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A Community Based Study of Hypertension in Rural Areas of South India

Mohammed Abdul Samee[1]*, Nuni Priyanka[1], Grace M[1], Binu K. M[1],
1. Department of Pharmacy Practice, N.E.T Pharmacy College, Raichur, Karnataka-584103

ABSTRACT

Cardiovascular and other non-communicable diseases are currently responsible for two thirds of global mortality. Hypertension is a consistent and independent risk factor for cardiovascular and kidney diseases and stroke. The prevalence of hypertension has increased in urban communities as well as in rural people. There is a strong correlation between changing lifestyle factors and increase in hypertension. Accurate and decisive data about hypertension prevalence and its risk factors is essential for scheming strategies for its effective regulation and prevention. A Community based cross-sectional study was carried out in rural community to monitor prevalence, risk factors, awareness, treatment and control of hypertension in rural population. A total of 627 subjects (males n=369 and females n=258) participated in the study (age > 18 years). The participant's blood pressure was measured and they were asked to answer a pretested questionnaire. As per the JNC VII report, hypertension was defined. Analysis of data was done using chi square test. The prevalence of hypertension was found to be 49.12% (males: 57.18% and female: 37.50%). About 1/4th of the hypertensive population did not knew about their health status. 60-79 year age group had the highest prevalence of hypertension (49.02%). Bivariate analysis of data was indicative of significant relationship between hypertension with that of age, gender, literacy, body mass index (BMI), physical inactivity, and smoking and alcohol consumption. Hence the prevalence of hypertension was found to be highly prevalent in rural community. We also realized the importance of clinical pharmacist and other health care professional's involvement in monitoring of health problems reporting possible drug related problems, measuring therapeutic compliance and counselling on lifestyle modification in rural populations.

Keywords: Cross-sectional study, Hypertension, Rural Community, Prevalence, Risk factors.

*Corresponding Author Email: mohammedsamee19@gmail.com
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INTRODUCTION

Hypertension continues to be one of the most significant risk factors for the development of stroke, congestive heart failure, coronary heart disease (CHD), and renal disease in the India[1]. The Seventh Joint National Committee on the Detection, Evaluation, and Treatment of High Blood Pressure (JNC-VII) sets forth recommendations to help healthcare providers improve the assessment and management of patients with hypertension[2].Though the trends are improving, still many patients are not aware of their condition, are not receiving therapy when needed, and when receiving therapy are not achieving recommended blood pressure (BP) goals. This represents a significant gap between recommended treatment goals and patients actually attaining those goals and is a clear opportunity for all healthcare providers to improve the outcomes of patients with hypertension[3].

In India, raised blood pressure increased from 5% in the 1960s to nearly 12% in 1990s, to more than 30% in 2008.The India specific data are similar to the overall trends in low-income countries[4].The prevalence of hypertension in the late nineties and early twentieth century varied among different studies in India, ranging from 2-15% in Urban India and 2-8% in Rural India. Review of epidemiological studies suggests that the prevalence of hypertension has increased in both urban and rural subjects and presently is 25% in urban adults and 10-15% among rural adults[3]. Many factors like alcohol consumption and smoking also increase the risk. High fatty diet and body mass index have a positive correlation and physical activity is negatively related with hypertension[4]. As with smoking, diabetes, and dyslipidaemia, hypertension is an important risk factor for cardiovascular diseases, which are responsible for roughly 30% of deaths worldwide.

Accurate and decisive data about hypertension prevalence and its risk factors is essential for scheming strategies for its effective regulation and prevention. Epidemiological studies to assess the prevalence of hypertension are essential to plan preventive strategies and promote the health of these populations[5]. To establish the prevalence of hypertension in a population amongst different ethnic groups, it is necessary to assess the effectiveness of health curriculums aimed at hypertension reduction, because small differences in its optimum management have large implications for health resources

MATERIAL AND METHODS

A Community Based Cross-sectional study was carried out in 627 people using Simple random sampling and probability proportionate to size technique for a period of 6 months from December 2014 to May 2014 in Community setting of Singonodi village, Raichur. Data were collected using

a structured questionnaire. The Main Outcome Measures were Socio-demographic characteristics, Anthropometry, Blood pressure pattern, Self-reported behavioural and lifestyle risk factors.

Obtaining clearance certificate from institutional Ethical Committee

It is a custom that any research involving human volunteers, researchers are requested to mention about approval of institution ethics committee. So for obtaining the clearance certificate, an application along with study protocol, which includes the proposed title, study site, duration, inclusion and exclusion criteria, objective and a brief methodology about the work to be carried out, was submitted to the Chairman of the Institutional Ethics Committee of Navodaya Medical College Hospital & Research Centre. The study was approved by Committee by issuing ethical clearance certificate.

Participant consent form

As it is mandatory to take consent from the participant for their involvement in the study as per ICH guidelines, a participant consent form was prepared and translated to local languages like Telugu, Hindi, kannada and Urdu, the most common languages spoken in the study area, a detail explanation of the study was also provided to the participants before their consent was obtained.

SAMPLE SIZE CALCULATION[6]

Considering the prevalence rate of hypertension approximately 20%, the sample size was calculated using the formula, sample size =4PQ/L2. Where, P is Prevalence = 20%, Q = 100 – P = 80% and L is absolute error= 4%. Sample size came out to be 400.

STATISTICAL ANALYSIS[7]

Microsoft excel and SPSS 18.0 were used for performing the data entry and statistical analysis of that data. The results were found out using chi square test. P Values <0.05 was considered significant for the outcome variables and identified risk factors of hypertension. Systolic and diastolic pressure were used as dependent variable and the various risk factors identified as independent variables for uni-variate regression analysis. Bivariate analysis which shows significant relationship of hypertension with gender, age, literacy, physical activity, body mass Index, smoking and alcohol consumption were done. Findings were described in terms of proportions and their 95% confidence intervals.

Design of Questionnaire

The formulated questionnaire was a hybrid of the WHO STEPS, SF-36, and KHDC Questionnaire. To address the peculiarities in the locale, additional questions were included using Uday Pareek scale. The questionnaire prepared includes social demographics of the patients, history of

vaccination and drug use, general high blood pressure information, diagnosis of hypertension, knowledge about hypertension, attitude towards hypertension and its self-care including complications of hypertension, medication used by individuals for hypertension and adherence to it. Each sector of the questionnaire included detail questions to evaluate complete information to calculate prevalence in the rural areas. This included both open and close ended questions .The questionnaire was translated to local languages like telugu, hindi and kannada, the prevailing language spoken in the study area.

RESULT AND DISCUSSION

Table 1: Demographics of Study Population

Variable	Number (%)	95% C. I
GENDER		
Male	369 (58.85)	55% to 62.7%
Female	258 (41.14)	37.29% to 44.99%
	S.M- 313.5 S.D- 78.48	
AGE GROUP		
18-39 Years	96 (15.3)	12.48% to 18.12%
40-59 Years	222 (35.40)	31.66% to 39.14%
60-79 Years	277 (44.19)	40.30% to 48.08%
≥80 Years	32 (5.11)	3.39% to 6.83%
	S.M-156.75 S.D- 112.50	
LITERACY		
Primary	104 (16.58)	13.67% to 19.49%
Secondary	79 (12.59)	9.99% to 15.9%
Intermediate	77 (12.28)	12.48% to 18.12%
Graduate	89 (14.19)	11.46% to 16.92%
Illiterate	278 (44.33)	40.41% to 48.19%
	S.M- 125.4 S.D- 85.97	
PHYSICAL ACTIVITY		
Heavy	235 (37.48)	33.69% to 41.27%
Moderate	257 (40.98)	37.13% to 44.83%
Sedentary	135 (21.54)	18.32% to 24.76%
	S.M- 209 S.D- 65.02	
DIET		
Veg	215 (34.30)	30.58% to 38.02%
Non-Veg	412 (65.70)	61.98% to 69.42%
	S.M- 313.5 S.D- 139.30	

HABITS		
Smoking	198 (31.80)	28.15% to 35.45%
Alcohol	163 (26)	22.57% to 29.43%
Added salt	266 (42.20)	38.33% to 46.07%
	S.M- 209 S.D- 52.37	
BMI		
Normal	226 (36.04)	32.28% to 39.8%
Underweight	103(16.42)	13.52% to 19.32%
Overweight	298 (47.52)	43.61% to 51.43%
	S.M- 209 S.D- 98.60	

Table 2: Demographics of Hypertensive Population (n=308)

Variable	HTN Number (%)	C. I (%)
GENDER		
Male	211(68.50)	63.31% to 73.64%
Female	97 (31.50)	26.31% to 36.69%
	S.M-154 S.D-80.610	
AGE GROUP		
18-39 Years	12 (3.89)	1.73% to 6.05%
40-59 Years	116 (37.66)	32.25% to 43.07%
60-79 Years	151 (49.02)	43.44% to 54.6%
≥80 Years	29 (9.41)	6.15% to 12.67%
	S.M-77 S.D-67.146	
LITERACY		
Primary	74 (24.02)	19.25% to 28.79%
Secondary	32 (10.38)	6.97% to 13.79%
Intermediate	13 (4.22)	1.97% to 6.47%
Graduate	12 (3.89)	1.73% to 6.05%
Illiterate	177 (57.46)	51.94% to 62.98%
	S.M-61.6 S.D-69.226	
PHYSICAL ACTIVITY		
Heavy	104 (34)	28.71% to 39.29%
Moderate	119 (39)	33.55% to 44.45%
Sedentary	85 (27)	22.04% to 31.96%
	S.M- 102.66 S.D- 17.039	
DIET		
Veg	86 (27.92)	22.91% to 32.93%
Non-Veg	222 (72.07)	67.06% to 77.08%
	S.M-54 S.D-45.254	

HABITS		
Smoking	108 (35)	29.67% to 40.33%
Alcohol	84 (27)	22.04% to 31.96%
Added salt	116 (38)	32.56% to 43.42%
	S.M-102.666 S.D-16.6533	
BMI		
Normal	176 (57)	51.47% to 62.53%
Underweight	43 (14)	10.12% to 17.88%
Overweight	89 (29)	23.93% to 34.07%
	S.M-102.666 S.D-67.545	

Table 3: Prevalence of hypertension (n=627)

Gender	Total number	Hypertensive	Prevalence (%)
Male	369	211	57.18
Female	258	97	37.50
Total	627	308	49.12

Table 4: Distribution of hypertension as per JNC VII criteria (n=627)

Classification	Number	%
Normal	136	21.69
Pre-hypertension	183	29.18
Stage 1 hypertension	221	35.24
Stage 2 hypertension	87	13.89
Total	627	100

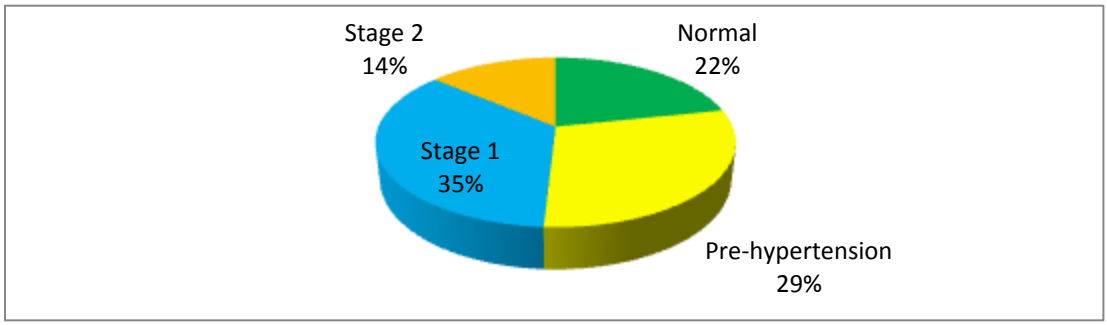

Figure 1: Distribution of hypertension as per JNC VII criteria (n=627)

Table 5: Bivariate Relationships between Risk Factors and Hypertension

Variable	Number (%)	HTN Number (%)	Chi-square (τ^2)	P-value
GENDER				
Male	369 (58.85)	211(68.50)	8.17	0.004
Female	258 (41.14)	97 (31.50)		
	S.M- 313.5 S.D- 78.48	S.M-154 S.D-80.610 Df(1)		

AGE GROUP				
18-39 Years	96 (15.3)	12 (3.89)	92.5	0.000
40-59 Years	222 (35.40)	116 (37.66)		
60-79 Years	277 (44.19)	151 (49.02)		
≥80 Years	32 (5.11)	29 (9.41)		
	S.M-156.75 S.D- 112.50	S.M-77 S.D-67.146 Df(1)		
LITERACY				
Primary	104 (16.58)	74 (24.02)	48.4	0.000
Secondary	79 (12.59)	32 (10.38)		
Intermediate	77 (12.28)	13 (4.22)		
Graduate	89 (14.19)	12 (3.89)		
Illiterate	278 (44.33)	177 (57.46)		
	S.M- 125.4 S.D- 85.97	S.M-61.6 S.D-69.226 Df(1)		
PHYSICAL ACTIVITY				
Heavy	235 (37.48)	104 (34)	4.33	0.015
Moderate	257 (40.98)	119 (39)		
Sedentary	135 (21.54)	85 (27)		
	S.M- 209 S.D- 65.02	S.M- 102.66 S.D- 17.039 Df(1)		
DIET				
Veg	215 (34.30)	86 (27.92)	4.59	0.032
Non-Veg	412 (65.70)	222 (72.07)		
	S.M- 313.5 S.D- 139.30	S.M-54 S.D-45.254 Df(1)		
HABITS				
Smoking	198 (31.80)	108 (35)	12.6	0.002
Alcohol	163 (26)	84 (27)		
Added salt	266 (42.20)	116 (38)		
	S.M- 209 S.D- 52.37	S.M-102.666 S.D-16.6533 Df(1)		
BMI				
Normal	226 (36.04)	176 (57)	39.5	0.000
Underweight	103 (16.42)	43 (14)		
Overweight	298 (47.52)	89 (29)		
	S.M- 209 S.D- 98.60	S.M-102.666 S.D-67.545 Df(1)		

The trend of increasing prevalence of hypertension all over the world was even evident in India with average prevalence of hypertension being 25% in urban areas and 10% in rural inhabitants. Rapid urbanization, life style and dietary changes and to some extent increased life expectancy are the factors attributing to this changes. The total prevalence of hypertension was found to be 49.12% in the present study. This prevalence is much higher to that in rural areas of India and other several studies carried out in rural India[9, 10, 11].

The prevalence of pre-hypertension (29.18%) in the present study is similar to the trends reported worldwide[12]. There was a significant relationship between age and hypertension, which tend to increase with the increasing age. These relationship finding was coherent with wardha study carried in rural areas. Through this findings it was known that atherosclerotic changes in blood vessel was the reason behind the relationship between age and hypertension.

Illiterate's respondents lead the percentage of hypertension but as seen in other studies there was no significant association with education in present study. But it was related to the protection of hypertension, which was found to be significant in the wardha study[13].

In the same way socio-economic status was also not associated with hypertension in our study, which was in contrast to WHO report which states that societies that are in transitional stage of economic and epidemiological change have higher prevalence of hypertension among upper socio-economic groups. This is possibly because most of our respondents belonged to lower income class.

Higher the BMI, higher was the hypertension indicating significant association between BMI and hypertension. Diet and nutrition have been linked to high blood pressure, composite diets have been demonstrated to reduce the risk of hypertension. Type of diet was found to be significantly associated to hypertension in our study.

There was no direct relationship between smoking and high blood pressure in our study which was in sharp contrast to Gujarat study, which states that smokers have a significantly higher B.P than non-smokers[14].

Our study couldn't find any relationship between hypertension and consumption of alcohol, possibly because of lesser respondents consuming alcohol. In several populations, alcohol consumption has been consistently related to high blood pressure in cross-sectional as well as prospective observational studies. Alcohol consumption in a moderate way was an important lifestyle measure recommended to lower blood pressure[15].

Prevalence of risk factors for hypertension varied from 3.89 – 72% in this study. High prevalence of salt intake 38% was found in comparison to findings of Agrawal et.al[10].The bivariate analysis showed significant correlation between hypertension with gender, higher age, literacy, physical inactivity, and body mass index, smoking and alcohol consumption.

Further studies are required to assess the prevalence, determinants and preventive interventions of hypertension in rural areas. There is a need for strengthening health education programs, promoting hypertension awareness and emphasizing preventive measures. Multipurpose health workers can be trained for detection and monitoring of hypertension. All such efforts must be coupled with continuing medical education programs for healthcare providers. This will promote awareness of the current guidelines for the diagnosis and treatment of hypertension.

CONCLUSION

Prevalence of hypertension was found to be highly prevalent in rural community. This study projects the need of increasing disease awareness, encouraging regular physical activity, abstaining from smoking and alcohol intake of fibre and potassium and promotion of literacy and screening programs in those having family history of hypertension may go a long way in preventing the hypertension in this community. We also realized the importance of clinical pharmacist and other health care involvement in monitoring of patient's health problems, reporting possible drug related problems, measuring therapeutic compliance and counselling on lifestyle modifications in rural populations.

Our study emphasizes the importance of cost effective strategies which could be implemented to improve detection, adherence and control of hypertension in India.

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