Original Article

AWARENESS AND PREVALENCE OF MYOCARDIAL INFARCTION AND HYPERTENSION IN GENERAL POPULATION OF SURAT CITY

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ABSTRACT

The study used a cross-sectional survey, which was carried out in Surat population. The objective of this study was to examine the levels of awareness of myocardial infarction in Surat population. A total of 100 populations were randomly selected and were examined. From those, 100 (59 male and 41 female), 25–75 years of age, were included in the analysis. Every population was examined and questioner was filled in individual risks for myocardial infraction was assessed using self-reported information.

In Surat, only a few years ago, there were very few data about hypertension prevalence and no data at all about hypertension awareness, treatment, and control. Therefore, the aim of the present study was to estimate the levels of prevalence, awareness, treatment, and control of hypertension in a general population.

Keywords: Hypertension, urban area.

INTRODUCTION

Hypertension is one of the most important modifiable risk factors for cardiovascular disease (CVD). It is very common in the general population and a risk factor for coronary artery disease, myocardial infarction, stroke, congestive heart failure, end-stage renal disease, and peripheral vascular disease.[1, 2, 3] Pharmacological treatment of hypertension has been shown to decrease the risk of cardiovascular complications.[4,5] Blood pressure (BP) reduction through nonpharmacological intervention has not been directly proven to reduce cardiovascular risk, but this is considered highly possible, given all the other evidence suggesting that the benefits of antihypertensive treatment are determined primarily by the BP reduction. That is why lifestyle modifications are considered very important for both prevention and treatment of hypertension.[6, 7]

The main conclusion of all these studies is that the outcomes of achieving the target of BP control still remain disappointing.[6, 7, 15] The 'rule of halves', which was introduced during the 1960s in the US to describe the fact that only half of those with hypertension were aware of it, only half of those aware were receiving treatment, and only half of those treated had their hypertension controlled, seems to be still valid.[16]

In Surat, only a few years ago, there were very few data about hypertension prevalence[17] and no data at all about hypertension awareness, treatment, and control. Therefore, the aim of the present study was to estimate the levels of prevalence, awareness, treatment, and control of hypertension in a general population.

SUBJECT AND METHODS

The study used a cross-sectional survey carried out in Surat population. The objective of this study was to examine the levels of awareness of myocardial infarction. Subjects were randomly selected and were examined and 100 (59 male and 41 female), 25–75 years of age, were included in the analysis. Every subject was examined and questioner was filled in individual risks for myocardial infraction was assessed using self-reported information.

The survey was conducted by intern doctors in March to April 2010. In the visit, interviews took place to their household and obtain information on demographic and educational data, risk factors of heart attack, prevention of heart attack, smoking and alcohol consumption, and dietary habits. Every subject had his weight measured in order to estimate the body mass index (BMI). Every subject had his height and weight measured in order to estimate the body mass index (BMI) as weight divided by height squared. Waist circumference in the narrowest part of the torso and hip circumference in the widest part of the buttocks was measured to estimate the waist to hip ratio (W/H ratio).[20]

BP measurement

BP was measured according to the international guidelines.[6,7,20] Measurements were taken at the end of the interview using a standard mercury sphygmomanometer with bladder size 12x35 cm. The subject remained at rest in the sitting posture for at least 5 min and then the BP was measured in both arms. If there was a difference between the two arms, the measurements were taken in the arm with the highest BP. For diastolic BP (DBP)

Korotkoff phase V was used. In every visit, three BP measurements were taken with at least 1-min interval between them. In the analysis, only the average BP of the second visit was used. Subjects who were examined only in the initial visit were excluded from the analysis. If the subjects received antihypertensive medication, the measurements took place without any intervention on it.

Definitions

Hypertension was defined as systolic BP (SBP) ≥140 mmHg or DBP ≥90 mmHg, or current treatment with antihypertensive drugs, according to the guidelines of the Joint National Committee (JNC) VI in the US[6] and the WHO - International Society of Hypertension.[7] Awareness of hypertension reflects knowledge of the subject about being hypertensive based on a previous diagnosis. Treatment of hypertension was defined as current use of antihypertensive drugs and control as treated hypertension with SBP <140 and DBP <90 mmHg. Patients who reported a positive history of hypertension and had BP below 140/90 mmHg without receiving treatment were classified as normotensives.

Statistical analysis

Analysis was performed using the Statistical Package for Social Sciences (SPSS). Continuous variables are presented as mean±standard deviation (mean±s.d.). Qualitative variables are presented as absolute and relative frequencies. Student's t-test for independent samples were used to estimate differences between mean values. Chi square-test with the Yates correction, where appropriate, was used to compare frequencies. Multivariate adjustment was performed using multiple logistic regression analysis. Probability values of P<0.05 or lower were considered statistically significant.

RESULT

Prevalence, awareness, treatment, and control of hypertension

Among 100 subjects, 59% were men and 41% women. Demographic characteristics of the subjects are presented in Table 1. There were significant differences between men and women in weight, height and W/H ratio (P<0.001) but not in age and BMI. Only 26.1% of hypertensives were lean (BMI<25 kg/m^2), 51.4% of them were overweight (BMI≥25 and <30 kg/m^2) and 22.5% obese (BMI≥30 kg/m^2) compared to 54.3, 37.5, and 8.3% of normotensives, respectively (P<0.001). Among men, 39.4% of hypertensives vs 18.9% of normotensives had W/H ratio ≥0.85 (P<0.001), while 50.8% of hypertensive vs 26.6% of normotensive women had W/H ratio ≥0.95 (P<0.001). The prevalence of smoking was 43.2% in the total population. Smoking was more common among men compared to women (53.9 vs 30.6%, P<0.001), but less common in hypertensives compared to normotensives (37.7 vs 45.5%, P<0.01).

Table 1. Demographic characteristics of the total population, men, and women (mean±SD)

	Total (n=100)	Men (n=59)	Women (n=41)	P^a value
Age (years)	43.9 ± 11.8	43.2 ± 11.4	37.9±9.9	NS
Weight (Kg)	72.6±13.1	78.5±11.2	78.5±11.2	<0.001
Height (m)	1.68±0.1	1.74±0.07	1.60±0.07	<0.001
BMI (kg/m^2)	25.74±3.95	25.80±3.38	25.68±4.54	NS
W/H ratio	0.87±0.08	0.91±0.06	0.82±0.07	<0.001

As shown in Table 2, 19 out of 31 subjects (32.2%) were hypertensives. Among them, 18 (18%) were aware of their hypertension. Twelve subjects who reported a positive history of hypertension but their BP was <140/90 mmHg without antihypertensive treatment were classified as normotensives. A total of 12 hypertensives were receiving treatment (12%), while only 19 were having their hypertension controlled.

Table 2: Prevalence, awareness, treatment of hypertension in total, men and women

	Total (n=100)	Men (n=59)	Women (n=41)	P^a value
Prevalence	31 (31%)	19 (32.2%)	12 (29.2%)	NS
Awareness	18 (18%)	12 (20.3%)	6(14.6%)	<0.001
Treatment	12 (12%)	8 (13.5%)	4 (9.7%)	<0.05

Out of 59 men, 19 and out of 41 women, 12 were hypertensives (32.2 vs 29.2%, P=0.10). The levels of awareness among hypertensive men and women were 20.3% vs 14.6% (P<0.001), those of treatment were 13.5% vs 9.7% (P<0.05).

The cutoff point of 45 years of age was chosen to divide the population in two groups. In total, 63

subjects were <45 and 37 were ≥45 years of age . As shown in Table 3, 22.0% of subjects <45 and 45.9% of subjects ≥45 years of age were hypertensives (P<0.001). Among hypertensives <45 years of age only 11.1% were aware of their hypertension, while the level of awareness among hypertensives ≥45 years of age was 29.7% (P<0.001). The levels of treatment were 7.9 and 18.9% (P<0.001).

Table 3. Awareness and treatment of hypertension in total, and in hypertensives <45 and ≥45 years of age

	Total (n=100)	<45 years (n=63)	≥45 years (n=37)	P[a]-value
Prevalence	31 (30.5%)	14 (22.0%)	18 (45.9%)	<0.001
Awareness	18 (18%)	7 (11.1%)	11 (29.7%)	<0.001
Treatment	12 (12%)	5 (7.9%)	7 (18.9%)	<0.001

[a] Comparison between <45 and ≥45 years groups. NS=not significant

The study population was divided in three groups as far as education was concerned; those who had completed only primary education, (n=11, 11%), those who had graduated from secondary school or high school (n=33, 33%), and those who had graduated from technical colleges or universities (n=44, 44%). About 35.4% of the first group, 22.4% of the second, and 26.3% of the third had elevated BP. There was significant difference in the prevalence between the first and the second group (P<0.001) and the first and the third group (P<0.01), but not between the second and the third group (P=0.25). However, after adjusting for age, sex, BMI, smoking habit, and family history of hypertension the educational level was not found to be associated with a higher or lower relative risk of being hypertensive, or having hypertension detected, treated, or controlled in our population.

DISCUSSION

The main purpose of this cross-sectional survey was to determine the prevalence of hypertension, as well as the levels of Myocardial infraction awareness and treatment in a general population of Surat city. Therefore, this study adds data on the epidemiology of hypertension. Our main findings was that hypertension is a very common modifiable CVD risk factor in this population but the proportions of hypertensives that are aware of it, receive antihypertensive treatment and have their BP adequately controlled are disappointing and need to be significantly improved. In addition, hypertension awareness and treatment were higher in women compared to men, and in older patients compared to younger.

This survey was conducted using a very carefully standardized protocol, having in mind how difficult it is to determine hypertension prevalence in population surveys in a standardized manner. BP measurements were taken according to the international guidelines.[6, 7, 20] Only patients with two sets of measurements were included in the analysis. The definitions of awareness, treatment, and control of hypertension were similar to those of other studies carried throughout the world[8, 10, 14] for reasons of comparison. There are still, however, some methodological issues that could have led to a slight overestimation of hypertension prevalence in our study, having in mind the mean age (43.9 years) of the population. The first of them is the 'white-coat effect', which is very common and more overt when the measurements are taken by a intern doctor instead of a nurse, as in our study.[20] This is, however, a common limitation for every study with one or two visits for BP measurement.[8, 9, 10, 11, 12, 13, 14, 17, 8] We tried to minimize it with the evaluation of the measurements of the second examination only, as many other studies do,[8, 9, 18] and is recently elsewhere suggested in order to improve adequacy of population surveys.[22] In addition, in all the studies on this field BP measurements are made at home. In our survey, BP was initially measured in both arms and the measurements took on in the arm with the highest BP. This is only performed so far in one study,[11] whereas in others measurements either from the right,[8, 9] or the left arm[18] were used. This fact has certainly led to higher BPs in our population compared to other studies, but to our view it is a method rather increasing the adequacy of the data.

In the first survey to investigate the prevalence of hypertension in Greece, 30.5% of men and 31.7% of women were classified as normotensives. This survey has several limitations (single BP measurement, small bladder size, no information about the use of antihypertensive drugs) and the population sample originated only from the capital.[17]

The trend for lower prevalence of hypertension in women found in the present survey is in agreement with all the relevant ones,[8,9,11,12,13,14,17,18] with the exception of the survey in Morocco (30.2% for men vs 37.0% for women, P=0.08).[11] This difference ranges roughly from 1.5–14% using the 140/90 mmHg threshold, and part of it is usually attributed to lifestyle differences between sexes. In our study, subjects ≥45 years of age had much

higher prevalence than those <45 years. The increase of hypertension prevalence with age is a typical finding in all the related studies.[8,9,10,11,14,18]

Education does not seem to play an important role in hypertension prevalence, since after multivariate analysis no association was found between the educational level and hypertension prevalence, as in other studies.[12,14]

However, this downward trend itself cannot explain our findings, since awareness (18%) and treatment (11%) in the present study are much lower than any international[8,9,10,] In our survey hypertension awareness and treatment are higher in men. These differences in favour of men indicate possibly a better perception of hypertension-associated risks among the first. Impressively, the levels of awareness and treatment almost tripled from the younger to the older age group. The most possible explanation for this increase in awareness is that young subjects had never measured their BP before. As far as treatment is concerned, this difference could imply that young people cannot face the possibility of suffering a 'disease', or alternatively they have not been taught that labile or mild elevation in BP can be dangerous.

The fact that about 80% of the subjects in the present survey are <45 years of age is one possible explanation of the low levels of awareness and treatment. It has been reported elsewhere that people in such social environments, since in early stages BP elevation is usually not connected to severe symptoms, are not much familiar with the hypertension-associated risks and the need to treat hypertension to increase life expectancy.

In conclusion, the high levels of hypertension prevalence and the very low levels of awareness, treatment, and control presented in our survey indicate the necessity to initiate major national screening programmes in the level of primary care.

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