



PREVALENCE AND PREDICTORS OF PREHYPERTENSION AND HYPERTENSION AMONG ADULTS RESIDING IN SLUMS: A COMMUNITY-BASED STUDY.

Medical Science

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ABSTRACT

Introduction: The adult populations in slum areas are more vulnerable to hypertension as they are so busy with the fulfilment of even day-to-day basic needs and care, family commitments and economic stress. **Aim and objectives:** To estimate the prevalence of prehypertension and hypertension and their predictors. **Methodology:** The present cross-sectional study was carried out among adults aged between 25 to 44 years residing in the slums of Meerut District. 30 Cluster Sampling technique was used. The slum was selected as a cluster unit. During the visit by house-to-house survey, members of the family were listed and eligible persons were interviewed and examined. **Results:** The cumulative prevalence of hypertension came out to be 21.9%, while 30.2% of the study population was pre-hypertensive. education, occupation, marital status, socioeconomic status, overcrowding, salt intake & type of diet were found to be statistically significant

KEYWORDS

Hypertension, Slums, Cluster Sampling, Screening

INTRODUCTION

Hypertension is a typical iceberg disease with those hypertensives that are actually known and under the care of the medical fraternity representing a very small proportion of the actual load of hypertensives in the community. This has also been sometimes referred to as the 'rule of halves'⁽¹⁾

In Uttar Pradesh, the prevalence of hypertension among men and women (15 years and above) is 21.7% and 18.4% respectively; while it is 24.8% and 20.9% in urban residents of Uttar Pradesh. The prevalence of hypertension in the Meerut district among men and women (of 15 years and above) is 26.2% and 20% respectively.⁽²⁾

An understanding of the basic epidemiology of hypertension is essential for effective public health and clinical efforts to prevent, detect, treat, and control this common condition⁽³⁾. Some of the problems discussed below faced by the slums dwellers anyhow predispose them to the risk of non-communicable disease; Hypertension is one of them.

The adult populations in slum areas are more vulnerable to hypertension as they are so busy in the fulfilment of even day-to-day basic needs and care; unhealthy living conditions, hazardous locations, insecure tenure, irregular or informal settlements, poverty, social exclusion, overcrowding, economic stress etc. adds to the aetiology. Due to their ignorant, poor health-seeking behaviour and lack of awareness, they do not approach health facilities for regular health check-ups which leads to delays in timely diagnosis and management of non-communicable diseases specifically hypertension⁽³⁾

Realising the importance of this "silent" easily manageable and preventable disease and fewer studies among adults in slum areas it was decided to conduct an epidemiological study of hypertension among them to know the various aspects of the disease.

AIM AND OBJECTIVES

1. To estimate the prevalence of hypertension and pre-hypertension among adults (25-44 years) of slum.
2. To study the factors associated with it.

MATERIALS AND METHODS

The present cross-sectional study was carried out among adults aged 25-44 years in the slums of Meerut District during the period between September 2021 to July 2022.

Sample Size Estimation:

Taking the anticipated proportion of Hypertension in the population of

Meerut as 26%⁽⁴⁾ and absolute precision of 5 % at a 95% confidence interval, the sample size for the study is calculated as follows:

$$n = DEFF \times (1.96)^2 p(1-p) / d^2$$

where DEFF = Design effect, p = anticipated value of proportion in the population, q = (1-p), d = allowable error, n = sample size

$$n = 1.8 \times 3.84 \times 0.26 \times (1-0.26) / (0.05)^2$$

 = 532

Thus, the minimum sample size is calculated to be 532. As we must study subjects from 30 clusters, so 18 subjects will be taken from each cluster making a sample size of 540.

Sampling Technique: 30 Cluster sampling technique.

The present study was conducted in slum areas of Meerut City through a house-to-house survey. All the slums were listed and tabulated with their population. The slum was selected as a cluster unit and 30 clusters were drawn out of 185 slum areas.

The sampling interval was determined by dividing the total cumulative population by 30. The selection of the first cluster was done by drawing a currency note. Subsequent clusters were selected by adding random numbers with the sampling interval until 30 clusters were selected. 18 study subjects were taken from each cluster. A total of 540 subjects had been selected for the study by cluster sampling.

The first house in a cluster was selected by going to the centre of a cluster, spinning a pencil, and selecting the first house in the direction of the pencil⁽⁵⁾. Further subsequent households will be selected until we get the prespecified number of study subjects in a cluster.

During the visit by house-to-house survey members of the family were listed and eligible persons i.e., aged between 25 to 44 years were interviewed and examined. For proper response, the purpose of the study is described in detail.

The information was collected on a structured and pretested schedule. We interviewed one of the randomly selected (lottery system method) eligible members from each household. A detailed history of relevant underlying factors responsible for the causation of hypertension was taken.

Inclusion Criteria:

All adults in the age group 25-44 years who will give consent for participation will be included in the study.

Exclusion Criteria:

More than one eligible study subject from a single household will be excluded. Adults who are not willing or who will be too sick to participate will be excluded.

Data Processing and Analysis:

The data thus collected, was first coded and transferred to a master chart from which tables were prepared, analysed, and statistically evaluated (Epi Info 7.2.5.0).

RESULTS

The present cross-sectional study was carried out in the slums of Meerut District by house-to-house survey from September 2021 to July 2022. A total of 540 subjects had been selected for the study by 30 cluster sampling technique.

Table 1 Classification-based prevalence of hypertension among the study population

Blood Pressure	Total	
	Number	Percent (%)
Normotensive	259	47.9
Pre-Hypertension	163	30.2
Stage I Hypertension	96	17.8
Stage II Hypertension	22	4.1
Total	540	100

The distribution of blood pressure levels in the study population can be inferred from the table given above as per JNC VIII Classification. The cumulative prevalence of hypertension in this study among adults residing in the slums of Meerut came out to be 21.9%, while 30.2% of the study population were prehypertensive

Table 2 Predictors of prehypertension and hypertension among the study population

Variables	Total				
	Number (%)	Normotensive	Pre-hypertension	Hypertension	Test of significance
Age (years)					
25-29	174 (32.2)	118(67.8)	47(27.0)	9(5.2)	$\chi^2=81.84$, df=6, p < 0.001.
30-34	64 (11.9)	35(54.7)	25(39.0)	4(6.3)	
35-39	106 (19.6)	39(36.8)	27(25.5)	40(37.7)	
40-44	196 (36.3)	67(34.2)	64(32.7)	65(33.1)	
Gender					
Male	285 (52.8)	134(47.0)	92(32.3)	59(20.7)	$\chi^2=1.35$, df=2, p=.507.
Female	255 (47.2)	125(49.0)	71(27.9)	59(23.1)	
Religion					
Hindu	426 (78.9)	209(49.0)	130(30.6)	87(20.4)	$\chi^2=2.46$, df=2, p=.291.
Muslim	114 (21.1)	50(43.9)	33(28.9)	31(27.2)	
Education					
Illiterate	88 (16.3)	33(37.5)	37(42.0)	18(20.5)	$\chi^2=14.98$, df=6 p=.020.
Primary	78 (14.4)	48(61.5)	20(25.7)	10(12.8)	
Secondary	263 (48.7)	122(46.4)	74(28.1)	67(25.5)	
Graduate and above	111 (20.6)	56(50.4)	32(28.9)	23(20.7)	
Occupation					
Professional/Semi-professional	67 (12.4)	35(52.2)	23(34.3)	9(13.5)	$\chi^2=50.49$, df=8 p< 0.001.
Clerical/shop/farm	87 (16.1)	37(42.5)	23(26.5)	27(31.0)	
Skilled worker	121 (22.4)	43(35.6)	28(23.1)	50(41.3)	

Semi-skilled worker	123(22.8)	68(55.3)	37(30.1)	18(14.6)	
Unskilled worker	142(26.3)	76(53.5)	52(36.6)	14(9.9)	
Socio-economic status					
Upper	102 (18.9)	53(51.9)	31(30.4)	18(17.7)	$\chi^2=45.10$, df=4, p<0.001.
Middle	143 (26.5)	46(32.2)	38(26.6)	59(41.2)	
Lower	295 (54.6)	160(54.2)	94(31.9)	41(13.9)	
Marital status					
Unmarried	94 (17.4)	63(67.0)	27(28.7)	4(4.3)	$\chi^2=29.29$, df=4, p<0.001.
Married	431 (79.8)	186(43.1)	136(31.6)	109(25.3)	
Divorced/ Widowed	15 (2.8)	9(60.0)	1(6.7)	5(33.3)	
Type of family					
Nuclear	321 (59.4)	146(45.5)	102(31.8)	73(22.7)	$\chi^2=6.91$, df=4, p= .140.
Joint	177 (32.8)	85(48.0)	52(29.4)	40(22.6)	
Three generation	42 (7.8)	28(66.7)	9(21.4)	5(11.9)	
Overcrowding					
Present	220 (40.7)	83(37.7)	84(38.2)	53(24.1)	$\chi^2=16.82$, df=2, p=.002
Absent	320 (59.3)	176(55)	79(24.7)	65(20.3)	
Salt Intake					
Low	113(20.9)	66(58.4)	38(33.7)	9(7.9)	$\chi^2=19.22$, df=4, p=.000
Recommended	84 (15.6)	37(44.1)	30(35.7)	17(20.2)	
High	343 (63.5)	156(45.5)	95(27.7)	92(26.8)	
Type of diet					
Vegetarian	231(42.8)	116(50.2)	78(33.8)	37(16.0)	$\chi^2=8.43$, df=2, p=.014.
Non-vegetarian	309(57.2)	143(46.3)	85(27.5)	81(26.2)	

DISCUSSION

The prevalence of 37.7% was seen in the age group of 35-39 years followed by 33.2% in the age group between 40-44 years. Prevalence of hypertension in the age group of 30-34 years and 25-29 years was seen as 6.3% and 5.2% respectively. This association between hypertension and age was found to be statistically significant while Deekala RS et al. ⁽⁶⁾ in the slums of Tirupati reported 9.2%, 18.8% and 26.5% in the age group of 30-35 years, 35-40 years and 40-45 years respectively.

Although it was found that the female gender is more susceptible to hypertension than male i.e., the prevalence of 23.1% and 20.7% respectively, a statistically insignificant association of hypertension with gender was found in the present study which is like findings by Garg M et al. ⁽⁸⁾ in Meerut as prevalence was higher (40.2%) in females than males (25.0%).

Muslim population in the present study had a higher (27.1%) prevalence of hypertension than Hindu (20.4%) while Garg M et al. ⁽⁸⁾ in Meerut reported that prevalence was higher in Hindu (38.5%) than Muslim 31.5%, even though it was not statistically significant in both mentioned studies.

In the present study, the prevalence of hypertension was found to be 21.9%. A comparable prevalence of 34.5% was observed by Rathod ND et al. ⁽⁹⁾ among adults residing in the slums of Mumbai. Prevalence by Rathod is noted at a higher level in stage II hypertension this might be due to the involvement of older adults (up to 60 years of age) in their study.

Prevalence of hypertension was found at 30.5% and 30.4% in illiterates and secondary-level studied individuals respectively. Least

(11.6%) of hypertensives were having a primary level of education; a statistically significant association was observed between hypertension and educational status; whereas Udayar SE et al.⁽¹⁰⁾ in Southern India reported the following prevalence as 28.8% (illiterate), 22.6% (primary), 15.0% secondary and 16.7% (graduate and above).

In the present study, a statistically significant association between hypertension and occupation was found. Skilled workers (electricians, drivers, carpenters etc.) were more prone to developing hypertension accounting for a prevalence of 41.3%; whereas Garg M et al.⁽⁸⁾ in Meerut observed that the prevalence of hypertension was higher among unemployed (57.1%).

The present study shows a statistically significant association of hypertension with socio-economic status, in a study by Bendhari DM et al.⁽⁷⁾ in the slums of Maharashtra found a highly significant association with a maximum 28% prevalence in SES class I followed by SES class II.

Prevalence of hypertension was a maximum of 33.3% in the Divorced/widowed category while the least prevalence of 4.3% was seen amongst unmarried individuals. A statistically significant association was found between marital status and hypertension. Similar results were obtained by Udayar SE et al.⁽¹⁰⁾ in Southern India that it was highest at 39.1% among divorced/separated/widowed.

An insignificant association was found between hypertension and type of family. The prevalence of hypertension was almost similar (22.7% and 22.6%) in Nuclear and joint families in this study. In the three-generation family, an 11.9% prevalence of hypertension was observed while Bendhari DM et al.⁽⁷⁾ in slums of Maharashtra reported a prevalence of 19.2% in the three-generation family followed by 15.0% in the nuclear family.

The present study also shows a significant association of hypertension with salt intake, with high salt intake the prevalence being 26.8% then that recommended intake (20.2%) and low salt intake (7.9%) respectively. Similar observations were noted by G Radhika et al.⁽¹¹⁾ that both systolic and diastolic blood pressure significantly increased with an increase in quintiles of total dietary salt both among hypertensive and normotensive subjects.

A statistically significant association was observed between the type of diet and hypertension. Prevalence was higher at 26.2% in non-vegetarians than in vegetarians at 16.0% while Maroof KA et al.⁽¹²⁾ reported insignificant association in their study.

Recommendations:

In the present study conducted in the Slums of Meerut district, the prevalence of hypertension was 21.9% among the adult population aged 25-44 years. The observations we had seen alarm us to take strong and effective public health interventions at all levels of prevention to curb this rising menace. To decrease the morbidity caused by hypertension following recommendations are suggested:

1. Measuring blood pressure is a very easy method even individuals from non-medical backgrounds can do it. All healthcare workers at all levels should be trained in how to measure blood pressure so that they can be utilised effectively in screening for Hypertension.
2. All Corporate hospitals/Non-communicable disease clinics/Rural health training centres/Urban health training centres should display proper charts/posters about the consequences of undiagnosed high blood pressure on various organ systems (heart, brain, kidney, eye, etc.) of the body.
3. Patients taking antihypertensive medication should be informed about irrevocable damage if they are not compliant with their treatment regime.
4. Periodic health check-up activities by means of health camps and health melas should be organised.
5. Eat healthy: An eating plan rich in fruits, vegetables, whole grains, fish, poultry, nuts, legumes, and low-fat dairy should be adapted. Include fibre in the diet, and food rich in potassium and magnesium. Cut out desserts, sweetened beverages, fats, red meat, and processed meats [Dietary Approach to Stop Hypertension (DASH) Diet]
6. Salt restriction: Use low sodium alternatives, avoid adding table salt. The salt intake should be restricted to <5 grams per day for all individuals.
7. Instead of actors promoting carbonated drinks and alcoholic

beverages they should be asked to promote healthy traditional drinks like lassi, chaach etc.

8. Indulgence in any aerobic physical activity of moderate intensity at least for 30 minutes five times a week. Meditation or yoga at least 15 minutes a day should be promoted.

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