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Original Research Article

An epidemiological study of prevalence of hypertension and its risk factors among non migratory tribal population of Mawai block of Mandla district of central India

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ABSTRACT

Background: Hypertension is the most recognized modifiable risk factor of CVD, stroke and end stage renal disease and it is directly responsible for 57% of all stroke and 24% of all coronary heart disease related deaths in India. There is paucity of data on hypertension among tribal population. Addiction of Nicotine and some cultural practices like alcohol intake is common in tribal, which are the known risk factor for NCDs. Therefore, the study of health status of tribal communities related to hypertension, is highly desirable and essential. The objectives of the study were to determine the prevalence of hypertension and associate risk factors among non migratory tribal population.
Methods: A cross sectional study was conducted from March 2015 to February 2016 among 762 adults aged 20-65 years who were non migratory residents of Mawai block of Mandla districts, and they were selected through multi stage random sampling method.
Results: Hypertension prevalence was 27.1% among study population. 82.2% study subjects had never undergone for blood pressure check-up. Prevalence was significantly associated with high age group. It was slightly more among the study subjects taking mixed diet than to pure vegetarian. Smoking and alcohol intake was found to be significantly associated with hypertension. It was more prevalent among mild and sedentary workers and association was significant with BMI ≥25.
Conclusions: In the study every fourth study individual is Hypertensive, where smoking (in any form) and obesity was found as commonest risk factor for it.

Keywords: Hypertension, Risk factor, Non migratory, Tribals

INTRODUCTION

Non communicable diseases (NCDs) refer to chronic diseases of long duration and generally with slow progression and which does not pass from person to person.[1] Most common types of non-communicable diseases are cardiovascular diseases, diabetes, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma) and cancers. NCDs are most common cause of death and disability in world.[2] Among these hypertension is most recognized modifiable risk factor of CVD, stroke and end stage renal disease.[3] According to JNC-7 systolic blood pressure >140 mm Hg and diastolic >90 mm Hg is considered as high blood pressure.[4]

As per World health organization report (2008), about 40% of people aged more than 25 years had

hypertension.[5] Worldwide, 7.6 million premature deaths were attributed to high blood pressure.[6] Overall prevalence of hypertension in India in 2013 was 29.8% which was significantly different b/w rural and urban population.[7] NNMB tribal survey (2008-09) estimated the prevalence of hypertension among man and women was 25% and 23% respectively.[8] A study carried out by Meshram et al, found 37% (as per JNC VII) prevalence of hypertension among adult tribal population of Kerala.[9] Hypertension is also directly responsible for 57% of all stroke and 24% of all coronary heart disease (CHD) related deaths in India.[10]

Rationale

It is clear from the above mentioned facts that the burden of hypertension causes significant morbidity and mortality. Non migrant tribal population are less expose to urban lifestyle and also have complex social, cultural, educational and economic conditions. There is paucity of data on the distribution of hypertension among non migrant tribal population of the region. Therefore, the study of health status of non migratory tribal communities related to hypertension is highly desirable and essential.

Aim and objectives

1) To determine the prevalence of hypertension among non migratory tribal population of Mawai block of district Mandla (MP).
2) To study the association of life style related risk factors with hypertension, among tribal population.

METHODS

A community based cross sectional observational study carried out in rural tribal areas of Mandla district over the period of March 2015 to February 2016. Out of nine development blocks of district Mandla, Mawai block was randomly selected for study.

All tribal Individuals aged between 20 – 65 years, who never migrated to urban areas for job or other purpose for more than a week in a year were considered except people who are temporarily residing like visitors or guests, terminally ill persons, pregnant females and individuals not willing to be part of the study were excluded.

Sample size and sampling procedure

Sample size was calculated using formula for determination of sample size for estimating proportions.[11]

Sample size (N) = Z^2PQ/d^2.

N=Sample size; Z=Confidence level (for 95% confidence limit, it is 1.96); P = Prevalence; Q= 100-P; d = Allowable error (10%).

A study carried out by Meshram et al, found 37% (JNC VII) prevalence of hypertension among adult tribal population of Kerala.[9] On the basis of this prevalence, calculated sample size was 680. Adding 12% non responders (82) to the above, a total of 762 sample size was considered for the study.

Multi stage random sampling was done. In the first stage out of total 25 sub health centres in the block Mawai, 5 sub health centres were selected randomly. These were Harratola, Saida, Sakwah, Kumhali and Baraai. Then from each sub health centre, 3 villages selected randomly by lottery method. Thus, a total 15 villages were selected from the whole block. In the final stage maximum 51 households were selected randomly from each village and from each house, one eligible individual selected by using KISH table.[12] In village pen point drop method was used to locate the direction of the first household to be surveyed. Then, the subsequent tribal households in the same direction were surveyed in the clockwise manner till the desired number of study subjects was achieved.

Study tools

Data was collected using predesigned and pretested proforma, Omron electronic blood pressure measuring apparatus, calibrated electronic weighing machine, and measuring tape.

Study technique

Oral informed consent was taken from all the participants. Personal interview and clinical examination was done. Blood pressure (BP) recorded by electronic equipment OMRON-4, which was calibrated by the mercury sphygmomanometer (auscultatory method). Three measurements was taken at 10 minute time interval, after persons were seated quietly for at least 30 min. Blood pressure measurements were made on the subject's left arm using a cuff of appropriate size at the level of the heart. Weight and height was measured by using electronic weighing machine and stature meter respectively.

Study variables

Age, gender, educational status, occupational status, family type, socio-economic status (according to modified B. G. Prasad's classification), and risk factors for hypertension (past history of hypertension, family history of hypertension, treatment status of known hypertensives, type of diet, amount of salt intake, history of alcohol intake, history of smoking, history of tobacco chewing, history of physical activity and BMI).

Criteria for diagnosis of various variables of the study

1. Hypertension diagnosed as per JNC-VII criteria.[13]

2. Body mass index (BMI) according to standard criteria of World Health Organization.

Data management and statistical analysis

Obtained data was coded and entered into Microsoft Office excel worksheet. This was analyzed using *Epi Info*™ 7.1.5 and SPSS 20.0. To find the association with the various risk factors, Pearson's chi-square test and odds ratio were applied. The statistical significance was evaluated at 5% level of significance. Fisher exact test was applied when the expected cell count was less than 5.

Ethical considerations

Ethical consent was taken from the ethical committee of Netaji Subhash Chandra Bose Medical College Jabalpur, M.P. Before the interview was commenced, the purpose of the study was clearly explained to the respondents.

The willingness to participate by the subjects in the study was confirmed by taking their oral informed consent. Due confidentiality was maintained by using coding system for analysis.

RESULTS

Out of total 762 study population 50.1% were male and 49.9% female. maximum in the age group of 20-29 (28.5%) years followed by 30-39, 40-49, 50-59 and minimum in 60-65 yrs. Mean age of male and female were 40.31(±12.6) and 37.65(±13.24) respectively. Out of total 408 were illiterate and 13.6% unemployed. Only 3.6% study subjects belong to upper middle and upper class. 81.5% individuals consume mixed diet. Only 6% subjects had less than 5 gram salt intake/day. Out of total, 26.6% consume alcohol while 11.8% & 39.7% were smoker and consume smokeless tobacco respectively. 54.6% were moderate to strenuous worker, 18.9% subjects belong to underweight while only 13.2% overweight and obese.

Table 1: Association of various parameters with hypertension.

Parameter		Hypertension		Total	Chi square and p value
		Yes	No		
Gender	Male	106 (27.7)	276 (72.3)	382 (50.1)	
	Female	101 (26.6)	279 (73.4)	380 (49.9)	
Age in year	20-29	23 (10.6)	194 (89.4)	217 (28.5)	$\chi 2$= 68.102, p<0.000, DF=4
	30-39	41 (22.2)	144 (77.8)	185 (24.3)	
	40-49	58 (34.7)	109 (65.3)	167 (21.9)	
	50-59	44 (39.3)	68 (60.7)	112 (14.7)	
	60-65	41 (50.6)	40 (49.4)	81 (10.6)	
Per capita income (Rs)	>2785	6 (40)	9 (60)	15 (2.0)	Fisher exact p=0.253
	≤2785	201 (26.9)	546 (73.1)	747 (98.0)	
Diet	Pure- veg	39 (27.7)	102 (72.3)	141 (18.5)	χ^2=0.002, p=0.97, DF=1
	Mixed diet	168 (27.0)	453 (73.0)	621 (81.5)	
Family history	Present	10 (71.4)	4 (28.6)	14 (1.8)	χ^2=16.63, p<0.001, DF=2
	Absent	7 (43.8)	9 (56.2)	16 (2.1)	
	Don't know	190 (26.0)	542 (74.0)	732 (96.1)	
Fruits intake	Irregular/occasional	201 (28.1)	514 (71.9)	715 (93.8)	χ^2=4.50, p=0.034, DF=1
	Regular	6 (12.7)	41 (87.3)	47 (6.2)	
Smoking habit	Present	36 (40.0)	54 (60.0)	90 (11.8)	χ^2=7.78, p<0.05 DF=1
	Absent	171 (25.4)	501 (74.5)	672 (88.2)	
Smokeless tobacco chewer	Present	93 (30.7)	210 (69.3)	303 (39.7)	χ^2-2.87, p=0.089, DF=1
	Absent	114 (24.8)	345 (75.2)	459 (60.3)	
Alcohol intake	Present	78 (38.4)	125 (61.6)	203 (26.6)	χ^2=16.96, p<0.001, DF=1
	Absent	129 (23.1)	430 (76.9)	559 (73.4)	
Physical activity	Sedentary	16 (27.1)	43 (72.9)	59 (7.7)	χ^2=1.47, p=0.689, DF=3
	Mild	85 (29.6)	202 (70.4)	287 (37.7)	
	Moderate	87 (25.5)	254 (74.5)	341 (44.7)	
	Strenuous	19 (25.3)	56 (74.6)	75 (9.8)	
body mass index (BMI)	Up to 24.9	165 (25.2)	489 (74.8)	654 (85.8)	χ^2=8.06, p=0.004, DF=1
	25 and above	42 (38.9)	66 (6 1.1)	108 (14.2)	
Salt intake (gram/day)	≤5	13 (28.9)	32 (71.1)	45 (5.9)	χ^2=0.01, p=0.924, DF=1
	>5	194 (27.1)	523 (72.9)	717 (94.1)	

Overall prevalence of hypertension was found 27.1% among the study subjects. From this 26.4% subjects showed hypertension at the time of survey in which 17.1% in stage 1 and 9.3% in stage 2. Only 15.2% subjects were aware of own hypertension status and 4% knew their family history of hypertension. 34.4% subjects was prehypertensive.

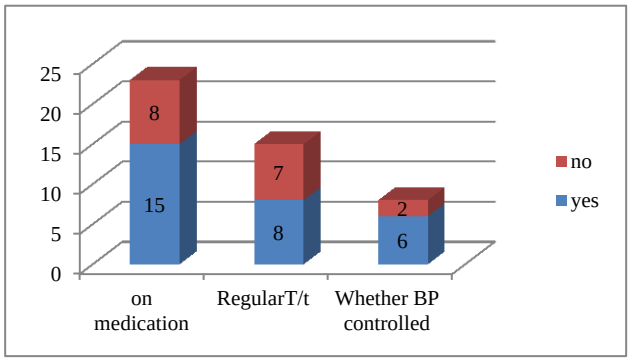

Figure 1: B.P. control status of known cases (n=23).

DISCUSSION

In present study sex ratio was 998 which is more in comparison to national average. Literacy rate was less than 50% which may be due to area was very remote, backward and individuals taken in study group were above 20 year of age. Only 5% individual intake <5 gram salt/day while average salt intake was more than 7 gram/day which was similar to study conducted by Australia-based George Institute of Global Health in India.[14] Nearly every fourth and every second individual were taking alcohol and chewing tobacco (39.7%), similar results were found in a study done by Kumar et al in Narayanganj, who found that 29.3% of tribal population consume alcohol.[15] Another study among tribals done by Mishra et al found, 48.5% prevalence of tobacco chewing which was more as compared to this study.[16] Every tenth study subject was smoker, result were nearly similar to the study done by Hazarika et al, who reported 12.5% smokers in rural population of Assam.[17] In present study every fourth (27.7%) individual was suffering from hypertension which was nearly similar to the study conducted by Laxmaiah et al who found 27% prevalence of hypertension among tribals of nine states.[18] Study conducted in Mishing tribe of Assam by Misra et al, found 25.6% prevalence of hypertension which is lower than our findings.[19] Radhakrishnan et al found 31.1% prevalence of hypertension in tribal population of Tamil Nadu which was higher than this study.[20] More than 80% individual were not knowing, their blood pressure status. Awareness to own hypertension status in the present study was found to be higher (15.2%) as compared to 10% among tribals of Kerala found by Meshram et al, but less as compared to 25.1% found in study done by Anchala et al on hypertension systemic review and meta-analysis, among rural tribals.[9,21]

Prevalence of hypertension is more in males, but the difference is not found to be significant. Nearly similar results were found in NNMB 2009 survey, where prevalence of hypertension in males was 25.2% and females 23% which is not significantly different from each other like our study.[22] A study of Rizwan et al also reported prevalence in females 18.6% was lower than in males19.3% but the difference was not significant.[23] But result was statically different among adult tribal men (45%) and women (36%) in study done by by Meshram et al in Kerala.[9]

Prevalence of hypertension was significantly associated with age. Prevalence increases with age, hypertension was 5 times more common among 60 & above age group as compared to 20-29 yrs age group. Above 60 year of age every second individual suffered from hypertension. Result of our study coincide with study done by Mahmood et al.[24] who found prevalence of hypertension significantly higher among individuals aged between 41-50 years (49.0%) as compared to those aged between 30-40 years (7.4%). Similar result was found in another study done by Laxmaiah et al, risk of hypertension was nearly 2 and 5 times higher among 35-59 and ≥60 yr old men, respectively compared with 20-35 yr old in tribal population.[18]

Prevalence was more in high income group individuals but difference was not statistically significant, similar to the study of Kashyap et al who found higher prevalence of hypertension among subjects of higher socio-economic status in rural areas.[25] Meshram et al in tribals of Maharashtra found no relation between high and low socioeconomic group with hypertension.[26] But Laxmaiah et al, found higher prevalence of hypertension in lower per capita income groups.[18]

Hypertension prevalence was similar in pure veg and mixed diet taking individuals in this study, similar result were found by Bhadoria et al in rural and urban population who found no significant effect of vegetarian diet and mixed diet on hypertension.[27] Similar findings was also observed by Radhakrishnan et al among tribals of Tamil Nadu.[20]

In this study family history was significantly associated with hypertension. Similar results were found by Radhakrishnan et al among the tribal population of Tamil Nadu.[20] Naresh et al also found positive family history was strongly associated with hypertension in rural population.[28] Regular fruits intake was significantly associated to normal blood pressure in present study. Misra et al also found that more fruits and vegetables intake was significantly associated with normal blood pressure in Mishing tribe of Assam but Bhadoria et al in their study found that there was no significant effect of fruit intake on hypertension.[16,27]

Smoking has significantly associated with hypertension in this study. Mandani et al also found that smoking was significantly associated with hypertension among the tribal population of Gujarat.[29]

Alcohol consumption associated with high prevalence of hypertension and this result was similar to Manimunda et al and Meshram et al study in tribal population.[30,9] Hypertension prevalence was more in tobacco chewer but association was not significant. Hazarika et al found more prevalence of hypertension among khaini users in tea garden workers and similar results were found in another study done by Naresh et al in rural area of Jamnagar.[31,28]

There is high prevalence among sedentary and mild worker but the difference is not statistically significant. Laxmaiah et al and Kandpal et al found significant correlation of hypertension with activity.[18,32]

BMI>25 was significantly associated with hypertension. Laxmaiah et al also found high prevalence of hypertension among overweight and obese tribals similar to this study.[18] Meshram et al among tribal adults in Kerala also found BMI significantly associated with hypertension.[9] Recommended salt intake by WHO have no significant correlation in this study but hypertension slightly more in high salt intake. In present study known hypertensive subjects follow the rule of half, total known hypertensive only 23 take treated in which only 8 on regular treatment and only 6 have under control.

CONCLUSION

The study revealed high prevalence of hypertension among non migrant tribal population of the region. Tobacco and alcohol consumption was common in this study. Age, substance abuse, BMI, family history were significantly associated with hypertension. Most of the individual not aware own hypertension status. This study suggests to health planners to take remedial measures to address growing hypertension in the remote tribal community through health education about lifestyle changes, dietary modification and avoidance of substance abuse.

Limitations

Present study include only one block of Mandla district and numbers of study subjects low due to limited resourses so result of this study not apply at country level.

Supplementary study also required to know the effect of urbanization on the prevalence of hypertension.

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

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