PREVALENCE AND RISK FACTORS OF HYPERTENSION IN A RURAL COMMUNITY

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ABSTRACT

BACKGROUND

Hypertension is an important public health problem in both economically developed and developing nations. In many patients, the condition causes no symptoms until the occurrence of major cardiovascular complications.

The aim of the study is to know the prevalence of hypertension among adults (18 years and above) in a rural community and to identify the risk factors of hypertension.

MATERIALS AND METHODS

It was an observational study carried out among all the 1151 adults aged 18 years and above residing in Raghunathapalem village of Khammam district, Andhra Pradesh. STEP1 and STEP2 of WHO's step wise approach was used for collecting data.

RESULTS

The prevalence of hypertension among study subjects was found to be 11.37%. The prevalence of hypertension was significantly higher in individuals aged 35 years and above than those less than 35 years. Prevalence of hypertension was significantly associated with age, educational status, occupation, type of family, socioeconomic class, smokeless form of tobacco use, extra salt intake, level of physical activity, BMI and waist–hip ratio.

CONCLUSION

Overall, this study determined a high prevalence of hypertension as well as its associated factors in the study population. Therefore, community-based preventive approaches like lifestyle modification and early detection and treatment of hypertension might bring a substantial change in tackling the burden effectively.

KEYWORDS

Prevalence, Hypertension, Risk Factors.

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BACKGROUND

We live in a rapidly changing environment. Throughout the world, human health is being shaped by the same powerful forces: demographic ageing, rapid urbanisation, and the globalisation of unhealthy lifestyles. Increasingly, wealthy and resource-constrained countries are facing the same health issues. One of the most striking examples of this shift is the fact that noncommunicable diseases such as cardiovascular disease, cancer, diabetes and chronic lung diseases have overtaken infectious diseases as the world's leading cause of mortality. One of the key risk factors for cardiovascular disease is hypertension or raised blood pressure.[1]

Hypertension is an important public health problem as it is common, asymptomatic, readily detectable, easily treatable and often leading to lethal complications if left untreated. Since a large number of hypertensives in early stages have no symptoms, it is called "Silent killer". Hypertensives when compared to normotensives develop twice as much coronary heart disease, four times as much congestive heart failure and seven times as much stroke.[2]

As per a WHO report,[3] for 1998, the total number of hypertensive cases worldwide has been estimated to be more than 69 million and prevalence wise it ranks fourth. Hypertension is now widely prevalent in several developing countries as well particularly those in rapid transition and is affecting both the elderly and middle aged alike. It is now competing with other traditional health concerns like malnutrition, infections, etc. In India, it is the second (after rheumatic heart disease) most common cardiovascular problem encountered in clinical practice in India (ICMR, 1992).[4]

Over the past few decades, the longevity of the average population is increasing and we see more aged people in our society. Simultaneously, we see more people who become victims of high blood pressure. In 2008, worldwide, approximately 40% of adults aged 25 and above had been diagnosed with hypertension; the number of people with the condition rose from 600 million in 1980 to 1 billion in 2008.[5] Hypertension is responsible for at least 45% of deaths due

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to heart disease and 51% of deaths due to stroke.[6] Just as hypertension is a risk factor for many diseases, there are many risk factors for hypertension. Some of these are not modifiable, but many of them can be easily modified with appropriate lifestyle modifications.

According to the World Health Statistics 2012 report, 23.10% men and 22.60% women above 25 years in India suffer from hypertension.[7] A community based survey was carried out by ICMR during 2007–08 under state based IDSP phase I. The survey was carried out in the states of Andhra Pradesh, Kerala, Madhya Pradesh, Maharashtra, Uttarakhand, Tamil Nadu and Mizoram. According to the survey report, the prevalence of hypertension was varying from 17 to 21% in all the states with marginal rural-urban differences.[8] India has diverse and heterogeneous population distribution making it difficult to get a precise picture of the prevalence and the effect of various risk factors of hypertension. Various studies have been conducted in different parts of the country but were lacking in common criteria and in different age groups. Data is available on hypertension in urban areas, but a few studies were reported in rural areas. It was against this backdrop of the importance of hypertension, the present study was undertaken to know the prevalence and risk factors of hypertension in a rural community.

Objectives

This study was done to know the prevalence of hypertension among adults (18 years and above) in a rural community and to identify the risk factors of hypertension.

MATERIALS AND METHODS

It was an observational study carried out from 1st June 2005 to 31st May 2006 among adults aged 18 years and above in Raghunathapalem village, a rural field practice area of Department of Community Medicine, Mamata Medical College, Khammam. All the 1151 adults residing in the village were taken as study subjects. The details of the study were explained to the Medical officers, health workers and the local ward members of the area and the necessary information regarding total population and recent voters list were collected. The total population of Raghunathapalem village is 2200.

For identification and initial contact, the help of the ANM, ASHA (Accredited Social Health Activist) was taken. Prior intimation was given to the study subjects to minimise nonresponse. Efforts were made to include whole population of 18 years and above by making regular visits. A pre-tested, pre-designed schedule using WHO's Step wise approach – STEP 1 and STEP 2 (core module and some questions from expanded core)[9] was administered to study subjects after taking informed consent. STEP 1 included information on socio-demographic variables and on risk factors for hypertension. STEP 2 included record of the results of the physical examination. All the physical instruments (sphygmomanometer, stethoscope, stadiometer, measuring tape and weighing machine) and techniques used in the study were initially standardised and were regularly standardised throughout the period of data collection.

Socio-demographic variables studied include age, sex, education, type of occupation, type of family, socioeconomic status (as per modified B.G. Prasad classification for the year 2005-06). Various risk factors studied were history of tobacco use (smoking as well as non-smoking form), alcohol consumption, and information on their level of physical activity, dietary habits and mental stress.

Height, weight, body mass index, waist circumference, hip circumference, Waist-hip ratio and blood pressure were recorded. BP was recorded for all the study subjects three times in sitting position, in the right arm, using sphygmomanometer. Hypertensive subjects were defined as those with a systolic blood pressure equal to or more than 140 mmHg and/or a diastolic blood pressure equal to or more than 90 mmHg or those being treated for hypertension. For classifying people with hypertension, 2003 World Health Organization (WHO)/International Society of hypertension (ISH) classification was considered.

Body mass index was calculated by weight in kilograms divided by height in metres squared. Analysis was done by using Microsoft Excel and Epi info software. Descriptive statistics and Chi square test as a test of association were applied for the analysis and interpretation of the results. P value <0.05 was taken as statistically significant.

RESULTS

The prevalence of hypertension was 11.7% (135 out of 1151) among study subjects. Socio-demographic characteristics of the hypertensive and non-hypertensive groups were shown in the Table 2.

Category	Number of Study Subjects	%
Normal*	193	16.8%
Pre-hypertension**	823	71.5%
Controlled hypertension***	46	4.0%
Stage 1 hypertension****	65	5.6%
Stage 2 hypertension*****	24	2.1%

Table 1. Distribution of Hypertension among Study Subjects (n=1151)

*SBP < 120 mmHg and DBP < 80 mmHg;
**SBP 120 to 139 mmHg and DBP 80 to 89 mmHg;
*** SBP <140 mmHg and DBP < 90 mmHg and on treatment for hypertension;
**** SBP 140 to 159 mmHg and DBP 90 to 99 mmHg;
***** SBP ≥ 160 mmHg and DBP ≥ 100 mmHg.

Socio-demographic Variable	Non-hypertensive Group (n = 1016)	Hypertensive Group (n = 135)	Total	Chi-square Value & p Value
Age in Years				
<35	479 (95.2%)	24 (4.8%)	503 (100%)	x^2 value =41.774
≥35	537 (82.9%)	111 (17.1%)	648 (100%)	P value=0.000*
Sex				
Male	525 (87.9%)	72 (12.1%)	597 (100%)	x^2 value =0.132
Female	491 (88.6%)	63 (11.4%)	554 (100%)	P value=0.717
Occupation				
Daily workers	624 (90.6%)	65 (9.4%)	689 (100%)	x^2 value =13.120
Unemployed and students	123 (80.4%)	30 (19.6%)	153 (100%)	P value=0.001*
Others	269 (87.1%)	40 (12.9%)	309 (100%)	
Education				
High school below	875 (90.7%)	90 (9.3%)	965 (100%)	x^2 value =33.292
High school and above	141 (75.8%)	45 (24.2%)	186 (100%)	P value=0.000*
Type of family				
Nuclear	229 (93.9%)	15 (6.1%)	244 (100%)	x^2 value =13.945
3 generation	285 (89.9%)	32 (10.1%)	317 (100%)	P value=0.001*
Joint	502 (85.1%)	88 (14.9%)	590 (100%)	
Socioeconomic classification				
Class I	73 (82%)	16 (18%)	89 (100%)	x^2 value =7.651
Class II & III	345 (86.3%)	55 (13.8%)	400 (100%)	P value=0.022*
Class IV & V	598 (90.3%)	64 (9.7%)	662 (100%)	
Family history of hypertension				
Yes	57 (90.5%)	6 (9.5%)	63 (100%)	χ^2 value =0.313
No	506 (88.2%)	68 (11.8%)	574 (100%)	P value= 0.855
Do not know	453 (88.1%)	61 (11.9%)	514 (100%)	

Table 2. Socio-demographic Characteristics of the Study Subjects (n=1151)

*p value significant

The prevalence of hypertension was significantly higher among persons with age 35 years and above (17.1%) than those with age less than 35 years (4.8%). Significant difference in the prevalence of hypertension was also seen with respect to educational status, type of occupation, type of family and socioeconomic class. There was no significant difference according to gender.

Socio-demographic Variable	Non-hypertensive Group (n = 1016)	Hypertensive Group (n = 135)	Total	Chi-square value & p value
Type of diet				
Vegetarian	746 (88.9%)	93 (11.1%)	839 (100%)	χ^2 value =1.241
Mixed diet	270 (86.5%)	42 (13.5%)	312 (100%)	P value=0.265
Smoking				
Present smokers	94 (87%)	14 (13%)	108 (100%)	χ^2 value =0.182
Ex-smokers	7 (87.5%)	1 (12.5%)	8 (100%)	P value= 0.913
Non-smokers	915 (88.4%)	120 (11.6%)	1035 (100%)	
Smokeless tobacco				
Current users	513 (83.3%)	103 (16.7%)	616 (100%)	χ^2 value =32.464
Ex-users	15 (88.2%)	2 (11.8%)	17 (100%)	P value= 0.000
Non-users	488 (94.2%)	30 (5.8%)	518 (100%)	
Alcohol				
Current users	53 (86.9%)	8 (13.1%)	61 (100%)	χ^2 value =0.127
Ex-users	24 (88.9%)	3 (11.1%)	27 (100%)	P value=0.938
Non-users	939 (88.3%)	124 (11.7%)	1063 (100%)	
Physical activity				
Sedentary	156 (80.8%)	37 (19.2%)	193 (100%)	χ^2 value =13.089
Moderate	137 (87.8%)	19 (12.2%)	156 (100%)	P value=0.001*
Rigorous	723 (90.1%)	79 (9.9%)	802 (100%)	
Extra salt intake				
Yes	591 (85.4%)	101 (14.6%)	692 (100%)	χ^2 value =13.771
No	425 (92.6%)	34 (7.4%)	459 (100%)	P value=0.000*
Extra fat intake				
Yes	276 (85.7%)	46 (14.3%)	322 (100%)	χ^2 value =2.823
No	740 (89.3%)	89 (10.7%)	829 (100%)	P value=0.093

Mental Stress				
Yes	62 (87.3%)	9 (12.7%)	71 (100%)	χ^2 value =0.066
No	954 (88.3%)	126 (11.7%)	1080 (100%)	P value= 0.798

Table 3. Modifiable Risk Factors of Hypertension among Study Subjects

*p value significant.

Table 3 shows modifiable risk factors among hypertensive and non-hypertensive groups. In this there was no significant difference in the prevalence of hypertension with respect to their type of diet, smoking, alcohol intake, extra fat intake and mental stress. Risk factors showing significant difference were smokeless form of tobacco use, extra salt intake and lack of physical activity.

Variable	Non-hypertensive Group	Hypertensive Group	Total	Chi-square Value & p value
BMI (n= 1151)				
≥ 25	79 (79.8%)	20 (20.2%)	99 (100%)	χ^2 value =7.511
< 25	937 (89.1%)	115 (10.9%)	1052 (100%)	P value= 0.006*
Waist-hip ratio (males) (n= 597)				
≥ 0.9	48 (78.7%)	13 (21.3%)	61 (100%)	χ^2 value =5.483
< 0.9	477 (89%)	59 (11%)	536 (100%)	P value= 0.019*
Waist-hip ratio (females) (n= 554)				
≥ 0.85	39 (79.6%)	10 (20.4%)	49 (100%)	χ^2 value =4.355
< 0.85	452 (89.5%)	53 (10.5%)	505 (100%)	P value= 0.037*

Table 4. Obesity as Risk Factor for Hypertension among Study Subjects

When compared to subjects with BMI less than 25, the prevalence of hypertension was almost double among persons with BMI 25 and above (10.9% vs. 20.2%). Statistically significant difference was seen in the prevalence of hypertension according to BMI and waist-hip ratio.

DISCUSSION

The prevalence of hypertension in our study was 11.37%. It falls within the range of 10 to 20% prevalence in most adult populations as mentioned by the report of WHO expert committee[10] (1996). It also compares well with the prevalence of hypertension of 15.3% as reported by Gupta et al[11] (1994) in rural Rajasthan among subjects aged more than 25 years and 14.5% as reported by Wander et al[12] (1994) in rural Punjab amongst those aged more than 30 years. The prevalence in our study was much less when compared to studies done by Singh et al[13] in 1995 in North India (23.7%) and Hazarika et al[14] in 2002 in rural Assam (30.2%). It was more when compared to 8.6% noted by Bhat et al[15] (2002) in rural Kashmir, 4.5% noted by Malhotra et al[16] (1998) in rural Haryana and 6.7% noted by Hussain et al[17] (1988) in rural Rajasthan.

In this study, with increase in age there is increase in the prevalence of hypertension and the association between age and hypertension was found to be statistically significant. It is a well-known fact that with increase of age there will be increase in hypertension. These findings compare well with the studies done by Whelton et al[18] (1994), Chada et al[19] (2001), Shantirani et al[20] (2003) and Hazarika et al[14] (2000).

The prevalence of hypertension was more among subjects with high level of education than people with low level of education and the difference was statistically significant. This could be due to their sedentary lifestyle and other food habits. As per a report of WHO expert committee[10] also there seemed to be an inverse relationship between hypertension and level of education. Hazarika et al[14] and Kalavathy et al[21] (2000) did not find any association between hypertension and educational status. Hypertension was more among unemployed and less among daily workers and the association between hypertension and occupation was statistically significant. Hazarika et al[14] also found significant association between hypertension and occupation.

In our study, smoking does not seem to be an important determinant for hypertension. This finding is well supported by recent report of WHO expert committee,[10] which mentions that tobacco smoking by itself does not seem to be causally related to hypertension. It is known that tobacco smoking is a major risk factor for ischaemic heart disease and cerebrovascular disease and this risk is compounded in the presence of hypertension (Cox[22], 1993). The reason for lack of association between hypertension and tobacco smoking needs further research to elucidate whether the relation is causal or prognostic. Our findings are in close agreement with Hazarika et al.[14] Similar findings were observed by Cryer et al[23] (1976) and Seltzer et al[24] (1974). Smoking was found to be associated with hypertension in the studies by Bhat et al[15] (2002), Shantirani et al[20](2003) and Ahlawat et al[25] (2002).

In the present study, 53.52% of the study subjects were users of smokeless tobacco. It is higher than the observation

of WHO expert group[10] report that in India 27% of men are smokeless tobacco users. The association between smokeless tobacco use and hypertension was found be statistically significant. The findings are in agreement with Benowitz et al[26] (1988) and Nanda et al[27] (1988). This finding is a cause for serious concern, considering other health hazards like oral cancer and other health disorders. There is a need for motivating the people to give up and not to adopt the habit of consumption of tobacco in any form.

The findings of the present study showed that alcohol consumption was not a risk factor for hypertension. No association was found between alcohol intake and hypertension by Shantirani et al[20] (2003) and Ahlawat et al[25] (2002). A positive association was found by Hazarika et al[14] (2002) and Kulkarni et al[28] (2001).

The present study showed an inverse association between hypertension and physical activity. The finding is in close agreement with the findings of Shantirani et al[20] (2003). As per WHO expert group,[10] sedentary individuals have high risk of developing hypertension than those who are more active. The present study revealed a positive association between hypertension and extra salt intake. This finding is in agreement with various other studies. In INTERSALT study[29] and TOHP,[30] it was demonstrated that salt intake is positively associated with blood pressure levels.

The present study has brought out the significant association between hypertension and BMI. WHO has recommended BMI as a very useful indicator for measuring obesity and has shown it as an independent risk factor for hypertension. Our study finding is comparable to Shantiraniet al,[20] Ahlawat et al[25] and Kulkarni et al.[28] In the present study, a significant association was found between hypertension and waist–hip ratio in both males and females. The findings are in agreement with the findings of Gupta et al,[11] Singh et al,[13] Shantirani et al[20] and Ahlawat et al.[25] Waist-hip ratio was not found to be associated with hypertension among females in Hazarika et al[14] study; however, it was significant among the male population. WHO expert committee report also mentioned that central obesity as indicated by increased waist-hip ratio correlates positively with high blood pressure.

CONCLUSION

There was significant burden of hypertension even among rural community. Age, education, extra salt intake, level of physical activity act as important risk factors for hypertension. People should be made aware of the risk factors and control measures of hypertension through behaviour change communication.

Limitations-STEP 3 of the WHO's step-wise approach like biochemical measurements were not taken into consideration because of the logistic constraints.

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