

A CROSS-SECTIONAL STUDY TO ESTIMATE THE PREVALENCE OF HYPERTENSION IN URBAN FIELD PRACTICE AREA OF MEDICAL COLLEGE IN METROPOLITAN CITY OF INDIA

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ABSTRACT

Objectives: The objectives of the study were to estimate the prevalence of hypertension in people above 35 years and to study the sociodemographic profile of the study subjects.

Methods: The study was a cross-sectional study conducted in urban field practice area of medical college. Five chawls were selected by simple random sampling out of 42 chawls. Males and females above 35 years of age living in study area formed a sample frame. Sample size was calculated and it was 667. As per the protocol, informed written consent and demographic details with clinical data were obtained from the patients.

Results: A total of 667 participants were included from five chawls. Maximum number of participants, that is, 37%; were from the age group of 35 to 44, consisting of 41% males and 59% females. Around 67% of study respondents belonged to the age group of 35–54 years. Around 3/4th of study respondents had studied up to primary school and secondary and high school. Out of 263 males, 37%, that is, 98 respondents were hypertensive, and out of 404 females, 152, that is, 38% were hypertensive. Hence, the total prevalence of hypertension in this study was 37.5%.

Conclusion: Hypertension is the new era pandemic which is the leading cause of morbidity and mortality in the world and is ranked third as a cause of disability-adjusted life years. To control hypertension, it is imperative to identify and modify its risk factors.

Keywords: Hypertension, Prevalence, Urban area.

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INTRODUCTION

As the world is moving toward industrialization and more high tech health-care facilities, there is a shift of concern about non-communicable disease from communicable disease in developed countries [1]. In the developing countries, on the one hand, it is already overburdened with communicable diseases and now, on the other hand, there is a surge of non-communicable diseases. Hypertension is one of the major diseases among non-communicable diseases [2].

As per the World Health Statistics 2012 [3], of the estimated 57 million global deaths in 2008, 36 million (63%) were due to non-communicable diseases (NCDs). The largest proportion of NCD deaths was caused by cardiovascular diseases (48%). In terms of attributable deaths, raised blood pressure was one of the leading behavioral and physiological risk factor to which 13% of global deaths were attributed. Hypertension was reported to be the fourth contributor to premature deaths in developed countries and seventh in the developing countries. While mean blood pressure has decreased in nearly all high-income countries, it has been stable or increasing in most African countries. Mean blood pressure remains very high in many African and some European countries. The prevalence of raised blood pressure in 2008 was highest in the WHO African region at 36.8% (34.0–39.7) [4].

The prevalence of hypertension in the late nineties and early 20th century varied among different studies in India, ranging from 2% to 15% in urban India and 2–8% in rural India [5]. In the interheart and interstroke study, hypertension accounted for 17.9% and 34.6% of population attributable risk of coronary artery disease and stroke, respectively.

As per the Registrar General of India and Million Death Study investigators (2001–2003), CVD was the largest cause of deaths in males (20.3%) as well as females (16.9%) and led to about 2 million deaths annually. The Global Status on Non-Communicable Diseases Report (2011) has reported that there were more than 2.5 million deaths from CVD in India in 2008, two-thirds due to coronary artery disease and one-third to stroke. These estimates are significantly greater than those reported by the Registrar General of India and show that CVD mortality is increasing rapidly in the country. CVD is the largest cause of mortality in all regions of the country.

The prevalence of hypertension in the last six decades has increased from 2% to 25% among urban residents and from 2% to 15% among the rural residents in India. According to Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India, the overall prevalence of hypertension in India by 2020 will be 159.46/1000 population [6].

Various factors might have contributed to this rising trend, attributable to several indicators of economic progress such as increased life expectancy, urbanization, and its attendant lifestyle changes including increasing salt intake and the overall epidemiologic transition India is experiencing currently. Another factor that may contribute is the increased awareness and detection.

In India, hypertension is a major public health problem. Diverse and heterogeneous population distribution makes it difficult to arrive at a precise prevalence [7]. A recent study using the World Health Organization criteria has shown a 23.7% prevalence of hypertension in North India in the age group of 25–64 years [8]. A study on

women in the age group of 25–64 years, defining hypertension as SBP>140 mmHg or DBP>90 mmHg, reported a prevalence of 30.7% in Thiruvananthapuram (south India), 28% in Mumbai (West India), 22.6% in Moradabad (North India), 24.2% in Nagpur (Central India), and 19.1% in Kolkata (East India)" [9].

Arterial blood pressure is the pressure exerted by circulating blood on the walls of blood vessels and is one of the principal vital signs. Systolic pressure reading is the first reading, which represents the maximum exerted pressure on the vessels when the heart contracts, while the diastolic pressure, the second reading, represents the minimum pressure in the vessels when the heart relaxes.

The present study is aimed to estimate the prevalence of hypertension in people above 35 years and to study the sociodemographic profile of the study subjects.

METHODS

The study was a cross-sectional study conducted in urban field practice area of medical college. The study duration was 1 year, and the Institutional Ethics Committee granted the ethical clearance for this study. Five chawls were selected by simple random sampling out of 42 chawls. Males and females above 35 years of age living in study area formed a sample frame. According to study conducted in Mumbai [12] by Gupta *et al.*; prevalence of hypertension in peoples above 35 years of age was estimated to be 48%. If we consider α error of 5% and using sample size formula $n=3.84 \times pq/d^2$ where p = prevalence, $q=100-p$, and $d=5\%$ of p , then sample size=383.

As this study area is our field practice area, a little larger sample size was covered by including all persons above 35 years from five chawls out of 42 chawls, which turned out to be 667. Hence, actual β error in this study was 3.79%

Sample size= $Z \times pq/d^2$

$667=3.841 \times 48 \times 52/d^2$
 $d=3.79\%$

Before starting the interview, each respondent was explained about the study and its purpose. Then, written informed consent was obtained. Participants were interviewed using pretested semi-structured questionnaire. Questionnaire was about sociodemographical factors, risk factors evaluation, and clinical examination containing simple examination; weight; height; waist circumference; and hip circumference was measured. Clinical assessment was done using standard calibrated and certified equipment. Blood pressure was taken in sitting position in all respondents. BP was taken again after 15 min, if high blood pressure was detected. Data were entered into a Microsoft Excel spreadsheet to organize and tabulate data for statistical analysis. SPSS 17 version was used for statistical analysis.

RESULTS

Most of the study population belonged to the age group of 35–44 years (37%) followed by 45–54 years (30%). Age structure of this population was similar to age structure for urban population of India. About 39% of the study population was constituted by males and the rest 61% by females. Around 3/4th of study respondents had studied up to primary school and secondary and high school. Out of total respondents, 10% were illiterate. Majority, that is, 43% of study population was engaged in semiskilled work followed by 34% population doing unskilled work. About 8% of respondents were engaged in skilled work while 2% of population was professional. About 13% of population was unemployed which also includes elderly retired persons. Majority of the study population belonged to upper-lower class (64%) followed by lower-middle class (17%) and lower class (8%).

Distribution of blood pressure among the respondents irrespective of treatment history revealed that 20.3% of respondents were

normotensive, 50.3% of respondents were pre-hypertensive, 25.3% of respondents were in Stage 1 hypertension, and 4% of respondents were in Stage 2 hypertension. In this classification, normal and pre-hypertensive group also included hypertensive patients on treatment who had controlled blood pressure.

According to JNC 7 criteria, the prevalence of hypertension was calculated by counting respondents whose blood pressure was greater than or equal to 140/90 mmHg or respondents who were already on antihypertensive medication.

$$\text{Prevalence of hypertension} = \frac{\left(\begin{array}{l} \text{Known hypertensive} \\ + \text{new hypertensive} \end{array} \right)}{\text{Total respondents}} \times 100$$

= $250 \times 100/667$

=37.5%

Prevalence of hypertension among male= $98 \times 100/263=37.26\%$

Prevalence of hypertension among females= $152 \times 100/404=37.62\%$

Among the 250 hypertensive persons, 22%, that is, 55 hypertensive patients were on treatment with controlled blood pressure (within 140/90 mmHg) out of which 24 were male and 40 were female. About 49%, that is, 122 hypertensive patients were on treatment without blood pressure control out of which 47 were male and 75 were female. In the present study, 64 new patients (i.e., 26%) were identified consisting of 24 males (i.e., 38%) and 40 females (i.e., 62%). Five respondents had knowledge that they were hypertensive but not started treatment and four respondents were known hypertensive started treatment and left treatment more than 3 months ago. Hence, 4%, that is, nine respondents were identified who were already diagnosed as hypertensive but not continued medication out of which five respondents were male and four respondents were female.

DISCUSSION

In the present study, out of 667 respondents, maximum, that is, 37% of respondents belonged to the age group 35–44 years followed by 30% of respondents from the age group of 45 to 54 years. The present study population consisted of 73% Hindu, 14% Muslims, 4% Christian, and 9% Buddhist. The present study consisted of single, married, and widowed/separated/divorced population of around 0%, 90%, and 10%. Maximum population in the present study, that is, 38% had studied up to secondary school and high school followed by 36% of respondents who had studied up to primary school. About 14% of graduate, 2% of postgraduate, and above were also included in the study.

Following JNC-7 definition of hypertension, the prevalence of hypertension in the present study for male was 37.26% and for female was 36.62%, so for total population, it was 37.48%. As per BP measurements, 20.3% of the population had blood pressure in the normal range and 50.3% of the population were pre-hypertensive, 25.3% of respondents had hypertension Stage 1, and 4% of respondents had blood pressure in the range of Stage 2 hypertension. These were blood pressure finding irrespective of patients on antihypertensive medication. Out of 667 respondents, 417 respondents were normotensive. In that, 135 respondents were having normal blood pressure and 282 respondents were pre-hypertensive. Hence, the true study population having normal blood pressure was 20.2% and true prevalence of pre-hypertension in the present study was 42.2%. The findings of the study were comparable to the WHO estimates which gives a 23% prevalence of hypertension above the age of 25 years in India [10]. Globally, the overall prevalence of raised blood pressure in adults aged 25 years and over was around 40% [11] Gupta *et al.* [12] in his study conducted at Mumbai on 88,653 subject showed that the prevalence of hypertension was 48% in people >35 years of age. The prevalence of hypertension was 47.5% in males and 48.4% in females.

Table 1: Sociodemographic characteristics of the study participants

Age	n	Percentage (%)
35-44	247	37
45-54	199	30
55-64	121	18
≥65	100	15
Education		
Illiterate	66	10
Primary	237	36
Secondary	255	38
Graduate	96	14
Postgraduate	13	2
Occupation		
Unemployed	84	13
Unskilled	226	34
Semiskilled	289	43
Skilled	56	8
Professional	12	2
Family		
Nuclear	503	75
Joint	121	18
3 generation	43	7
Socioeconomic status		
Upper	26	4
Upper-middle	50	7
Lower-middle	111	17
Upper-lower	427	64
Lower	53	8

Table 2: Prevalence of hypertension

Distribution of respondents according to blood pressure (JNC 7 criteria)						
	Male	%	Female	%	n	%
Normal	46	34	90	66	136	20.3
Pre-hypertension	141	42	195	58	336	50.3
HTN Stage-1	66	39	103	61	169	25.3
HTN Stage-2	10	38	16	62	26	4
Grand total	163	24	404	76	667	100

Table 3: Distribution of hypertensives

Distribution of hypertensives		
Code	Meaning	Total %
1	The whole community - 667	100
2	Normotensive subjects - 417	62.5
3	Hypertensive subjects - 250	37.5
4	Undiagnosed hypertension - 64	9.6
5	Diagnosed hypertension - 186	27.8
6	Diagnosed but untreated - 7	1
7	Diagnosed and treated - 177	26.5
8	Inadequately treated - 122	18.3
9	Adequately treated - 55	8.2

Chockalingam *et al.* [13] conducted prevalence study in Chennai and found that the prevalence of hypertension was 34.7%, pre-hypertension was 47.4%, and normotensive persons were 18%.

Out of total 250 hypertensive persons, 74.4% of respondents were known hypertensive persons and 25.6% of respondents were new hypertensive persons. Out of these 186 known hypertensive persons, 92% of respondents were on treatment and among them, only 31% had adequate control of blood pressure. Hypertension is an "iceberg" disease. It became evident in early 1970s that only about half of the hypertensive subjects in the general population of most developed countries were aware of the condition, only half of those aware of the

problem were being treated, and only about half of these treated were considered adequately treated [14]. In the present study, more (i.e., 74%) of total hypertensive were identified and 95% of them were on treatment. About 31% of the hypertensive on treatment had adequate blood pressure control. Identification and starting of treatment was more in comparison to "rule of half" may be because of the OPD situated in the study area. Inadequate blood pressure control may be due poor follow-up and referral.

The prevalence of pre-hypertension is rising steadily over the years. In the present study, the prevalence of prehypertension was 42.2%. In Chennai, the study was conducted by Shanthirani *et al.* [15] in urban population, the prevalence of pre-hypertension was 47%. In another study conducted by Prabhakaran *et al.* [16] on 2935 men working in industry, the prevalence of hypertension was 30% and pre-hypertension in North India was 44%. About 31% of respondents had adequate control of blood pressure.

CONCLUSION

Hypertension is the new era pandemic which is the leading cause of morbidity and mortality in the world and is ranked third as a cause of disability-adjusted life years. People with hypertension possess 2-fold higher risk of developing coronary artery disease, 4 times higher risk of congestive heart failure, and 7 times higher risk of cerebrovascular disease compared to normotensive persons.

Because of changes in lifestyle and environment, the problem of hypertension is on the rise. Various risk factors are implicated in the development of hypertension and there are differences in these risk factors in urban slum populations depending on the level of development and epidemiological transition. To control hypertension, it is imperative to identify and modify its risk factors.

The present study was conducted to estimate the prevalence of hypertension in people above 35 years and identify some sociodemographic and lifestyle risk factors associated with hypertension. The study included 667 respondents taken from five randomly selected chawls in the study area.

The prevalence of hypertension in this study was 37.48%. A total of 250 hypertensive persons were identified out of 667 respondents. Out of these, 25% were newly diagnosed hypertensive persons whereas 22% were known hypertensive persons with adequate blood pressure control and 49% were known hypertensive persons without adequate control of blood pressure. About 3% of respondents had left treatment intermittently or not started treatment at all.

The prevalence of pre-hypertension 42% and prevalence of pre-hypertension were more among younger age group. About 20.2% of the population had blood pressure in the normal range. The prevalence of hypertension was 37.26% among males and 37.62% among females. There was no statistically significant difference between prevalence of hypertension among males and females.

AUTHORS' CONTRIBUTIONS

All authors contributed significantly toward the preparation, review, and editing of the manuscript. Dr. Shireen Sharma and Dr. Shrawin Kumar Singh helped in preparing the manuscript and review of literature. Dr. Vishal Kale collected the data. Dr. Pankaj Kumar Baranwal and Dr. Dhananjay Kumar Singh did analysis of data and reviewing of the manuscript. All authors read and approved the final manuscript.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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