Research Article

Study of prevalence and risk factors of hypertension in adults in an urban slum area of Western Maharashtra, India

Manisha L. Bendhari^{1*}, Rajendra S. Korade², Santosh J. Haralkar³

¹Department of Community Medicine, RSCM Govt. Medical College, Kolhapur, Maharashtra, India 416003

²Consultant Paediatrician, Shree Maha- Ganpati Hospital, Titwala, Maharashtra, India 421605

³Department of Community Medicine, Dr. Vaishampayan Memorial Government Medical College, Solapur, Maharashtra, India 413003

Received: 29 July 2016

Accepted: 31 August 2016

*Correspondence:

Dr. Manisha L. Bendhari,

E-mail: drmanishabendhari@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Hypertension is an important public health problem, which is common, asymptomatic, readily detectable, having preventable risk factors and often lead to lethal complications (viz. stroke, coronary heart disease) if left untreated. Identification of different risk factors is important for the prevention and control of hypertension. The objectives was to estimate prevalence of hypertension among people of age 20 years and above in an urban slum area and to study the association between risk factors and hypertension.

Methods: A community based cross sectional study was carried out among the adults residing in the urban slum area, catered by U.H.C. of the Department of Community Medicine, Dr. V.M.G.M.C Solapur, Maharashtra, India. The sample size was 1122 adults in the age group of 20 years and above. By using systematic random sampling method, every 5th household was selected and data was collected by house to house visits, clinical examination and interview of study population with a pre-designed pre-tested proforma. Chi- square test and binary logistic regression analysis were used to analyze data.

Results: The overall prevalence of hypertension was found to be 15.15 %. Prevalence of hypertension was slightly higher in males (15.86%) than prevalence of hypertension in females (14.51%). Age, body mass index, Physical activity, salt intake >5 grams, smoking, family h/o hypertension and waist-hip ratio were significantly associated with hypertension.

Conclusions: Prevalence of hypertension in urban slum area was found to be 15.15%. Age, BMI, Physical activity, salt intake, smoking, family h/o hypertension and WHR are the risk factors found in study.

Keywords: Prevalence, Risk factors, Urban slum

INTRODUCTION

High blood pressure (BP) is a major public health problem in India and its prevalence is rapidly increasing among both urban and rural populations.¹ In fact, hypertension is the most prevalent chronic disease in India. The prevalence of hypertension ranges from 20-40% in urban adults and 12-17% among rural adults. The number of people with hypertension is projected to

increase from 118 million in 2000 to 214 million in 2025, with nearly equal numbers of men and women.² In India, the trend is increasing due to changes in lifestyle.³ Rapid unplanned urbanization also tends to promote the development of hypertension as a result of unhealthy environments that encourage consumption of fast food, sedentary behaviour, tobacco use and the harmful use of alcohol. Finally, the risk of hypertension increases with age due to stiffening of blood vessels, although ageing of

blood vessels can be slowed through healthy living, including healthy eating and reducing the salt intake in the diet.⁴

The enormous burden of cardiovascular disease (CVD) and its risk factors are clearly evident among slum dwellers due to increasing lifespan and rapid acquisition of adverse lifestyles.² Prevalence of risk factors like high blood pressure, obesity, diabetes, dyslipidemia, physical inactivity and unhealthy diet in slum dwellers is intermediate between rural and urban population, the latter having the worst risk factor profile.^{5,6} Hence the present study was undertaken in an urban slum area to define the magnitude and risk factors associated with hypertension in urban slum area for effective planning and management of the problem of hypertension.

Objectives

- To estimate prevalence of hypertension among people of age 20 years and above in an urban slum area.
- To study the association between risk factors and hypertension.

METHODS

This community based cross sectional study has been carried out in the slum area (populations approximately 14,353), catered by Urban Health Center of the Department of Community Medicine. The period of study was from January 2012 to June 2013. Sampling frame consisted of total inhabited households (2860) in the slum area catered by Urban Health Center, of the Department of Community Medicine with its inhabitant adults aged 20 years and above are 8283 i.e. 59.1% of total population.⁷ So in each house, there will be $8283/2860 = 2.89$ adults of age 20 years and above. Sampling unit was the household having adult with an age 20 years and above. The sample size was estimated by using formula $n = (1.96)^2 \times p \times q / L^2$ at 95% Confidence interval, Where p = prevalence of hypertension in adults in urban slum = 8.6 %, $q = 100 - p = 91.4$, L = allowable error, 20% of $p = 1.72$.⁸ After adding the non response errors of 10% an additional 102 subjects are included, thus 1122 minimum subjects are required for the study.

Males and females 20 years and above age group and subjects willing to participate in study procedure were included in study.

All population below 20 years of age, pregnant women, subjects unwilling to participate in study procedure, non-availability inspite of three successive visits to their homes, unusual residents i.e. those living in household for less than 6 months and permanently locked houses are excluded in study. A house to house survey was carried out by systematic random sampling method. Total 1122 persons of 20 years and above from 561 houses

(considering 2 adults in each selected house) were planned to interview but 417 houses were interviewed (in some houses more than 2 adults were found). Every 5th household (total houses in slum area divided by selected number of houses. i.e. $2860 / 561$) was selected in study sample. After identifying each lane, first of all the households were enlisted serially with chalk piece, then the first household i.e. (No.3) was selected randomly from the first five households. Then subsequently by adding 5 to the previously selected household number i.e. $3+5=8$, then $8+5=13$, $13+5=18$ similarly the further households were selected. Then at the end of every day's interview the last home was marked as 'complete home'. On the next day enlisting was started further from previous day last home which was marked as 'complete home'. The due care was to avoid missing of the homes. At first visit the household head and other members were informed about the survey and its purpose, importance and uses for participating individuals themselves. The blood pressure readings were taken by a single observer for every individual as per guidelines by "the Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure" (1997).⁹

RESULTS

Table 1 shows that overall prevalence of hypertension was 15.15 % and prevalence of hypertension was found to be increased gradually with increasing age. The difference was found to be highly significant ($P < 0.0001$).

Table 2 shows that prevalence of hypertension was slightly higher in males (15.86%) than prevalence of hypertension in females (14.51%). The difference in prevalence of hypertension in both genders was statistically not significant ($P > 0.05$).

Distribution of study subjects according to Body Mass Index shows that 8.26% of the individuals having BMI of < 18.5 and 38.89% of individuals having BMI of ≥ 30 were having hypertension. The difference was found to be statistically significant ($P < 0.001$). 18.72% study subjects having habit of tobacco chewing were having hypertension and 14.29 % study subjects not having habit of tobacco chewing were having hypertension. The difference was found to be not significant ($P > 0.5$). Higher prevalence of hypertension was observed among study subjects with sedentary activity (36.45%) followed by prevalence among study subjects with moderate activity (10.32%). Lowest prevalence of hypertension (8.65 %) was found in study subjects with heavy physical activity. The difference was found to be statistically highly significant ($P < 0.001$).

Table 4 shows binary logistic regression analysis in both sex which reveals that age, salt intake, smoking, family history of hypertension and waist-hip ratio were significantly associated with hypertension.

Table 1: Age wise prevalence of hypertension among study subjects.

Age group in years	Hypertensives (%)	Non-hypertensives (%)	Total (%)
20-29	5 (1.29%)	383 (98.71%)	388 (34.58%)
30-39	19 (8.37%)	208 (91.63%)	227 (20.23%)
40-49	37 (17.21%)	178 (82.79%)	215 (19.16%)
50-59	32 (21.05%)	120 (78.95%)	152 (13.55%)
60-69	46 (50.55%)	45 (49.45%)	91 (8.11%)
70-79*	24 (61.54%)	15 (38.46%)	39 (3.48%)
≥ 80*	7 (70%)	3 (30%)	10 (0.89%)
Total	170 (15.15%)	952 (84.85%)	1122 (100%)

Rows with * were clubbed for chi square test; [$\chi^2 = 248.31$, d.f.= 5, $P < 0.001$; highly significant].

Table 2: Gender wise prevalence of hypertension among study subjects.

Gender	Hypertensives (%)	Non-hypertensives (%)	Total (%)
Male	85 (15.86%)	451 (84.14%)	536 (47.77%)
Female	85 (14.51%)	501 (85.49%)	586 (52.23%)
Total	170 (15.15%)	952 (84.85%)	1122 (100%)

[$\chi^2 = 0.39$, d.f.= 1, $P > 0.05$; not significant].

Table 3: Association between risk factors and hypertension.

Variables		Hypertensives (%)	Non-hypertensives (%)	Total (%)	Chi-square value
Body mass index	< 18.5	10 (8.26%)	111 (91.74%)	121 (10.78%)	[$\chi^2 = 117.85$, d.f. = 3, $P < 0.001$; Highly significant]
	18.5-24.9	54 (7.89%)	630 (92.11%)	684 (60.96%)	
	25-29.9	71 (31.28%)	156 (68.72%)	227 (20.23%)	
	≥ 30	35 (38.89%)	55 (61.11%)	90 (8.02%)	
	Total	170 (15.15%)	952 (84.85%)	1122 (100%)	
Tobacco consumption	Yes	41 (18.72%)	178 (81.28%)	219 (19.52%)	[$\chi^2 = 2.69$, d.f. = 1, $P > 0.5$, not significant]
	No	129 (14.29%)	774 (85.71%)	903 (80.48%)	
	Total	170 (15.15%)	952 (84.85%)	1122 (100%)	
Physical activity	Sedentary	78 (36.45%)	136 (63.55%)	214 (19.07%)	[$\chi^2 = 93.49$, d.f. = 2, $P < 0.001$, Highly significant]
	Moderate	83 (10.32%)	721 (89.68%)	804 (71.66%)	
	Heavy	9 (8.65%)	95 (91.35%)	104 (9.27%)	
	Total	170 (15.15%)	952 (84.85%)	1122 (100%)	

Table 4: Association between hypertension and risk factors by binary logistic regression analysis.

Variable	B	S.E.	Wald	df	Sig	Exp (B)	95.0% C.I. for EXP (B)	
							Lower	Upper
Age	0.121	0.015	61.552	1	0.00	1.128	1.095	1.163
Male	-0.32	0.388	0.679	1	0.41	0.726	0.339	1.555
Salt intake >5 grams	0.641	0.309	4.307	1	0.038	1.898	1.036	3.477
Alcohol intake	0.629	0.574	1.200	1	0.273	1.876	0.609	5.784
Smoking	1.499	0.557	7.248	1	0.007	4.476	1.503	13.330
Diabetes	23.070	1.089E4	0.000	1	0.998	1.045E10	0.000	0.000
Family h/o HT	2.334	0.402	33.699	1	0.00	10.317	4.692	22.685
Family h/o DM	0.269	0.527	0.261	1	0.609	1.309	.466	3.674
WHR	0.899	0.389	5.329	1	0.021	2.456	1.145	5.268

DISCUSSION

In present study, overall prevalence of hypertension was found to be 15.15 %.

Prevalence of hypertension in urban area was reported different in different studies. Pooja et al reported the overall prevalence of hypertension was 38.5% in an

Urban Area of Uttarakhand.¹⁰ Chandwani H et al¹ reported prevalence of 24% among adults in the urban area of Jamnagar, Gujarat.¹¹ Mandal PK et al reported prevalence of hypertension of 19.8% among adult in an urban area of Kolkata.¹²

The above findings are comparable with these studies. Prevalence of hypertension was found to be increased gradually with increasing age in our study. Similar finding of statistically significant increase in prevalence of hypertension with increasing age was observed in other studies done by Gupta M et al, Mahmood SE et al and Todkar SS et al.¹³⁻¹⁵

Statistically insignificant difference was observed in prevalence of hypertension between males and females in the present study. Similar insignificant association between sex and hypertension was reported by Reddy SS et al, Undhad AM et al and Mahanta TG et al.^{16,17}

Distribution of study subjects according to Body Mass Index shows strong and statistically significant association between obesity and prevalence of hypertension. Similar significant association was reported by Midha T et al ($p < 0.0001$) and Gothankar JS.^{18,19} Sagare SM et al also found significant association between hypertension and BMI.²⁰

18.72 % study subjects having habit of tobacco chewing were having hypertension and 14.29% study subjects not having habit of tobacco chewing were having hypertension. Insignificant association between tobacco chewing and hypertension was found ($P > 0.05$). Similar insignificant association was reported by Mahanta TG et al and Hazarika NC et al.^{17,21} But Mandal CR et al, Mahmood SE et al and Kannan L et al found significant association of prevalence of hypertension with tobacco chewing which is in contrast with our finding.^{14,22,23}

Higher prevalence of hypertension was observed among study subjects with sedentary activity (36.45%) and lowest prevalence of hypertension (8.65%) was found in study subjects with heavy physical activity. The difference was found to be statistically highly significant ($P < 0.001$). This findings are similar with the findings reported by Yadav S et al, Agrawal R et al, Sugasri S et al and Prabakaran J et al.²⁴⁻²⁷

Table 4 shows binary logistic regression analysis in both sex reveals that age, salt intake, smoking, family history of hypertension and waist-hip ratio were significantly associated with hypertension. Similar significant association between age, BMI, extra salt intake, family history of hypertension by binary logistic regression was observed by Mandal PK et al.¹²

Chataut J et al found age, BMI, smoking as independent risk factors for hypertension by Multivariate analysis.²⁸ These studies are comparable.

CONCLUSION

Prevalence of hypertension in urban slum area was found to be 15.15%. Age, BMI, Physical activity, salt intake, smoking, family h/o hypertension and WHR are the risk factors found in study.

Recommendations

As hypertension is not only problem in affluent society but also in slum area. So 'High risk' screening programmes should be started in urban slum areas to detect person at risk of developing hypertension.

Awareness campaign through good quality Information, Education and Communication (I.E.C) activities should be started in urban slum area also to adopt healthy lifestyles like regular physical exercise, restricted salt intake, avoidance of alcohol and smoking.

ACKNOWLEDGMENTS

Authors are thankful to the Department of Community Medicine, Dr V.M.G.M.C. Solapur, Maharashtra, India for their support and guidance during the course of the study.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

- Gupta R, Gupta S. Strategies for initial management of hypertension. *Indian J Med Res*. 2010 Nov;132(5):531-42.
- Reddy KS. Regional case studies-India. *Nestle Nutr Workshop Ser Pediatr Program*. 2009;63:15-24; 41-16, 259-68.
- Suryakantha AH. *Community Medicine with recent advances*, 2nd edition. India: Jaypee Brothers Medical Publishers (P) LTD; 2010. p. 508.
- World Health Organization. A global brief on hypertension Silent killer, global public health crisis [Internet]. Geneva 27: WHO Press; 2013 April. p. 5. WHO reference number: WHO/DCO/WHO/2013.2. [cited 2013 May 20]. Available from: http://www.who.int/cardiovascular_diseases/publications/global_brief_hypertension/en.html
- Kar SS, Thakur JS, Viridi NK, Jain S, Kumar R. Risk factors for cardiovascular diseases: is the social gradient reversing in northern India? *Natl Med J India*. 2010;23(4):206-9.
- Shah B, Mathur P. Surveillance of cardiovascular disease risk factors in India: the need & scope. *Indian J Med Res*. 2010;132(5):634-42.
- Park K. *Park's Textbook of preventive and social medicine*, 22nd ed. Jabalpur, India: M/s Banarasidas Bhanot publishers; 2013 February. p. 444,447,591,635.

8. 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(3):84-6.
9. Anonymous, Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood pressure, The sixth report of Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood pressure (JNC VI), Archives of Internal Medicine. National Institute of Health Publication; 1997 November: pages 11-12. NO. 98-4080.
10. Pooja, Mittal Y. Prevalence of Hypertension and its Determinants in an Urban Area of Uttarakhand. *Asian J Biomedical and Pharmaceutical Sciences*. 2013;3(21):12-6.
11. Chandwani H, Pandor J, Jivarajani P, Jivarajani H. Prevalence and Correlates of Hypertension among Adults in the Urban area of Jamnagar, Gujarat, India. *Electronic Physician*. 2010;2:52-9.
12. Mandal PK, Sinha Roy AK, Chatterjee C, Mallik S, Manna N, Sardar JC, Chakrabarty D, Sau M. Burden of Hypertension and its risk factors in an urban community of India: Are we aware and concerned? *Sudanese J Public Health*. 2010;5(3):130-35.
13. Gupta M, Parashar P, Nath B, Bansal R. An epidemiological study on hypertension and its dietary correlates in a rural population of Meerut. *Indian J Community Health*. 2012;24(2):161-5.
14. Mahmood SE, Srivastava A, Shrotriya VP, Shaifali I, Mishra P. Prevalence and Epidemiological Correlates of Hypertension among Labour Population. *National J of Community Med*. 2011;2(1):43-8.
15. Todkar SS, Gujarathi VV, Tapare VS. Period Prevalence and Sociodemographic Factors of Hypertension in Rural Maharashtra: A Cross-Sectional Study. *Indian J Community Med*. 2009;34(3):183-7.
16. Undhad AM, Bharodiya PJ, Sonani RP. Correlates of Hypertension among the Bank Employees of Surat City of Gujarat. *National J Community Med*. 2011;2(1):123-5.
17. Mahanta TG, Ahmed FU, Mahanta BN, Barua A. Prevalence of Hypertension and its Risk Factors in a Tea Garden Community of Dibrugarh District, Assam. *Indian J of Public Health*. 2008;52(1):45-7.
18. Midha T, Idris MZ, Saran RK, Srivastava AK, Singh SK. A Study on the Association between Hypertensive Status and Anthropometric Correlates in the Adult Population of Lucknow District, India. *Indian J Prev Soc Med*. 2009; 40(1):50-4.
19. Gothankar JS. Prevalence of Obesity and its Associated Comorbidities amongst Adults. *National Journal of Community Medicine*. 2011;2(2):221-4.
20. Sagare SM, Rajderkar SS, Girigosavi BS. Certain Modifiable Risk Factors in Essential Hypertension: A Case-Control Study. *National J of Community Med*. 2011;2(1):9-13.
21. Hazarika NC, Narain K, Biswas D, Kalita HC, Mahanta J. Hypertension in the native rural population of Assam. *The National Med J India*. 2004;17(6):300-4.
22. Mandal CR, Adak DK, Biswas S, Bharati P. Isolated Systolic Hypertension among the Bhotia of Uttaranchal. *Human Biology Review*. 2012;1(1):51-6.
23. Kannan L, Satyamoorthy T.S. An Epidemiological Study of Hypertension in a Rural Household Community. *Sri Ramachandra J Med*. 2009;2(2):9-13.
24. Yadav S, Boddula R, Genitta G, Bhatia V, Bansal B, Kongara S, Julka S, Kumar A, Singh HK, Ramesh V, Bhatia E. Prevalence & risk factors of pre-hypertension and hypertension in an affluent north Indian population. *Indian J Med Res*. 2008;128:712-20.
25. Agrawal R, Chaturvedi M, Singh S, Gupta SC. An epidemiological study of dietary and exercise habits as correlates of hypertension in persons aged 45 years and above in Agra District. *Indian J Community Health*. 2012;24(2):91-6.
26. Sugasri S, Lakshmi UK. Diet, Lifestyle and Hyperlipidemia as Possible Risk Factors among Hypertensive Adults. *Int J Applied Biology and Pharmaceutical Tech*. 2012;3(1):123-9.
27. Prabakaran J, Vijayalakshmi N, VenkataRao E. Prevalence of Hypertension among Urban Adult Population (25-64 years) of Nellore, India. *Int J Res Dev Health*. 2013;1(2):42-9.
28. Chataut J, Adhikari RK, Sinha NP. The Prevalence of and Risk Factors for Hypertension in Adults Living in Central Development Region of Nepal. *Kathmandu Univ Med J*. 2011;33(1):13-8.

Cite this article as: Bendhari ML, Korade RS, Haralkar SJ. Study of prevalence and risk factors of hypertension in adults in an urban slum area of Western Maharashtra, India. *Int J Community Med Public Health* 2016;3:2812-6.