Original Research Article

Study of prevalence of hypertension in an adult population of age group 40 to 60 years in an urban slum of Mumbai, Maharashtra, India

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ABSTRACT

Background: Hypertension is the number one health related risk factor in India, which is common, asymptomatic, readily detectable, having preventable risk factors and often lead to lethal complication if left untreated. Awareness of hypertension in middle age adult population is low while appropriate treatment and control among those with hypertension is even lower especially in urban slum area. As they are so busy with their job responsibilities, family commitments, economic stress etc. so it is necessary to study the prevalence of hypertensions in this adult population.
Methods: A cross-sectional study was conducted among the adult population of 40-60 years residing in urban slums of Mumbai during July, 2015-16. Using systematic sampling technique 350 participants from slum area were interviewed and examined. A pre-tested interview tool was used to collect necessary information. Blood pressure <120/80 mmHg (normal), 120/80 to 139/89 mmHg (pre hypertension) and >140/90 mmHg (hypertension).
Results: Out of the 350 participants, 148 (42.3%) participants had normal blood pressure and 81 (23.1%) participants had pre-hypertension, 79 (22.6%) participants had stage I hypertension and 42 (12.0%) participants had stage II hypertension.
Conclusions: Prevalence of hypertension and pre-hypertension was 34.5% and 23.1% respectively. Various factors like gender, increasing age, low physical activity (exercise), high BMI, history of addiction, history of extra salt intake and family history of hypertension was associated with hypertension.

Keywords: Hypertension, Prevalence, Urban slum, Middle age adult

INTRODUCTION

Hypertension, the "Silent, Invisible killer" - is a modern day's epidemic and is an increasingly important medical and global public health issue due to its role in causation of coronary heart disease, stroke and other vascular complications. According to WHO expert committee report hypertension in adults is arbitrarily defined as a systolic blood pressure equal to or greater than 140 mmHg and/or a diastolic pressure equal to or greater than 90 mm Hg.[1] The middle age adult populations especially in urban slum area are more vulnerable for hypertension as they are so busy with their job responsibilities, family commitments, economic stress etc. The people in this age group also likely to have addictions that adds to the risk factors. Due to their busy schedule and lack of awareness they don't approach to health facility for regular health check-ups.

Hypertension has been found to be highly correlated with reduced life expectancy, - higher the blood pressure, shorter the life span.[2,3] As we age, our arteries become stiffer and less flexible; therefore a certain increase in blood pressure is normal over the years. A quarter of adults have high blood pressure, and among those over 60

the proportion rises to half. But many people don't know they have it. An estimated 18 per cent of men and 13 per cent of women with high blood pressure are not receiving treatment that could protect them from an early death.[4] So it is necessary to study the prevalence of hypertension in adult population of 40 to 60 years in an urban slum and to study the socio- demographic profile of this population.

METHODS

A community based cross-sectional study was carried out among 350 people who are residing in the field practice area (Shahaji Nagar urban health center) of the Topiwala National Medical College & B. Y. L. Nair Hospital, Mumbai during the period of July 2015 to June 2016. The ethics committee of the institute approved the study.

The study was carried out in an urban slum community which is a resettlement colony on the outskirts of Mumbai. This urban slum is the field practice area under the Department of Community Medicine of Topiwala National Medical College, Mumbai. It has extended campus of about 70 acres with the population of around 83523 as per survey done in May 2010.The urban slum consists of total 14487 houses which is divided into 11 sectors namely A to K. The houses in each row face the opposite row forming a pair.

Sample size was calculated considering the prevalence of hypertension in urban slum to be 34% and by using the formula: $n=4pq/L^2$, Where n=sample size, p=prevalence of hypertension= 34%, q=100-34= 66 L=admissible error (15% of p) =15/100×34= 5.1 Now putting values in the formula: $n = 4 \times 34 \times 66 / 5.1 \times 5.1 = 8976 / 26.01 = 345.$[5]

So, calculated minimum sample size was around 345 which were extended to 350. Hence sample size was 350.

The sample size of 350 was divided among 50 plots equally- 350/50 = 7, thus total 7 participants of 40 to 60 years (according to the inclusion criteria) were selected from each plot for the study. As there were 140 houses in each plot, 7 participants fulfilling the inclusion criteria were selected by Systematic sampling technique with a random start (In each plot every first house was selected by simple random sampling method).

Every 20th house was selected for the study till the sample size of 7 was met from each plot (140/7 = 20). When any house was found locked or inclusion criteria not fulfilled then next house was targeted. Also when more than one sample was found in the same house then all of them were included in the study. And as soon as the target of 7 samples from 1 plot was completed other plot was targeted.

Inclusion criteria

The beneficiaries meeting the following inclusion criteria were adult people of age 40 to 60 years in study population; residing in community more than 6 months; study population volunteering to give information.

Exclusion criteria

Exclusion criteria were mentally challenged persons; case of secondary hypertension; people not willing to participate in the study; people seriously ill due to any other disease at the time of interview.

Data collection

A pre-designed questionnaire was used to collect necessary information such as socio demographic profile, addictions, blood pressures, weight, height, BMI and general examination was the tool of data collection.

Informed consent was obtained verbally from all the participants after explaining the purpose of the study and promise was made about anonymity, and that social and economic information collected about them was to be kept confidential.

Definitions

Family history of hypertension

The information was obtained as a direct response by the subject to the question. Either the father, mother or siblings suffering from hypertension was taken as positive family history.

Exercise

Any physical activity i.e. walking, jogging, cycling etc for more than 30 minutes a day for 4 or more days per week. (Moderate intensive exercise– 30 to 45 minutes brisk walking for 4 to 5 days a week).[2]

Examination of blood pressure

The procedure of examination of blood pressure was completely explained to relive anxiety and apprehension. Blood pressure was measured by mercury sphygmomanometer using appropriate sized cuff by auscultator method in sitting position. Three readings were recorded 3 to 5 minutes apart and lowest reading was taken as the final reading and classified as,

Normal blood pressure= <120/80 mmHg, pre-hypertension= 120/80 to 139/90 mmHg, hypertension stage 1= 140/90 to 159/99 mmHg, hypertension stage 2= ≥160/100 mmHg.

Weight and height measurement and calculation of body mass index (Quetelet's index). Weight was recorded in kilograms using weighing scale, height was measured using measuring scale.[3]

Body mass index was calculated by formula: BMI= weight (kg)/height (m) [2]

Classification according to BMI[3]

- Underweight <18.50
- Normal 18.50 to 24.99
- Pre obese 25.00 to 29.99
- Obese >30.00

Statistical analysis

The statistical analysis was performed using SPSS software (version 17.0). All values are expressed in the form of percentages, mean and standard deviation and the chi-square test was applied wherever necessary. Statistical significance was set at p≤0.05.

RESULTS

In the present study, out of 350 study subjects 240 (68.7%) were female and 110 (31.3%) were male.

Table 1: Distribution of blood pressure in the study population.

Blood pressure	Frequency	Percentage (%)
Normal	148	42.3
Pre hypertension	81	23.1
Hypertension stage I	79	22.6
Hypertension stage II	42	12.0
Total	350	100

It was seen from Table 1 that out of 350 participants, 121 (34.5%) participants were hypertensive and 229 (65.5%) participants were not hypertensive. So the prevalence of hypertension in this study was 34.5%.

Among 350 participants, 148 (42.3%) participants had normal blood pressure i.e. <120/80 mmHg and 81 (23.1%) participants had prehypertension i.e. blood pressure between 120/80 to 139/89 mmHg, 79 (22.6%) participants had stage I hypertension i.e. blood pressure between 140/90 to 159/99 mmHg and 42 (12.0%) participants had stage II hypertension i.e. blood pressure ≥160/100 mmHg.

Table 2: Association between gender and hypertension.

Gender	Hypertensive (%)	Normotensive (%)	Total (%)	P value
Male	65 (53.7)	45 (19.7)	110 (31.4)	X^2=19.76
Female	56 (46.3)	184 (80.3)	240 (68.6)	df=1
Total	121 (100)	229 (100)	350 (100)	P<0.0001

Table 3: Association between age distribution and hypertension.

Age distribution	Hypertensive (%)	Normotensive (%)	Total (%)	P value
40-45	20 (16.4)	52 (22.8)	72(20.6)	
46-50	26 (21.9)	80 (35.0)	106 (30.28)	X^2=9.679
51-55	40 (32.9)	48 (21.0)	88 (25.14)	df=3
56-60	35 (28.8)	49 (21.2)	84 (24.0)	P=0.021
Total	121 (100)	229 (100)	350 (100)	

Table 4: Distribution of subjects according to type of addictions.

Type of addiction	Frequency	Percentage (%)
Smoking	27	7.8
Tobacco chewing	80	22.9
Smoking & tobacco chewing	5	1.4
Others	8	2.2
No addiction	230	65.7
Total	350	100

Table 5: Association between addiction and hypertension.

History of addiction	Hypertensive (%)	Normotensive (%)	Total (%)	P value
Yes	80 (58.9)	40 (17.5)	120 (34.2)	X^2=23.58
No	41 (41.1)	189 (82.5)	230 (65.8)	df=1
Total	121 (100)	229 (100)	350 (100)	P<0.0001

Table 6: Association between extra salt added in food while eating and hypertension.

Extra Salt Added	Hypertensive (%)	Normotensive(%)	Total (%)	P value
Yes	73 (60.3)	95 (41.6)	168 (48)	X^2=8.588
No	48 (39.7)	134 (58.4)	182 (52)	df=1
Total	121 (100)	229 (100)	350 (100)	P<0.00338

Table 7: Association between family history of hypertension and hypertension.

Family H/o hypertension	Hypertensive (%)	Normotensive (%)	Total (%)	P value
Yes	68 (56.2)	52 (22.8)	120 (34.2)	X^2=33.58
No	53 (43.8)	177 (77.2)	230 (65.8)	df=1
Total	121 (100)	229 (100)	350 (100)	P<0.0001

Table 8: Association between body mass index and hypertension.

BMI score	Hypertensive (%)	Normotensive (%)	Total (%)	P value
<18.50(Underweight)	7 (5.5)	37 (16.2)	44 (12.5)	
18.50 to 24.99(Normal)	43 (35.6)	125 (54.9)	168 (48)	X^2=29.275
25.00 to 29.99(Pre obese)	53 (43.8)	57 (24.7)	110 (31.4)	df=3
>30.00(Obese)	18 (15.1)	10 (4.2)	28 (8)	P<0.0001
Total	121 (100)	229 (100)	350 (100)	

Table 9: Association between exercise and hypertension in the study subjects.

Exercise	Hypertensive (%)	Normotensive (%)	Total (%)	P value
Yes	8 (6.8)	59 (25.7)	67 (19.1)	X^2=12.44
No	113 (93.2)	170 (74.3)	283 (80.9)	df=1
Total	121 (100)	229 (100)	350 (100)	P<0.0001

As seen from Table 2 that among 121 hypertensive participants, 65 (53.7%) participants were male and 56 (46.3%) were females. The association between male sex and presence of hypertension was found to be statistically significant (p<0.0001).

It was seen from Table 3 that among 350 participants, most of the participants i.e. 106 (30.28%) were in the age group of 46 to 50 years followed by 88 (25.14%) participants were in the age group of 51 to 55 years, 84(24.0%) participants were in the age group of 56 to 60 years and 72 (20.6%) participants were in the age group 40 to 45 years. It was seen that there were more cases of hypertension in the age group 50 to 60 years i.e. 75 (61.7%) cases out of 121. It suggests that as the age increases the chances of hypertension also increases.

There were total 121 hypertensive participants, out of which 46 (38.3%) participants were in the age group 40 to 50 years, 75 (61.7%) participants were in the age group 51 to 60 years When Pearson Chi square test was applied, chi square value was 9.679 and p value was 0.021 So, association between age and hypertension was found to be statistically significant.

As seen from Table 4 that among 350 participants, out of which 120 i.e. 34.2% participants had history of addiction and 230 i.e. 65.8% had no history of addiction. Out of the

350 participants, 27 (7.8%) were smokers, 80 (22.9%) were tobacco chewer, 5 (1.4%) were having both addiction i.e. smoking and tobacco chewing, 8 (2.2%) were having other addiction i.e. alcohol intake (5 participants i.e. 1.3%), misri use (3 participants i.e. 0.9%) and 230 (65.7%) were non addicts.

Out of the 27 smokers, 16 (59.2%) were hypertensive and 11 (40.7%) were normotensive. Out of the 80 tobacco chewer, 47(58.7%) were hypertensive and 33 (41.3%) were normotensive. Out of 5 participants having both addictions i.e. tobacco chewer and smoking all were hypertensive i.e.100%. Out of 230 participants having no addiction, 40(17.3%) were hypertensive and 190 (82.6%) were normotensive.

It was seen from Table 5 that among 121 hypertensive participants, 80 (58.9%) had history of addiction and 41 had no history of addiction. Out of the 229 normotensive participants, 40 (17.5%) had history of addiction and 189 (82.5%) had no history of addiction. When Pearson Chi square test was applied, chi square value was 23.58 and p value was < 0.0001 so, association between history of addiction and hypertension was found to be statistically significant.

It was evident from Table 6 that among 350 participants, 168 i.e. 48% participants had extra salt added in food

while eating and 182 i.e. 52% had no extra salt intake. Out of the 121 hypertensive participants, 73 (60.3%) participants had extra salt in diet and 48 (39.7%) had no extra salt intake. Out of the 229 normotensive participants, 95 (41.6%) participants had extra salt in diet and 134 (58.4%) participants had no extra salt in diet. When Pearson Chi square test was applied, chi square value was 8.588 and p value was 0.003384 so, association between extra salt intake and hypertension was found to be statistically significant.

As seen from Table 7 that among 350 participants, 120 i.e. 34.2% participants had family history of hypertension and 230 i.e. 65.8% participants had no family history of hypertension. Out of the 121 hypertensive participants, 68 (56.2%) participants had family history of hypertension and 53 (43.8%) had no family history of hypertension.

Out of the 29 normotensive participants, 52 (22.8%) participants had family history of hypertension and 177 (77.2%) participants had no family history of hypertension. When Pearson Chi square test was applied, chi square value was 33.58 and p value was < 0.0001 so, association between family history of hypertension and hypertension was found to be highly significant.

It was seen from Table 8 that among 450 participants, 44 participant i.e. 12.5% participants were under weight, 168 i.e. 48% had normal weight, 110 (31.4%) were pre obese and 28 (8.0%) were obese. Out of the 121 hypertensive participants, 7 (5.5%) participants were underweight, 43 (35.6%) had normal weight, 53 (43.8%) were pre obese and 18 (15.1%) were obese. When Pearson Chi square test was applied, chi square value was 29.275 and p value was <0.0001 so, association between body mass index and hypertension was found to be significant.

As seen from Table 9 that among 350 participants, 67 i.e. 19.1% participants did exercise on regular basis, 283 i.e. 80.9% did not exercise. Out of the 121 hypertensive participants, 8 (6.8%) participants did exercise, 113 (93.2%) did not exercise. When Pearson Chi square test was applied, chi square value was 12.44 and p value was <0.001 so, association between exercise and hypertension was found to be highly significant.

DISCUSSION

The prevalence found in a study done by Anand in Mumbai among Mumbai executives in age group 30 to 60 years residing in an urban area was 34% which approximately similar to our study i.e. 34.5%.[5]

Association between gender and hypertension

It was observed that out of 121 hypertensive cases, 65 were male and 56 were female. Thus hypertension was seen more in male than female and this association was found to be statistically significant (p value is <0.0001).

Similar findings were found in studies were prevalence of hypertension was more among males.[2,6,7]

Association between age distribution and hypertension

In relation with age factor out of 121 hypertensive cases, 16.4% participants were in the age group 40 to 45 years, 21.9% participants were in the age group 46 to 50 years, 32.9% participants were in the age group 51 to 55 years and 28.8% participants were in the age group 56 to 60 years. It was seen that there were more cases of hypertension in the age group 50 to 60 years i.e. 45 (61.7%) cases out of 75.[7-9]

It suggests that as the age increases the chances of hypertension also increases and this association was found to be statistically significant (p value = 0.021). Similar findings were observed in studies where increasing age was an independent risk factor for hypertension.

Association between addiction and hypertension

In relation with addiction it was observed that out of 121 hypertensive cases, 58.9% had history of addiction and 41.1% had no history of addiction. Out of the 229 normotensive participants, 17.5% had history of addiction and 82.5% had no history of addiction. More hypertensive cases were seen with the history of addiction and this association between addiction and hypertension was statistically significant (p<0.0001). Similar results were seen in a study where higher prevalence of hypertension was found with history of addiction.[2,8]

Association between extra salt added in food while eating and hypertension

It was observed that out of 121 hypertensive cases, 60.3% participants had extra salt in their diet and 39.7% had no extra salt intake. Out of the 229 normotensive participants, 41.6% participants had extra salt in their diet and 58.4% participants had no extra salt in diet. More hypertensive cases where seen with extra salt intake and this association was statistically significant (p=0.003384). Similar results were seen in studies where extra salt intake was an independent risk factor of hypertension.[7,9]

Association between family history of hypertension and hypertension

Out of 121 hypertensive cases, 56.2% participants had family history of hypertension and 43.8% had no family history of hypertension. It was observed that more hypertensive cases were seen with the family history of hypertension and this association was statistically significant (p<0.0001). Similar results were seen in studies where higher prevalence of hypertension was found with family history of hypertension.[8-10]

Association between body mass index and hypertension

Out of the 121 hypertensive participants, 5.5% participants were underweight, 35.6% had normal weight, 43.8% were pre obese and 15.1% were obese. It was observed that more hypertensive cases were seen with higher BMI and this association was statistically significant (p<0.0001). Similar results were seen in other studies where high body mass index was a independent risk factor of hypertension.[7,8]

Association between exercise and hypertension in the study subjects

Out of the 121 hypertensive participants, 6.8% participants did exercise regularly, 93.2% did not exercise at all or regularly. It was observed that more hypertensive cases were seen in participants with low physical activity and this association was statistically significant (p<0.0001). Similar results were seen in other studies where low physical activity was an independent risk factor of hypertension.[7,8]

CONCLUSION

The present study concluded that the prevalence of hypertension in the age group of 40 to 60 years was high i.e. 34.5% and prevalence of pre-hypertension was also high i.e. 23.1%. Various factors like gender, increasing age, history of addiction, extra salt intake, and family history of hypertension, high BMI and physical inactivity were associated with increased risk of hypertension. So there is need for special attention to avoid early progression to hypertension through early screening and lifestyle modification.

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