awareness of disease			Total	46.2	
30.4	37.1	50.1	Male	34.6	
22	26.8	37.7	Female	52.6	
36	43.6	60.2			
Under treatment					
Total	23	24.8	26.5	33.9	
Meal	16.29	17.1	22.2	24.27	
Female	26.99	29.6	30	41.7	
Controlled hypertension					
Total	2.8	5	6	12	
Male	2.2	2.6	4.2	6.5	
Female	3.1	6.9	8	16.4	

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