Original Research Article

DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20171244

Prevalence of hypertension in rural population of Central India

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Received: 20 January 2017 Accepted: 04 March 2017

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ABSTRACT

Background: Hypertension is an important public health problem in both rural and urban areas of economically developed as well as developing nations. It is a chronic medical condition and is one of the most common life threatening non-communicable disease. It is an asymptomatic condition, symptoms do not arise unless the complications develop which result in delayed diagnosis and treatment especially among the uneducated and unexplained social groups such as rural population. Present study was an attempt to provide data on hypertension in rural area of central India. The objective of present study was to estimate the prevalence of hypertension in rural population above 18 years of age in Etawah and neighbouring districts of Uttar Pradesh, India.

Methods: The study was planned to determine the prevalence of hypertension in rural community by health camp and door to door approach. BP measurements were made after the subject had rested for at least 5 minutes in a seated position using mercury sphygmomanometer. The first blood pressure measurement was taken after obtaining socio-demographic information from the study subject, while the second was recorded after 5 minutes.

Results: The prevalence of hypertension was found to be 17%, which was observed to be higher among female i.e. 170 (18.3%) individuals than males 153 (15.8%) individuals. The prevalence of hypertension was observed to be higher among the older individuals. It was found to be 5.26 times higher in older (>50 years) than the younger (<30 years) age group. We found prehypertension in 65.74%, Stage I hypertension in 11.33% and stage II hypertension in 5.69% individuals.

Conclusions: Present study showed that high prevalence of hypertension in rural area of Western Uttar Pradesh, Central India.

Keywords: Blood pressure, Hypertension, Prevalence, Rural population

INTRODUCTION

Hypertension is a chronic medical condition and one of the most common life threatening non-communicable diseases. It contributes to 7.6 million premature deaths, 54% of stroke, 47% of ischemic heart disease and 13% of attributable deaths, worldwide.¹ In 2012, cardiovascular disease was identified as the reason for the death of 17.5 million people in a year.² Of whom, approximately 9.4 million were due to hypertension which is more than all the deaths from infectious diseases combined.³ According to the studies by Global Burden of Hypertension in 2005 and then in 2010, there is an alarming rise in prevalence of hypertension (HTN).^{4,5} It is expected to rise further by 2025 involving over 1.5 billion people.⁶

Hypertension is defined as a systolic blood pressure at or above 140mmHg and/or a diastolic blood pressure at or above 90mmHg. Systolic blood pressure is the maximum pressure in the arteries when the heart contracts. Diastolic blood pressure is the minimum pressure in the arteries between the heart's contractions. Hypertension increases the risk for a variety of cardiovascular diseases including stroke, coronary artery disease, heart failure and peripheral vascular disease.

Hypertension is an important public health problem in both economically developed and developing nations as well as in both rural and urban areas.⁷ Previously communicable diseases were the most common pathological processes affecting the people of developing countries especially of rural areas. With the rise of urbanization, there is increase in sedentary lifestyles, tobacco smoking, lack of physical activity, unhealthy diet intake, harmful use of alcohol etc., which are the risk factors of hypertension.⁸

Hypertension is an asymptomatic condition, symptoms do not arise unless the complications develops which result in delayed diagnosis and treatment especially among the uneducated and unexplained social groups such as rural population.⁹

So reliable information about the prevalence of hypertension is essential to the development of national and local level health policies for prevention and control of hypertension at earliest stage. There is scarcity of community level data about prevalence of hypertension and its risk factors in rural population of central India. Thus, this study was conducted with the objective of finding prevalence of hypertension and its risk factors in a rural population of central India.

METHODS

A community-based cross-sectional study was conducted using camps and door to door approach over a period of 2 years. Study population was constituted by people above 18 years of age residing in villages of Etawah and neighbouring districts.

Inclusion criteria

- Rural population residing in villages of Etawah and neighbouring districts.
- Age 18 years and above

Exclusion criteria

- Patients unwilling to participate.
- Age below 18 years.
- Patients with other co morbid conditions.

Written informed consent were taken from the enrolled study participants. It was ensured that study participants had refrained from drinking any caffeinated or alcoholic beverages and from smoking during the half hour preceding the medical evaluation.

BP measurements were made after the subject had rested for at least 5 minutes in a seated position using mercury sphygmomanometer (Diamond and co.). The first blood pressure measurement was taken after obtaining sociodemographic information from the study subject while the second was recorded after 5 minutes.

As recommended in the Report of a WHO Expert Committee on Hypertension Control (1996), before the reading was taken, the subject was seated comfortably, preferably in a chair that supported the back. Any extra clothing was removed or rolled up. Care was taken that arm muscles were relaxed and the forearm was supported with the cubital fossa at heart level. The cuff was applied evenly to the upper arm.

It was rapidly inflated until the manometer readings was 30mmHg above the level at which the radial pulse disappeared and then slowly deflated at approximately 2mmHg/second.

During this time, the Korotkoff sound were monitored using a stethoscope placed over the brachial artery, the first appearance and the fifth disappearance or muffling of Korotkoff sounds were recorded as indicative of the systolic (SBP) and diastolic blood pressure (DBP) respectively. SBP and DBP were measured twice and both were recorded and the mean for each calculated.¹⁰

Statistical analysis of data was performed using Statistical Package for Social Sciences version 21.0. Categorical variables were expressed as absolute number and percentage Continuous variables were expressed as mean and standard deviation (SD). Correlation between different variables were calculated using Pearson's correlation method and values were expressed as correlation coefficient (r). A p-value of less than 0.05 was considered significant.

RESULTS

Total 1897 subjects were included in the study. Demographic profile of study population is given in Table 1. The prevalence of hypertension was found to be 17%. The prevalence of hypertension was observed to be higher among females (18.3%) than males (15.8%). The mean age of female was 39.89 ± 13.86 years while that of male was 41.36 ± 15.17 years.

Grade I hypertension was found in 11.33% of individuals while Grade II hypertension was found in 5.69% of individuals. Out of 1574 normal individuals, the prevalence of pre-hypertension was found in 1247 (79.2%) individuals and normal blood pressure was found in 327 (20.8%) individuals (Table 2).

The prevalence of hypertension was observed to be higher among the older subject. Out of 506 individuals of age less than 30 years, hypertension was noted in only 32 (6.3%).

Out of 903 individuals of age 30-50 years, hypertension was found in 163 (18.1%) and among 488 individuals of

age more than 50 years, 128 (26.2%) were hypertensive. The prevalence of hypertension was 5.26 times higher among the age group >50 years than age group <30 years

and this difference was statistically significant (OR=5.26; p=0.0001) (Table 3).

Vorschle	Cuerra	Non-hypertensive	Hypertensive	
variable	Groups	Ν	n	%
Candar	Male	816	153	15.8
Gender	Female	758	170	18.3
	Less than 30 years	474	32	6.3
Age	30-50 years	740	163	18.1
	More than 50 years	360	128	26.2
	Hindu	1358	289	17.55
Religion	Muslims	210	33	13.58
	Others	6	1	14.29
	Primary	402	72	15.1
Education lavel	Secondary	256	48	15.78
Education level	Graduate and above	98	15	13.27
	Illiterate	818	188	18.69

Table 1: Sociodemographic profile of subjects.

Table 2: Distribution according to grading of hypertension.

Grading (in mm of Hg)	Number of individuals (n)	Percentage (%)
Normal (SBP<12O and DBP<80)	327	17.24
Prehypertension (SBP =120-139 or DBP=80-89)	1247	65.74
Stage 1 hypertension (SBP=140-159 or DBP=90-99)	215	11.33
Stage 2 hypertension (SBP > 160 or DBP > 100)	108	5.69
	1897	100

Table 3: Age wise distribution of hypertension.

Age (years)	Number of individual (n)	Hypertensive individual (n)	% of hypertensive
< 30	506	32	6.3
30-50	903	163	18.1
>50	488	128	26.2

Table 4. Comparison of mean blood pressure in hypertensive and non-hypertensive.

	SBP	DBP
Hypertensive	158.69±17.37	97.99±8.06
Non-hypertensive	125.47±14.67	78.57±19.17
p-value	0.0001	0.0001

The mean systolic blood pressure among hypertensive individual was 158.69 ± 17.37 mmHg while mean diastolic blood pressure was 97.99 ± 8.06 mmHg. Among non-hypertensive mean systolic and diastolic blood pressure was 125.47 ± 14.67 mmHg and 78.57 ± 19.17 mmHg respectively. The mean SBP and DBP among female was 130.89 ± 20.33 mmHg and 82.35 ± 10.70 mmHg respectively, while mean SBP and DBP among male was 131.35 ± 18.97 and 81.43 ± 25.20 mmHg (Table 4).

DISCUSSION

In the current study, the prevalence of hypertension was found to be 17% among the rural participants. In present study, higher prevalence of hypertension was observed among females (18.3%) than males (15.8%) which is similar to the findings by different studies like that of Kaur P et al in South India, Kokiwar et al in Central India and Thankappan et al in Kerala also found it more common in females.¹²⁻¹⁴ Findings of a multinational prospective urban rural epidemiological study conducted across the 17 nations, showed variable extent among urban and rural settings of the prevalence of hypertension across higher income nations (urban- 36.4% vs. rural- 40.2%), upper middle income nations (urban- 45.2% vs. rural- 46.9%), lower middle income nations (urban- 34.9% vs. rural- 38.7%), and low income nations (urban- 44.4% vs. rural- 39.2%), respectively.¹⁵ In most of the studies, a slightly higher prevalence of hypertension has been observed in rural settings as compared to urban settings, probably because of the low literacy rate or poor awareness among the rural population or the limited accessibility to the health centers. Prevalence of hypertension is more or less similar to the prevalence found in different studies conducted in rural settings from 2004-2016 as shown in Table 5.

Table 5: Recent studies (2004-2016) on prevalence ofhypertension in rural Indian population.

Study	Year	State	Sample size	Prevalence
Kusuma et al ¹⁶	2004	Andhra Pradesh	1316	21.0
Hazarika et al ¹⁷	2004	Assam	3180	33.3
Thankappa n et al14	2006	Kerala	2159	36
Krishnan A et al ¹⁸	2008	Haryana	2828	9.3
Todkar SS et al ¹⁹	2009	Maharashtra	1297	7.2
Midha et al ²⁰	2009	Uttar Pradesh	400	14.5
Bhardwaj R et al ²¹	2010	Himachal	1092	35.9
Kinra et al ²²	2010	National	1983	20.0
Kadu et al ²³	2012	Maharashtra	2196	12.8
Bansal et al ²⁴	2012	Uttarakhand	968	32.3
Kaur et al ¹²	2012	Tamil Nadu	10463	21.4
Bhadoria et al ²⁵	2014	Jabalpur	911	17.1
Kishore et al ²⁶	2016	Delhi slum	1005	14

Rural parts of India have lower rates of literacy and have wider disparity in access and quality of health services as compared with urban areas. Recent studies from India have shown that hypertension is significantly more prevalent in the lower education group when compared with higher education group.²⁷

The other factor found to effect prevalence of hypertension in our study is age revealing a directly proportional relationship between each other. Similar results were observed in an epidemiological study performed in rural settings in Central India¹³ and other

studies.^{13,28-33} This is probably because of the adoption of harmful lifestyle habits with increase in age.

CONCLUSION

Rising prevalence in the rural population must raise an alarm for policy makers and health care professionals as this is an area where primordial and primary prevention measures can bring reduction in cardiovascular morbidity and mortality in the future.

Majority of the hypertensive subjects remain undetected and therefore unaware of the risks they face. This points to the need for greater awareness of hypertension in the general population of rural areas and health care givers. Strategies should be identified to diagnose hypertension at an early stage and prevent or postpone its complications.

Funding: No funding sources

Conflict of interest: None declared Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

- 1. Lawes CM, Hoorn SV, Rodgers A. Global burden of blood pressure related disease. Lancet. 2008;371(9623):1513-8.
- 2. Major cause of death. WHO. November 2012. (Retrieved 17 January 2017. Available from: http://www.who.int/mediacentre/factsheets/fs310/en/in dex2.html.)
- 3. World Health Day. A global brief on Hypertension: Silent killer, global public health crisis. Geneva, World Health Organization.2016;15.
- World Health Organization, "Global brief on hypertension," 2013. (Retrieved 17 January 2017. Available from: http:// apps.who.int/ iris/ bitstream/ 10665/79059/1/WHO DCO WHD 2013.)
- Lim SS, Vos T, Flaxman AD. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012;380(9859):2224-60.
- 6. World Heart Federation. Retrieved 17 January 2017. Available from http:// www.world- heartfederation.org/ cardiovascular- health/ cardiovasculardisease- riskfactors/ hypertension.
- 7. Kearney PM, Whelton, RK, Whelton PK, He J. Worldwide prevalence of hypertension: a systematic review. J Hypertens. 2004;22(1):11-9.
- 8. Alwan A. Global status report on noncommunicable diseases. 2010. World Health Organization; 2011:9-31.
- 9. Victor RG, Leonard D, Hess P, Bhat DG, Jones J, Vaeth PA, et al. Factors associated with hypertension awareness, treatment, and control in Dallas County, Texas. Arch Intern Med. 2008;168(12):1285-93
- 10. Hypertension control. Report of a WHO Expert Committee. World Health Organ Tech Rep Ser. 1996;862:1-83.

- Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Jones DW, et al. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. JAMA.2003;290(2):197.
- Kaur P, Rao SR, Radhakrishnan E, Rajasekar D, Gupte MD. Prevalence, awareness, treatment, control and risk factors for hypertension in a rural population in South India. Int J Public Health. 2012;57:87-94.
- Kokiwar PR, Gupta SS, Durge PM. Prevalence of hypertension in a rural community of central India. J Assoc Physic India. 2012;60:26-9.
- Thankappan KR, Sivasankaran S, Sarma PS, Mini G, Khader SA, Padmanabhan P, et al. Prevalencecorrelates-awareness-treatment and control of hypertension in Kumarakom, Kerala: baseline results of a community-based intervention program. Indian Heart J. 2006;58(1):28-33.
- Chow CK, Teo KK, Rangarajan S, Islam S, Gupta R, Avezum A, et al. Prevalence, awareness, treatment and control of hypertension in rural and urban communities in high-, middle-, and low-income countries. JAMA. 2013 Sep 4;310(9):959-68.
- Kusuma YS, Babu BV, Naidu JM. Prevalence of hypertension in some cross-cultural populations of Visakhapatnam district, South India. Ethn Dis. 2004;14:250-9.
- Hazarika NC, Narain K, Biswas D, Kalita HC, Mahanta J. Hypertension in the native rural population of Assam. Natl Med J India. 2004;17:300-4.
- Krishnan A, Shah B, Lal V, Shukla DK, Paul E, Kapoor SK. Prevalence of risk factors for noncommunicable disease in a rural area of Faridabad district of Haryana. Indian J Pub Health. 2008;52(3):117-24.
- Todkar SS, Gujarathi VV, Tapare VS. Period prevalence and sociodemographic factors of hypertension in rural Maharashtra: a cross-sectional study. Indian J Comm Med. 2009;34:183-7.
- Midha T, Idris MZ, Saran RK, Srivastav AK, Singh SK. Prevalence and determinants of hypertension in the urban and rural population of a north Indian district. East Afr J Pub Health. 2009;6:268-73.
- Bhardwaj R, Kandori A, Marwah R, Vaidya P, Singh B, Dhiman P, Sharma A. Prevalence, awareness and control of hypertension in rural communities of Himachal Pradesh. J Assoc Physic India. 2010;58:423-24, 429.
- Kinra S, Bowen LJ, Lyngdoh T, Prabhakaran D, Reddy KS, Ramakrishnan L, et al. Sociodemographic patterning of non-communicable disease risk factors in rural India: a cross sectional study. BMJ. 2010;341:4974.
- 23. Kadu AV, Mane SS, Lakde RN, Vedpathak VL, Gaikwad AE, Choudhari SG. Prevalence of

hypertension in the rural community of Central Maharashtra, India. Int J Med Pub Health. 2012;2;39-45.

- 24. Bansal SK, Saxena V, Kandpal SD, Gray WK, Walker RW, Goel D. The prevalence of hypertension and hypertension risk factors in a rural Indian community: A prospective door-to-door study. J Cardiovasc Dis Res. 2012;3:117-23.
- 25. Bhadoria AS, Kasar PK, Toppo NA, Bhadoria P, Pradhan S. Prevalence of hypertension and associated cardiovascular risk factor in central India. J Fam Comm Med.2014;21:29-38.
- 26. Kishore J, Gupta N, Kohli C, Kumar N. Prevalence of hypertension and determination of its risk factors in rural Delhi. Int J Hypertension. 2016;2016:1-6.
- Reddy KS, Prabhakaran D, Jeemon P, Thankappan KR, Joshi P, Chaturvedi V, et al. Educational status and cardiovascular risk profile in Indians. Proc Natl Acad Sci USA. 2007;104:16263-8.
- Borah PK, Shankarishan P, Hazarika NC, Mahanta J. Hypertension subtypes and angiotensin converting enzyme (ACE) gene polymorphism in Indian population. J Assoc Physic India 2012;60:11-7
- 29. Dutta A, Ray MR. Prevalence of hypertension and prehypertension in rural women: a report from the villages of West Bengal, a state in the eastern part of India. Aust J Rural Health. 2012;20:219-25.
- 30. Sathish T, Kcannan S, Sarma PS, Razum O, Thankappan KR. Incidence of hypertension and its risk factors in rural Kerala, India: a community-based cohort study. Public Health. 2012;126:25-32
- 31. Manimunda SP, Sugunan AP, Benegal V, Balakrishna N, Rao MV, Pesala KS. Association of hypertension with risk factors and hypertension related behaviour among the aboriginal Nicobarese tribe living in Car Nicobar Island, India. Indian J Med Res. 2011;133:287-93.
- Mohan V, Deepa M, Farooq S, Datta M, Deepa R. Prevalence, awareness and control of hypertension in Chennai: the Chennai Urban Rural Epidemiology Study (CURES-52). J Assoc Physic India 2007;55:326-32
- Hazarika NC, Biswas D, Narain K, Kalita HC, Mahanta J. Hypertension and its risk factors in tea garden workers of Assam. Natl Med J India. 2002;15:63-8.

Cite this article as: Singh PS, Singh PK, Zafar KS, Sharma H, Yadav SK, Gautam RK, et al. Prevalence of hypertension in rural population of Central India. Int J Res Med Sci 2017;5:1451-5.