ASSESSMENT OF RISK FACTORS OF HYPERTENSION: A CROSS-SECTIONAL STUDY

Makwana Naresh, Shah Viral, Khambhati Sudham, Choudhary Mahesh, Goswami Kalpesh, Yadav Sudha

1. Associate Professor, Department of Community Medicine, Shri M P Shah Medical College, Jamnagar, Gujarat
2. Assistant Professor, Department of Community Medicine, Shri M P Shah Medical College, Jamnagar, Gujarat
3. Medical Officer, Department of Community Medicine, Shri M P Shah Medical College, Jamnagar, Gujarat
4. Resident, Department of Community Medicine, Shri M P Shah Medical College, Jamnagar, Gujarat
5. Resident, Department of Community Medicine, Shri M P Shah Medical College, Jamnagar, Gujarat
6. Professor & Head, Department of Community Medicine, Shri M P Shah Medical College, Jamnagar, Gujarat

CORRESPONDING AUTHOR

Dr. Mahesh Choudhary, Resident,
Department of Community Medicine,
Shri M P Shah Medical College, Jamnagar,
E-mail: drmahesh2711@gmail.com,
Ph: 0091 9016098640.

ABSTRACT: BACKGROUND: Context: The epidemiology of hypertension, in terms of its importance as a risk factor for cardiovascular diseases, continues to be major area of research.

Aims: The aim of this study is to assess the prevalence of various risk factors on hypertension among adult population (20-60 years) in the rural areas. **MATERIAL AND METHODOLOGY:**

The present study was a community based cross-sectional study. The study was carried out in three villages of the field-practice area of Rural Health Training Centre of Community Medicine Department, M. P. Shah Medical College, Jamnagar during the months of September to November 2011. A total of 250 adult study subjects were included by simple sampling random technique in the present study. Pre-designed, pre-tested schedule was used to collect data regarding demographic characteristics and different risk factors. Percentages, chi-square test and P-value were calculated using Epi Info software. **RESULTS:** Out of 250 study subjects, 25.60% were male while 74.40% were females. Majority of the subjects belonged to 30 to 39 years of age. Overall magnitude of hypertension was found to be 15.6%. Addiction to any form of tobacco was found among 28.40% of the study participants and out of those, almost 50% were hypertensives. 29.82% of the over-weight individuals were also found hypertensives.

CONCLUSIONS: The prevalence of hypertension was found to be 15.6% in the rural areas in the present study, which needs attention because in current trend of migration from rural to urban area it may cause harm as a hidden disease and may give impact on other non-communicable diseases.

KEY-WORDS: Hypertension, risk factors, rural area

INTRODUCTION: Hypertension is reported to be the fourth contributor to premature death in developed countries and the seventh in developing countries.⁽¹⁾ Reports indicate that nearly 1 billion adults (more than a quarter of the world's population) had hypertension in 2000, and this is predicted to increase to 1.56 billion by 2025.⁽²⁾ Earlier reports also suggest that the prevalence of hypertension is rapidly increasing in developing countries^(3, 4) and is one of the leading causes of death and disability in developing countries. The epidemiology of hypertension, in terms of its importance as a risk factor for cardiovascular diseases, continues to be major area of research. India is a vast country with a heterogeneous and young population.

In the past, the control and prevention of communicable diseases were emphasized, but, recently, attention has shifted to the control and prevention of non-communicable diseases, including stroke, hypertension, and coronary artery disease at the national level in view of the rising incidence of these diseases.⁽⁵⁾ Blood pressure (BP) is directly associated with risks of several types of cardiovascular disease, and the associations of BP with disease risk are continuous, indicating that large proportions of most populations have non-optimal BP values. Data on Hypertension in the rural areas are again limited, so that present study was conducted to assess the prevalence of various risk factors on hypertension among adult population (20-60 years) in the rural areas.

SUBJECTS AND METHODS: The present study was a community based cross-sectional study. The study was carried out in the field practice area of Rural Health Training Centre (RHTC) of Community Medicine Department, M. P. Shah Medical College, Jamnagar i.e. Alia village, during the months of September to November 2011. Total 250 study subjects in the age group of 20 – 60 years were included by simple random sampling technique in the present study. Oral consent was obtained from the participant prior to enroll in the study. Pre-designed, pre-tested proforma was used to collect data regarding demographic characteristics and different risk factors i.e. smoking, alcoholism etc. through house to house visits.

Blood pressure was recorded in the sitting position in the right arm to the nearest 2mmHg using the mercury sphygmomanometer. Two readings were taken 5 minutes apart and mean of two was taken as the blood pressure.⁽⁶⁾ Hypertension was diagnosed based on drug treatment for hypertension or if the blood pressure was greater than 140/90 mmHg – Joint National Committee 7 (JNC VII) Criteria.⁽⁷⁾ Anthropometric measurements including weight, height, waist and hip measurements were obtained using standardized techniques as given below. Height was measured with a tape to the nearest cm. Subjects were requested to stand upright without shoes with their back against the wall, heels together and eyes directed forward. Weight was measured with a traditional spring balance that was kept on a firm horizontal surface. Subjects were asked to wear light clothing and weight was recorded to the nearest 0.5 kg. Body mass index (BMI) was calculated using the formula: weight (Kg)/height (m)².⁽⁶⁾ BMI of equal to or more than 25 was regarded as Overweight and lesser than 25 was considered as non-overweight. Percentages, chi-square test and P-value were calculated using Epi Info software.

RESULTS: Figure – 1 indicates that risk factors for hypertension were found in orders of overweight (22.80%), tobacco chewing (14.80%) and smoking (8.40%) in the study subjects.

Table – 1 shows that majority (72%) of the study subjects were in the age group of 20 – 39 years and 6.8% were in the age group of 50 – 60 years. Sex-wise distribution of study subjects shows over representation of females, which may be due to collection of data in day time when majority of male members of the family were not present in their houses. More than fifty percent were found to be illiterate. Out of the total, 66.80% of the participants were housewives followed by farmers (11.20%). Married study subjects were 87.2%, whereas 10.8% and 2% were unmarried and widow respectively.

Table – 2 shows association of non-modifiable risk factors with hypertension. Out of the total 250 study subject, 39 (15.6%) were found to be hypertensive. Significant statistical association was observed between age and hypertension. As age increases, the chance of becoming hypertensive rises. Sex-wise distribution shows that though hypertension was found

more among females, statistical test fails to prove this association ($p>0.05$). Positive family history was strongly related with hypertension ($p=0.0002$).

Table – 3 shows various modifiable risk factors associated with hypertension. 28.40% of the study subjects were addicted to tobacco in any form, whereas 71.60% subjects were non-addicted. Almost half (49.30%) of addicted subjects were hypertensive and 2.23% of non-addicted individuals were hypertensive, this difference is statistically significant ($p<0.05$). No significant association was found among various forms of addiction (smoking, tobacco chewing, snuffing viz.) and hypertension ($p>0.05$), depicts that any form of addiction is associated with hypertension. Hypertension was found almost double among married persons (16.51%) than unmarried and widow (9.38%), but the association was not statistically significant. 17.29% Illiterates was found hypertensives. Hypertension was almost equally distributed among different occupations in the range of 15 to 22%. While looking at body mass index, 17 (29.82%) overweight individuals were found hypertensive and the association between over-weight and hypertension was statistically significant ($p=0.0016$). Associated co-morbid conditions such as diabetes mellitus and coronary heart disease were also found among hypertensives.

DISCUSSION: In the present study the overall prevalence of hypertension was found to be 15.6%. Similar findings have also been reported in other studies. Comparable prevalence (15%) was found in the study conducted at squatter settlement of Karachi (Pakistan).⁽⁸⁾ Similar prevalence of hypertension (16.9%) has also been reported in the study conducted among labour population of Gujarat.⁽⁹⁾ A higher prevalence (20.6%) was reported in the study conducted among adult population at rural Wardha.⁽¹⁰⁾ Prevalence of 23% was reported by Cielito C. in rural areas of Philippines.⁽¹¹⁾ The WHO estimates the prevalence of HTN at 20% among adult populations in several countries.⁽¹²⁾ However a study among tribal “Oraon” population of Orissa revealed lower prevalence of hypertension (4.6/1000 population).⁽¹³⁾ Similar finding (prevalence 5.8%) was also noted by Chadha SL et al⁽¹⁴⁾ among Gujaratis residing in Delhi and prevalence of 7.8% was reported in hospital patients, Mumbai.⁽¹⁵⁾ Differential rates are due to different cut-off points in determining the level of hypertension and also to the differing age groups constituting the study population.

The prevalence of hypertension rises with the advancing age i.e. it was maximum (52.94%) in the age group of 50 – 60 years (table – 2), while minimum i.e. 3.45% in the age group of 20 – 29 years. Strong statistical association was found between the age group and hypertension ($p=0.0001$). Age increase prevalence of hypertension was also reported by Todkar SS⁽¹⁶⁾, Reddy SS.⁽¹⁷⁾ Similar observations were found in other studies.^(18,19,20) This increase in age incidence of hypertension can be explained by changes in the lifestyle, migration, stress, atherosclerotic changes in the blood vessels that happen with the age and certain genetic and environmental factors.

Addiction to any form of tobacco was found to be 28.40% in the study subjects. Prevalence of hypertension was higher among addicted in comparison with non-addicted (49.30% vs 2.23%). This difference is statistically significant. There is a plethora of studies suggesting the tobacco consumption as an important and independent risk factor for hypertension and cardiovascular diseases.⁽⁹⁾ A positive association was observed between body mass index and development of hypertension. Persons having BMI more than or equal to 25 reported with higher risk of hypertension. The similar findings were reported by number of epidemiological studies e.g. Todkar SS et al.⁽¹⁶⁾ 2009, Das et al.⁽²¹⁾ 2005, Reddy SS and Prabhu GR⁽¹⁷⁾ 2005. Associated co-morbid conditions such as Diabetes and Coronary heart disease

(CHD) were observed among hypertensives. This findings were supported by Reddy SS and Prabhu GR⁽¹⁷⁾ 2005. Education, Occupation and Marital status has not been significantly associated with hypertensives as observed in the current study ($p>0.05$).

Thus to summarize, this study reveals that the magnitude of hypertension in the rural population is comparable to the magnitude found in the other Indian studies.

CONCLUSION: The overall prevalence of hypertension in the present study was is 15.6%. Significant association has been noted between hypertension, age and body mass index. Other modifiable risk factors were associated with hypertension but the statistical association was not found.

Limitations of the study:

1. It is likely that a systematic and larger study may give better understanding of the prevalence and the underlying risk factors among these populations.
2. Over representation of female in the current study dilutes picture of various risk factors on hypertension.

Figure 1 Distribution of participants according to risk factors of hypertension

Table: 1 **Demographic profile of study participants**

	Number (N=250)	Percentage
AGE GROUP		
20-29	87	34.8%
30-39	93	37.2%
40-49	53	21.2%
50-60	17	6.8%
SEX		
Male	64	25.6%
Female	186	74.4%
EDUCATION		
Illiterate	133	53.2%
Primary	78	31.2%
Secondary	32	12.8%
Higher Secondary	4	1.6%
Graduate	3	1.2%
OCCUPATION		
Service	9	3.6%
Business	11	4.4%
Farmers	28	11.2%
Labourers	23	9.2%
Housewife	167	66.8%
Unemployed	12	4.8%
MARITAL STATUS		
Married	218	87.2%
Unmarried	27	10.8%
Widow	5	2%

ORIGINAL ARTICLE

Table: 2 Non-modifiable risk factors associated with hypertension

Risk Factors	Non-hypertensive (n=211)		Hypertensive (n=39)		TOTAL (N=250)		chisquare value	p value
	No.	%	No.	%	No.	%		
Age								
20-29	84	96.55	3	3.45	87	34.80	34.769	0.0001
30-39	81	87.10	12	12.90	93	37.20		
40-49	38	71.70	15	28.30	53	21.20		
50-60	8	47.06	9	52.94	17	6.80		
Sex								
Male	50	78.13	14	21.88	64	25.60	1.972	0.1602
Female	161	86.56	25	13.44	186	74.40		
Positive family history	5	41.67	7	58.33	12	4.80	14.240*	0.0002

*=chisquare value is calculated between Positive Family History and No positive Family History among hypertensives and Non-hypertensives

Table: 3 Modifiable risk factors affecting hypertension

ORIGINAL ARTICLE

Risk Factors	Non-hypertensive (n=211)		Hypertensive (n=39)		TOTAL (N=250)		chisquare value	p value
	No.	%	No.	%	No.	%		
Addiction								
Smoking	10	47.62	11	52.38	21	8.40	0.354	0.8379
Tobacco chewing	20	54.05	17	45.95	37	14.80		
Snuffing	6	46.15	7	53.85	13	5.20		
Non Addicted	175	97.77	4	2.23	179	71.60	81.975*	0.0001
Marital status								
Married	182	83.49	36	16.51	218	87.20	0.606	0.4363
Unmarried/widow	29	90.63	3	9.38	32	12.80		
Education								
Illiterate	110	82.71	23	17.29	133	53.20	0.375	0.5405
Literate	101	86.32	16	13.68	117	46.80		
Occupation								
Service	7	77.78	2	22.22	9	3.60	1.019	0.9069
Business	9	81.82	2	18.18	11	4.40		
Farmer	23	82.14	5	17.86	28	11.20		
Labourer	18	78.26	5	21.74	23	9.20		
Housewife	142	85.03	25	14.97	167	66.80		
Body Mass Index								
Over-weight	40	70.18	17	29.82	57	22.80	9.99	0.0016
Non-obese	171	88.60	22	11.40	193	77.20		
Associated co-morbid condition								
DM	0	0.00	4	100.00	4	1.60		
CHD	0	0.00	7	100.00	7	2.80		

*=chi-square value is calculated between addicted and non-addicted.

REFERENCES:

1. Deepa R, Shanthirani CS, Pradeepa R, Mohan V. Is the 'rule of halves' in hypertension still valid?--Evidence from the Chennai Urban Population Study. J Assoc Physicians India 2003;51:153-7.
2. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: analysis of worldwide data. Lancet 2005; 365: 217-23.
3. Reddy KS. Hypertension control in developing countries. Genetic issues. J Hum Hypertens 1996; 10:S33-8.
4. Nissinen A, Bothig S, Granroth H, Lopez AD. Hypertension in developing countries. World Health Stat Q 1988;41:141-54.

5. Shyamal Kumar Das, Kalyan Sanyal, and Arindam Basu. Study of urban community survey in India: growing trend of high prevalence of hypertension in a developing country. *Int J Med Sci.* 2005;2(2):70-78.
6. 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 Physicians India* 2007;55:326-32.
7. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL, et al. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC-7). *JAMA* 2003;289:2560-71.
8. Hemna Siddiqui, Qudsia Anjum, Amir Omair, Jawed Usman, Raza Rizvi, Tabinda Ashfaq. Risk factors assessment for hypertension in a squatter settlement of Karachi. *J Pak Med Assoc* 2005;55:390-2
9. Tiwari RR. Hypertension and epidemiological factors among tribal labour population in Gujarat. *Indian Journal of Public Health* 2008; 52(3):144-146
10. Deshmukh PR, Gupta SS, Dongre AR, Bharambe MS, Maliye C, Kaur S, Garg BS. Relationship of anthropometric indicators with blood pressure levels in rural Wardha. *Indian J Med Res* 2006; 123: 657-664.
11. Cielito C. Reyes-Gibby and Lu Ann Aday. Prevalence of and Risk Factors for Hypertension in a Rural Area of the Philippines. *J Community Health* 2000;25:389-99.
12. Hypertension Control Report of a WHO Expert Committee. Geneva: World Health Organization, 1996.
13. Dash SC, Sundaram KR, Swain PK. Blood pressure profile, urinary sodium and body weight in the 'Oraon' rural and urban tribal community. *J Assoc Physicians India.* 1994; 42: 878-80.
14. Chadha SL, Gopinath N, Ramachandran K. Epidemiological study of coronary heart disease in Gujaratis in Delhi (India). *Ind J Med Res* 1992, 96:115-121.
15. Joshi SV, Patel JC, Dhar HL. Prevalence of hypertension in Mumbai. *Indian J Med Sci* 2000;54:380-3
16. 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;34:183-7
17. Reddy SS and 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.
18. Chadha SL, Radhkrishnan S, Ramachandran V, Kaul U and Gopinath N. Prevalence, awareness and treatment status of hypertension in urban populations of Delhi. *Ind J Med Res* 1990; 92:233-40.
19. Bhasin SK, Chaturvedi S, Gupta P and Aggarwal P. Status of physical exercise and its association with obesity and hypertension in two urban assembly constituencies of East Delhi. *Journal of Indian Medical Association* 2001; 99:631-33.
20. Kalavathy MC, Thankappan KR, Sharma PS and Vasan RS. Prevalence, awareness, treatment and control of hypertension in an elderly community based sample in Kerala, India. *National Medical Journal of India* 2000; 13:9-15.
21. Das K, Sanyal K, Basu A. A study of urban community survey in India; Growing trend of high prevalence of hypertension in individuals. *International Jr of Med Sciences* 2005;2:70-8.