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Original Research Article

Study of prevalence of hypertension in young adult population of age group 20 to 40 years in an urban slum of Mumbai, Maharashtra, India

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ABSTRACT

Background: Hypertension is a growing health problem in Asia, while most studies describe hypertension in older adults and elderly. There is paucity of data on hypertension in teenagers and young adults, as they are deemed to be at lower risk of developing the disease. With the growing problem of hypertension in worldwide there is concern that hypertension in young population may also be on a rise. But those cases remain undetected because of inadequate screening in this age group. So, there's a need to study the prevalence of hypertension in young population.
Methods: A cross-sectional study was carried out in the field practice area (Shivaji Nagar urban health centre) of the T. N. Medical College, Mumbai during the period of July 2014 to June 2015. A total 450 participants in the age group of 20 to 40 years using systematic sampling technique from Shivaji Nagar 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 450 participants, 322 (71.6%) participants had normal blood pressure and 55 (12.2%) participants had pre-hypertension, 64 (14.2%) participants had stage I hypertension and 9 (2.0%) participants had stage II hypertension.
Conclusions: Prevalence of hypertension and pre-hypertension was 16.2% and 12.2% 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, Young adult

INTRODUCTION

Blood pressure is a continuously distributed variable in populations. There is no natural dividing line between high and normal blood pressure. However WHO in its expert committee report has arbitrarily defined hypertension in adults 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 epidemiological studies have demonstrated that hypertension is potentially as injurious in the young as in the old and is an important risk factor for most cardiovascular complications including congestive cardiac failure, stroke, myocardial infarction and sudden death.

Hypertension has been found to be highly correlated with reduced life expectancy, the higher the blood pressure, and the shorter the life. The natural course of hypertension spans some 15 to 25 years starting on the average around age 35 years and often ending in

premature death around the age of 50 years. Hypertension is a growing health problem in Asia.[2,3]

While most studies describe hypertension in older adults and elderly there is paucity of data on hypertension in teenagers and young adult's i.e. young population, as they are deemed to be at lower risk of developing the disease. With the growing problem of hypertension in worldwide there is concern that hypertension in young population may also be on a rise. But those cases remain undetected because of inadequate screening in this age group. So, it is necessary to study the prevalence of hypertension in young population.

METHODS

A community based cross-sectional study was carried out among 450 people who are residing in the field practice area (Shivaji Nagar urban health centre) of the Topiwala National Medical College & B. Y. L. Nair Hospital, Mumbai during the period of July 2014 to June 2015. 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 and having approximate population of 80000. This urban slum is the field practice area under the Department of Community Medicine of Topiwala National Medical College, Mumbai. The urban slum consists of total 50 plots. Each plot has A to T line. Each line has 9 houses. 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 47.9%.[4] and by using the formula: $n=4pq/L^2$, Where n=sample size, p=prevalence of hypertension= 47.9%, q=100-47.9= 52.1

L=admissible error (10% of p) =10/100 x 47.9= 4.79 Now putting values in the formula: n = 4 x 47.9 x 52.1 / 4.79 x 4.79 = 9982.36 / 22.9441 = 435.07

So, calculated minimum sample size was around 435 which were extended to 450. Hence sample size was 450.

The sample size of 450 was divided among 50 plots equally - 450/50 = 9, thus total 9 participants of 20 to 40 years (according to the inclusion criteria) were selected from each plot for the study. As there were 180 houses in each plot, 9 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 9 was met from each plot (180/9 = 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 9 samples from 1 plot was completed other plot was targeted.

Inclusion criteria

- The beneficiaries meeting the following inclusion criteria were selected:
- Individuals residing in the houses as randomly selected by the above method.
- Individuals of age between 20-40 years.
- Individuals of either sex.

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 auscultatory method in sitting position.[4] 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 mm Hg
Pre-hypertension = 120/80 to 139/90 mm Hg
Hypertension Stage 1 = 140/90 to 159/99 mm Hg
Hypertension Stage 2 = ≥160/100 mm Hg

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

Body mass index was calculated by formula - BMI = weight (kg) / height $(m)^2$

Classification according to BMI

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 450 study subjects 309 (68.7%) were female and 141 (31.3%) were male.

It was seen from Table 1 that out of 450 participants, 73 (16.2%) participants were hypertensive and 377 (83.8%) participants were not hypertensive. So the prevalence of hypertension in this study was 16.2%.

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

Blood pressure	Frequency	Percentage
Normal	322	71.6
Pre hypertension	55	12.2
Hypertension stage I	64	14.2
Hypertension stage II	9	2.0
Total	450	100

Among 450 participants, 322 (71.6%) participants had normal blood pressure i.e. <120/80 mm Hg and 55 (12.2%) participants had prehypertension i.e. blood pressure between 120/80 to 139/89 mm Hg, 64 (14.2%) participants had stage I hypertension i.e. blood pressure between 140/90 to 159/99 mm Hg and 9 (2.0%) participants had stage II hypertension i.e. blood pressure ≥ 160/100 mm Hg.

Table 2: Association between gender and hypertension.

Gender	Hypertensive	Normotensive	Total	p-value
Male	39 (53.4%)	102 (27.1%)	141 (31.3%)	X2 = 19.764
Female	34 (46.6%)	275 (72.9%)	309 (68.7%)	d.f. = 1
Total	73 (100%)	377 (100%)	450 (100%)	p<0.0001

Table 3: Association between age distribution and hypertension.

Age (in years)	Hypertensive	Normotensive	Total	p-value
20-25	12 (16.4%)	86 (22.8%)	98 (21.8%)	
26-30	16 (21.9%)	132 (35.0%)	148 (32.9%)	X2 = 9.679
31-35	24 (32.9%)	79 (21.0%)	103 (22.9%)	d.f. = 3
36-40	21 (28.8%)	80 (21.2%)	101 (22.4%)	p = 0.021
Total	73 (100%)	377 (100%)	450 (100%)	

As seen from Table 2 that among 73 hypertensive participants, 39 (53.4%) participants were male and 34 (46.6%) 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 450 participants, most of the participants i.e. 148 (32.9%) were in the age group of 26 to 30 years followed by 103 (22.9%) participants were in the age group of 31 to 35 years, 101 (22.4%) participants were in the age group of 36 to 40 years and 98 (21.8%) participants were in the age group 20 to 25 years.

There were total 73 hypertensive participants, out of whom 12 (16.4%) participants were in the age group 20 to 25 years, 16 (21.9%) participants were in the age group 26 to 30 years, 24 (32.9%) participants were in the age group 31 to 35 years and 21 (28.8%) participants were in the age group 36 to 40 years. The association between age and hypertension was found to be statistically significant (p = 0.021).

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

Type of addiction	Frequency	Percentage
Smoking	35	7.8
Tobacco chewing	103	22.9
Smoking & tobacoo chewing	6	1.3
Others	10	2.2
No addiction	296	65.8
Total	450	100

As seen from Table 4 that among 450 participants, 35 (7.8%) were smokers, 103 (22.9%) were tobacco chewers, 6 (1.3%) were having both addictions i.e. smoking and tobacco chewing, 10 (2.2%) were having other addiction i.e. alcohol intake (6 participants i.e. 1.3%), misri use 4 (0.9%) and 296 (65.8%) had no history of any addiction. Out of the 35 smokers, 16(45.7%) were hypertensive and 19 (54.3%) were normotensive. Among103 tobacco chewer, 21 (20.4%) were hypertensive and 82 (79.6%) were normotensive. Out of 6 participants having both addictions i.e. tobacco chewer and smoking all were hypertensive. Out of 296 participants having no addiction, 30 (10.1%) were hypertensive and 266 (89.9%) were normotensive.

Table 5: Association between addiction and hypertension.

History of Addiction	Hypertensive	Normotensive	Total	p-value
Yes	43 (58.9%)	111 (29.4%)	154 (34.2%)	X2 = 23.581
No	30 (41.1%)	266 (70.6%)	296 (65.8%)	d.f. = 1
Total	73 (100%)	377 (100%)	450 (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	44 (60.3%)	157 (41.6%)	201 (44.7%)	X2 = 8.588
No	29 (39.7%)	220 (58.4%)	249 (55.3%)	d.f. = 1
Total	73 (100%)	377 (100%)	450 (100%)	p = 0.00338

It was seen from Table 5 that among 73 hypertensive participants, 43 (58.9%) participants had a history of addiction and 30 (41.1%) had no history of addiction. Among 377 normotensive participants, 111 (29.4%) had a history of addiction and 266 (70.6%) had no history of addiction. The association between history of addiction and hypertension was found to be statistically significant (p<0.0001). It was evident from Table 6 that among 450 participants, 201 (44.7%) participants had extra salt added in their food while eating and 249 (55.3%) had no extra salt intake. Among 73 hypertensive participants, 44 (60.3%) participants had extra salt added in their food and 29 (39.7%) had no extra salt intake. Out of the 377 normotensive participants, 157 (41.6%) participants had extra salt in their food and 220 (58.4%) participants had no extra salt intake. The association between extra salt intake and hypertension was found to be statistically significant (p= 0.003384).

As seen from Table 7 that among 450 participants, 127 (28.2%) participants had family history of hypertension and 323 (71.8%) participants had no family history of hypertension. Among 73 hypertensive participants, 41 (56.2%) participants had family history of hypertension and 32 (43.8%) had no family history of hypertension. Out of the 377 normotensive participants, 86 (22.8%) participants had family history of hypertension and 291 (77.2%) participants had no family history of hypertension. The association between family history of hypertension and hypertension was found to be statistically significant by (p<0.0001).

It was seen from Table 8 that among 450 participants, 65 (14.4%) participants were under weight, 233 (51.8%) had normal weight, 125 (27.8%) were pre obese and 27 (6.0%) were obese. Out of the 73 hypertensive participants, 4 (5.5%) participants were underweight, 26 (35.6%) had normal weight, 32 (43.8%) were pre obese and 11 (15.1%) were obese. The association between Body Mass Index and hypertension was found to be statistically significant (p<0.0001).

As seen from Table 9 that among 450 participants, 102 (22.7%) participants did exercise on regular basis, 348 (77.3%) did not exercise at all or regularly. Out of the 73 hypertensive participants, 5 (6.8%) participants did exercise regularly, 68 (93.2%) did not exercise. The association between exercise and hypertension was found to be statistically significant (p<0.0001).

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

Family H/o hypertension	Hypertensive	Normotensive	Total	p-value
Yes	41 (56.2%)	86 (22.8%)	127 (28.2%)	X2 = 33.584
No	32 (43.8%)	291 (77.2%)	323 (71.8%)	d.f. = 1
Total	73 (100%)	377 (100%)	450 (100%)	p <0.0001

Table 8: Association between body mass index and hypertension.

BMI score	Hypertensive	Normotensive	Total	p-value
<18.50 (Underweight)	4 (5.5%)	61 (16.2%)	65 (14.4%)	X2 = 29.275 d.f. = 3 p < 0.0001
18.50 to 24.99 (Normal)	26 (35.6%)	207 (54.9%)	233 (51.8%)	
25.00 to 29.99 (Pre obese)	32 (43.8%)	93 (24.7%)	125 (27.8%)	
>30.00 (Obese)	11 (15.1%)	16 (4.2%)	27 (6.0%)	
Total	73 (100%)	377 (100%)	450 (100%)	

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

Exercise	Hypertensive	Normotensive	Total	p-value
Yes	5 (6.8%)	97 (25.7%)	102 (22.7%)	X2 = 12.437 d.f. = 1 p < 0.0001
No	68 (93.2%)	280 (74.3%)	348 (77.3%)	
Total	73 (100%)	377 (100%)	450 (100%)	

DISCUSSION

In this study, among 450 study subjects, 309 (68.7%) were female and 141 (31.3%) were male.

Distribution of blood pressure in the study population

Among 450 participants, 73 (16.2%) participants were hypertensive and 377 (83.8%) participants were normotensive. So the prevalence of hypertension in this study was 16.2% and 322 (71.6%) participants had normal blood pressure and 55 (12.2%) participants had pre-hypertension.

Out of the 73 hypertensive participants, 64 (87.7%) participants had stage I hypertension and 9 (12.3%) participants had stage II hypertension. Similar prevalence was found in a study among adults residing in an urban area of North India (over all prevalence of hypertension was 14.4% and 9.5% had stage I hypertension, 4.9% had stage II hypertension and 11.1% had pre-hypertension range).[5]

While in another study the prevalence was high i.e. 29.3%. This difference could be because of inclusion of higher age group in that study (25-64 years).[6]

Association between gender and hypertension

Among 450 study participants, 141 were male and 309 were female. Out of the total 73 hypertensive participants, 39 were male and 34 were female. Thus it was observed that 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.[7-9]

Association between age distribution and hypertension

Among 450 participants, 148 (32.9%) were in the age group of 26 to 30 years followed by 103 (22.9%) participants were in the age group of 31 to 35 years, 101 (22.4%) participants were in the age group of 36 to 40 years and 98 (21.8%) participants were in the age group 20 to 25 years.

There were total 73 hypertensive participants, out of whom 12 (16.4%) participants were in the age group 20 to 25 years, 16 (21.9%) participants were in the age group 26 to 30 years, 24 (32.9%) participants were in the age group 31 to 35 years and 21 (28.8%) participants were in the age group 36 to 40 years. It was seen that there were more cases of hypertension in the age group 30 to 40 years i.e. 45 (61.6%) cases out of 73.

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.[6,8,9]

Association between addiction and hypertension

Out of the 450 participants, 154 (34.2%) had history of addiction and 296 (65.8%) had no history of addiction. Out of 73 hypertensive cases, 43 (58.9%) had history of addiction and 30 (41.1%) had no history of addiction. Out of the 377 normotensive participants, 111 (29.4%) had history of addiction and 266 (70.6%) 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.[9]

Association between extra salt added in food while eating and hypertension

There were total 450 participants, out of which 201 (44.7%) participants had extra salt added in food while eating and 249(55.3%) had no exta salt intake. Out of the

73 hypertensive participants, 44 (60.3%) participants had extra salt in their diet and 29 (39.7%) had no extra salt intake. Out of the 377 normotensive participants, 157 (41.6%) participants had extra salt in their diet and 220 (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 a studies where extra salt intake was a independent risk factor of hypertension.[6,8]

Association between family history of hypertension and hypertension

Out of the 450 participants, 127 (28.2%) participants had family history of hypertension and 323 (71.8%) participants had no family history of hypertension. Out of the 73 hypertensive participants, 41 (56.2%) participants had family history of hypertension and 32 (43.8%) had no family history of hypertension. Out of the 377 normotensive participants, 86 (22.8%) participants had family history of hypertension and 291 (77.2%) participants 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 a studies where higher prevalence of hypertension was found with family history of hypertension.[6,9,10]

Association between body mass index and hypertension

Out of the 450 participants, 65 (14.4%) participants were under weight, 233 (51.8%) had normal weight, 125 (27.8%) were Pre obese and 27 (6.0%) were obese. Out of the 73 hypertensive participants, 4 (5.5%) participants were underweight, 26 (35.6%) had normal weight, 32(43.8%) were pre obese and 11 (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.[8,9]

Association between exercise and hypertension in the study subjects

Out of the 450 participants, 102 (22.7%) participants did exercise on regular basis, 348 (77.3%) did not exercise at all or regularly. Out of the 73 hypertensive participants, 5 (6.8%) participants did exercise regularly, 68 (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.[8,9]

Limitations

This is an urban slum based study so results may not be universal. This is a cross sectional study, follow up study would give more detailed information. Age group is limited to 20 to 40 years in this study, study of adolescent group can yield better picture of hypertension in younger population.

CONCLUSION

The present study concluded that the prevalence of hypertension in the age group of 20 to 40 years was high i.e. 16.2% and prevalence of pre-hypertension was also high i.e. 12.2%. 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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REFERENCES

1. A global brief on hypertension-Silent killer, global public health crisis. Geneva: http://ish-world.com/downloads/pdf/global_brief_hypertension.pdf (Assessed on 18 July 2015).
2. Prabakaran J, Vijayalakshmi N, Venkata Rao E. Prevalence of hypertension among urban adult population of 25-64 years of Nellore. Int J Res Dev Health. 2013:1(2):2-5.
3. Park K. Textbook of Preventive and Social Medicines. Epidemiology of chronic non-communicable diseases and conditions. 2015; 23rd ed. Jabalpur. M/s Banarsidas Bhanot publishers; 2015;372-400.
4. Dudala SR, Reddy KAK, Prabhu GR. Prasad's socio-economic status classification- An update for 2014. Int J Res Health Sci. 2014;2(3):875-78.
5. Ahmad S. Prevalence and risk factors of hypertension, among adults residing in an urban area of North India. Int J Pure App Biosci. 2015;3(2):338-44.
6. Panesar S, Chaturvedi S, Saini NK, Avasthi R, Singh A. Prevalence and predictors of hypertension among 20 to 59 years old residents of a slum-resettlement colony in Delhi, India. WHO Southeast Asia J Public Health. 2013;2:83-7.

7. Yuvraj BY, Nagendra Gowada MR, Umakantha AG. Prevalence, awareness, treatment and control of hypertension in rural areas of Davanagere, India. Ind J Com Med. 2010;35:138-41.
8. Prabakaran J, Vijayalakshmi N, VenkataRao E. Prevalence of hypertension among urban adult population of 25-64 years of Nellore. Int J Res Dev Health. 2013;1(2):21-5.
9. Reddy SS, Prabhu GR. Prevalence and Risk Factors of Hypertension in Adults in an Urban Slum Tirupati, A.P. Indian J Community Med. 2005;30:84-6.
10. Yennawar BS, Chavan YB, Giri PA. Socio-demographic determinants and awareness regarding hypertension among adult population in an urban slum of Mumbai, India. Int J Community Med Public Health. 2015;2:666-71.

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