Prevalence of Hypertension in a low income settlement of Karachi, Pakistan

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Abstract

Objective: To assess the prevalence of hypertension in a low-income community in Karachi.
Methods: Cross sectional survey, through multi-stage sampling of 857 adult subjects in 405 households was conducted between April and September 2002.
Results: The overall prevalence of hypertension was 26% (95% C.I. 23, 29), the prevalence among males (34%) was higher than females (24%). The mean age of participants was 35+14 years, the prevalence of hypertension increased with age. Proportionately there were more cases of hypertension among male participants over 35 years of age as compared to female participants of the same age (p=<0.001). Fifty-eight percent of hypertensives were unaware of their hypertension. None of the hypertensive subjects who were aware of their condition had blood pressure under 140/90 mmHg. Stratified analysis revealed significant risk factors for hypertension. Hypertension was 1.7 (OR 95% C.I. 1.14, 2.42) times more common among males then females. Males were 1.7 (OR 95% C.I. 1.06, 2.6) times less likely to have been aware of their hypertension status. Age analysis revealed that the prevalence of hypertension increased with age and hypertensive subjects were 5.6 (OR 95% C.I. 3.9, 8.1) times more likely to be over 35 years of age.
Conclusion: There is a need to control hypertension and prevent its complications through effective community interventions. The survey results indicate high prevalence and poor control of hypertension in the community, but more research is required to understand the reasons behind this phenomena (JPMA 54:506;2004).

Introduction

World population of persons 60 years and above will rise to 21% by 2050. With it an increase in chronic diseases associated with aging will be observed.1 Pakistan, like other developing countries faces a double burden of disease, as it passes through demographic transition, towards acquiring human longevity, where infectious diseases will decline and chronic diseases will become more prevalent. Infectious disease from the country's under-developed past are on the decline, but are still existent, with the additional burden of non-communicable diseases, which are on the increase.

The risk of coronary artery disease and stroke is strongly associated with high blood pressure, especially along with other risk factors, including diabetes mellitus, renal disease, high serum cholesterol, etc. Hypertension can occur at any age, but it is more common among adults and often goes unnoticed.2 High blood pressure (or hypertension) is defined in an adult as a blood pressure greater than or equal to 140 mm Hg systolic pressure or greater than or equal to 90 mm Hg diastolic pressure.3 This study estimates the prevalence of hypertension in a population-based sample of a low-income community in Karachi, Pakistan.

Methods

A cross-sectional survey was conducted in a low-income settlement of Karachi, through multi stage sampling, between April and September 2002. It is economically homogenous and ethnically mixed community. The area has a population of approximately 30,000 living in 4,300 households. The area is divided into eight housing blocks.

In the first stage, the area was divided in two regions for logistic convenience. The lower region, comprised of blocks A, B, C and D; and upper region, included blocks E, F, G and H. Lower region was randomly selected through a toss of a coin. In the second stage, 25% of households were systematically sampled by including every fourth

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house in blocks 'A' through 'D'. All household members over 18 years of age, which were present at the time of the survey, were screened for hypertension.

The sample size was calculated by using EpiInfo-6 Statcalc software program. Based on the assumption of 18% expected prevalence of hypertension, the sample size for 95% confidence level was 657, with a margin of error of +3 percent. This sample size was adjusted for a 20% non-response rate, thus giving a final required sample size of 822 subjects. It was assumed that there would be at least two adults (>18 years of age) in every household. A total of 430 households were surveyed, of these 405 were included in the final analysis. Thirty households were either locked or their occupants refused to participate or their questionnaires were incomplete. The non-response rate was 7.0%, which was well within the acceptable limit.

Third and fourth year medical students were trained to measure blood pressure by using aneroid sphygmomanometer and stethoscope. The start of phase-1 Korotkoff sound was the systolic blood pressure and the end of phase-5 Korotkoff sound was recorded as diastolic pressure. Blood pressure was measured in all subjects in sitting position in the right arm extended to 45 degrees. The cuff was firmly tied approximately 2.5 centimeters above the cubital fossa and was inflated and radial pulse felt simultaneously to manually ascertain the systolic pressure. The cuff was again inflated to the level of manual reading of systolic pressure plus an additional 30mmHg. The final blood pressure reading was taken with the diaphragm of the stethoscope placed on the brachial artery.

All cases of hypertension, which were identified by the students were checked and reconfirmed for accuracy by a supervising faculty of Community Health Sciences. The cut-off values for hypertension were based on the recommendations of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure3 (Table 1).

Data analysis was done on Epi Info 6 software, of the Centre for Disease Control, Atlanta.

Results

The final analysis was done on data from 405 participating households. The sample included 172 males and 685 females. The mean age of participants was 35+14 years, for males it was 39+17 years and for females 34+13 years. The participants whose age was under-35 years were 53% in the sample.

Table 1. Blood pressure classification..3

Category	Systolic mmHg		Diastolic mmHg	Recommended follow-up
Normal	< 130	and	< 85	Recheck in 2 years
High Normal	130-139	or	85-89	Recheck in 1 year
Stage 1	140-159	or	90-99	Confirm within 2 months
Stage 2	160-179	or	100-109	Evaluate within 1 month
Stage 3	> 180	or	> 110	Evaluate within 1 week

The overall prevalence of hypertension was 26% (95% C.I. 23, 29); the prevalence among males (34%) was higher than females (24%). The mean systolic and diastolic pressures of male and female subjects were different (p=0.002) i.e. systolic 124+17 and 119+20, diastolic 81+12 and 76+13, respectively. The mean pulse pressure (systolic-diastolic) was significantly (p=0.01) higher in males (62+8.7 mmHg) than females (60+9.3 mmHg). There was no statistical difference in mean arterial pressure (average systolic and diastolic) between both sexes. Substantially, more males were suffering from stage-1 hypertension than females (p=0.009). This difference was not found in stage-2 and stage-3 categories of hypertension (Table 2).

Among the 857 participants, 223 had hypertension.

Table 2. Blood pressure category according to sex.

Category	Male (n=172) n (%)	Female (n=685) n (%)	Overall (n=857) n (%)	P value
Normal	96 (55.8)	459 (67.0)	555 (64.8)	0.006 *
High Normal	17 (9.9)	62 (9.1)	79 (9.2)	0.735
Stage 1	39 (22.7)	99 (14.5)	138 (16.1)	0.009 *
Stage 2	15 (8.7)	47 (6.9)	62 (7.2)	0.399
Stage 3	5 (2.9)	18 (2.6)	23 (2.7)	0.951

* Statistically significant

Forty-two percent of the hypertensives knew that they had hypertension and the rest (58%) were unaware of their status. Overall, there were more cases of unknown (15%; n =130) hypertension than known (11%; n = 93) hypertension. Male hypertensives (18-24 and 55+ years) were less likely to have been aware of their condition (Table 3 and 4). None of the hypertensive subjects who were aware of their condition had blood pressure under 140/90mmHg.

Table 3. Prevalence of hypertension.

Prevalence	Hypertension Status n (%)		
	Known	Unknown	Overall
Male (n=172)	23 (13.4)	36 (20.9)	59 (34.3)
Female (n=685)	70 (10.2)	94 (13.7)	164 (23.9)
p value	0.273	0.024 *	0.009 *

* The difference between males and females is statistically significant.

Sex and age had influence upon the overall prevalence of hypertension. But stratified age and sex specific prevalence was almost similar for both males and females, except for subjects over 55 years of age (Table 4). The prevalence of hypertension increased with age. Proportionately there were more cases of hypertension among male participants over 35 years of age as compared to female participants of the same age (p=<0.001). Among females (25%) and males (20%), below 35 years of age, there was no statistical difference in the prevalence of hypertension (p=0.23). Seventeen percent of the participants were single and 83% fell in the category of ever-married, which included married, widow/er and divorced. Prevalence of

hypertension was higher among ever-married (29.4%) than single (9.6%) subjects (Table 5).

Table 4. Age and sex specific prevalence and status of hypertension (n=857).

Age Group (n)		Hypertension Prevalence n (%)					
		Male	Female	P value	Known	Unknown	P value
		(n=172)	(n=685)		(n=93)	(n=130)	
18-24	(218)	5 (2.9)	10 (1.5)	0.33	1 (1.1)	14 (10.8)	0.004*
25-34	(238)	7 (4.1)	31 (4.5)	0.795	6 (6.5)	32 (24.6)	<0.001*
35-44	(181)	12 (7.0)	42 (6.1)	0.683	23 (24.7)	31 (23.8)	0.775
45-54	(119)	15 (8.7)	44 (6.4)	0.287	29 (31.2)	30 (23.1)	0.176
55+	(101)	20 (11.6)	37 (5.4)	0.003 *	34 (36.6)	23 (17.7)	0.001*

*The difference is statistically significant

Table 5. Marital status and hypertension.

Marital Status	Hypertension n (%)			
	Male	Female	Overall	P value
	(n=172)	(n=685)	(n=857)	
Ever married	124 (40)	588 (27)	712 (29.4)	0.003 *
Single	48 (19)	97 (5)	145 (9.6)	0.020 *

* The difference is statistically significant

But this difference maybe due to the confounding effect of age, which is higher for married subjects (mean age; ever married 38+14 and single 22+6 years).

Stratified analysis revealed significant risk factors for hypertension. Hypertension was 1.7 (OR 95% C.I. 1.14, 2.42) times more common among males then females. Males were 1.7 (OR 95% C.I. 1.06, 2.6) times less likely to have been aware of their hypertension status. Age analysis revealed that the prevalence of hypertension increased with age and hypertensive subjects were 5.6 (OR 95% C.I. 3.9, 8.1) times more likely to be over 35 years of age.

Discussion

Blood pressure is a highly variable phenomenon and it is not possible to determine hypertension status based on a single reading. The diagnosis for hypertension should ideally be made after multiple readings on different occasions over several months apart, unless the elevations are severe or associated with symptoms. The approach to classification of hypertension and subsequent management are illustrated in Table 1. People suffering from hypertension are more likely to develop coronary artery disease and renal complications.4 In Pakistan circulatory disease as a whole is responsible for 12% of all deaths annually.5

The National Health Survey 1990-94 of Pakistan reported 17.9% prevalence of hypertension among adults 15 years and above, with substantially higher prevalence in urban areas5 (i.e. Urban 21.5% and Rural 16.2%). The community-based prevalence of hypertension in this study was 26% (95% C.I. 23, 29). The prevalence of hypertension was higher among males in both the surveys. Although, the inclusion criteria for age was different in this survey and the NHS-1990-94, but these results are comparable, because the prevalence of hypertension below 20 years of age is quite uncommon.

The prevalence of stage 1 and 2 hypertension was more common than stage 3 hypertension. According to Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure, stage 1 and 2 hypertension responds well to non-pharmacological interventions, such as weight reduction, exercise etc. The prevalence of undiagnosed hypertension was higher in the community (Table 3 and 4). These differences were consistent for both genders and all ages. In ideal circumstances, it can be assumed that knowledge of hypertension may lead to better outcome for hypertensive subjects, as they may take steps to control their blood pressure with appropriate medical care and lifestyle modifications. Interestingly, this assumption did not hold true in this survey, as 42% hypertensives subjects already knew about their condition, but none had blood pressure within recommended control limits i.e. <140/90 mmHg.3

This survey was conducted during morning hours, when most adult males are on their jobs. This led to less representation of males in the final sample. Although the prevalence of hypertension was higher among males than females (Table 3), but this difference should be interpreted cautiously as the available males may not be truly representative of the overall adult male population of the area i.e. males who were not available during the survey may have been healthy working males as compared to those who were at home due to ill health.

The survey results indicate high prevalence and poor control of hypertension in the community, but more research is required to understand the reasons behind this phenomena. There is enough evidence to suggest that control of hypertension can significantly reduce morbidity and mortality.2,6,7 There is a need to control hypertension and prevent its complications in the community through programs that: 1) create community awareness regarding long-term complications, 2) identify the cases early through regular screening and 3) provide treatment and monitor compliance.

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