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ASSOCIATION BETWEEN SOCIOECONOMIC STANDARD AND CARDIOVASCULAR RISK AMONG SANTHAL TRIBAL POPULATION IN RURAL AND PERI-URBAN POPULATION OF BIRBHUM DISTRICT, WEST BENGAL

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ABSTRACT

Background: World, especially India had been witnessing a sharp increase of death and disability due to cardiovascular disease (CVD. Lifestyle modifications, including dietary changes and acculturation are the main reasons for the high prevalence of hypertension among the Indian indigenous (tribal) population. Though studies have been conducted in urban and rural areas, data related to tribal communities is limited. The present study aims to examine various CVD related risk factors including hypertension, high waist –hip ratio and obesity in 2 blocks of Birbhum district, West Bengal.

Methods: A cross-sectional study was conducted among the adult tribal (18 years and above) population of 892 from 2 blocks (Rajnagar & Md Bazar) of Birbhum district. Data related to blood pressure, anthropometry, demographic and behavioural variables were collected with prior consent from the participants from April to December, 2023.Statistical tests such as logistic regression, odds ratio, percentage were used to analyze the data. Data was analyzed with STATA software.

Results: The prevalence of hypertension among tribal population was 30.24 % for male population and 34.09 % for female population in study area. Hypertension was comparatively higher among illiterate population who were not aware regarding medicine used, physical activity and dietary intake. Logistics regression revealed that socioeconomic variables had an impact on hypertension.

Conclusions: A significant co-occurrence of higher body mass index (BMI), fewer physical activities, increased fat consumption, and changing habits relating behaviour to hypertension may be designated as potential risk factors.The prevention and treatment intervention programs should be implemented taking into consideration age and gender.

Key Words: Cardiovascular disease, hypertension, obesity,logistic regression

INTRODUCTION

Like all developing countries, large-scale developmental activities and urbanization in India have brought significant changes in the lifestyles, occupational patterns, and dietary habits of the tribal

communities, once considered outreach groups [Gopalan C, 1992, Ghurye GS, 1963 &Gautam MK, 1977]. India has the second-largest tribal population in the world with 705 scheduled tribes (STs), which constitute approximately 8.6% of the nation’s population (Census of India, New Delhi. 2011). In West Bengal, Tribal population is 52,96,963 as per Census 2011, which is about 5.8% of the total population of the State.

Hypertension and its associated CVD cases have gained an alarming rise of 47.8% worldwide by the year 2010. Rapid urbanisation has led to changes in daily activity, diet and lifestyle leading to NCDs like diabetes, Cardiovascular Diseases (CVDs), neuropsychiatric disorders etc. Of the estimated 57 million global deaths in 2008, 36 million were due to NCDs [WHO, 2011].Obesity is a growing global health concern, with a rapid increase being observed in morbid obesity. Excess body weight is associated with an increased cardiovascular risk and earlier onset of cardiovascular morbidity. (Fox CS, 2008).Increasing age is an important risk factor which is non modifiable, but hypertension can be prevented through regular physical exercise, lower intake of saturated fat and low salt intake. Sedentary lifestyle is an important risk factor for hypertension as observed by other authors [Anand MP, 2000, Meshram II, 2012]. Total deaths due to cardiovascular diseases were 9.1 million in developing countries and 1.5 million in India [Murray CJL, 1997].

The prevalence of hypertension has increased significantly in the past decade, especially in low- and middle-income countries (LMICs) [Geldsetzer, P et al, 2019). Socioeconomic level is a total measure combining the economic and sociological part of a person’s attainment (Howe LD et al, 2012). . This indicator can be used as a surrogate to assess the distribution of certain health risk factors, and to give an idea of the transition phase in which a given population is ongoing (Panamerican Health Organization, 2014).

Tribal population of West Bengal constitutes about 5.08% of total Tribal population of the Country. There is a paucity of literature on hypertension and the associated factors among different tribal communities in India.Hence, the present study has attempted to find the prevalence of hypertension, and its associated factors among the tribal and to study the perception of these tribes with respect to hypertension.

MATERIALS AND METHODS

A cross-sectional study was carried out in the Rajnagar and Md Bazar block of the Birbhum districtout of 19 blocks. Out of these, 16 villages were selected by Probability Proportional to Size (PPS) sampling technique. In every selected village, all ST households (HHs) were listed. One ST HH was chosen randomly as the starting point and all the members of the household aged >/=18 years present during the day of the questionnaire and were included in the study. A total of 892 participants were included in the study.Eligible participants were evaluated using a structured questionnaire, blood pressure, waist, hip, and weight and height measurements. The questionnaire included demographic information such as sex, level of education, physical activity, use of fuel and sanitation facility used.

Criteria and definitions used

Hypertension

Based on JNC 7, the study considered individuals with systolic blood pressure (SBP)>=140 mmHg or diastolic blood pressure (DBP)>=90 mmHg as hypertensive. Hypertension was regrouped in binary (0 and 1) as it was treated as the dependent variable.

Obesity

As per Asian guidelines, Overweight is defined by BMI: 23–24.9 Kg/m2 and obesity is defined by 25 Kg/m2 and above. High BMI levels included overweight and obesity category [WHO/IASO/IOTF, 2000]. Abdominal obesity was defined as WC ≥ 90 cm in males and 80>= cm in females (MisraA et al, 2009). In the study the proposed cutoffs by the WHO for the WHR are ≥ 0.90 cm in men and ≥ 0.85 cm in women to identify a significantly increased risk of metabolic complications.

Inclusion & exclusion criteria

All the individuals' ≥18 years of age and willing to participate in the study were surveyed, while those less than 18 years of age, not willing to participate and pregnant women were excluded from the study.

Education Level

In study, we categorized the education levels into six stages: illiterate, read &write, primary (1 to 4 years), middle school (5 to 8 years), Secondary and Higher Secondary school (9 to 12 years), Graduation and more (> 12 years) and not applicable those who denied replying.

Type of House

Houses made from mud, thatch, or other low-quality materials are called kuccha houses, houses that use partly low-quality and partly high quality materials are called semi-pucca houses, and houses made with high quality materials throughout, including the floor, roof, and exterior walls, are called pucca house.

Sanitary Latrine Used

In the study, sanitary latrine has been divided into present and in use, present and not in use and absent. Open defecation is identified as absent.

Type of Fuel Used

Type of fuel used has been divided into firewood, biogas, LPG, electricity and others. Among category others Gul/coal, dung cake were included.

Physical Activity

In physical activity, sedentary activity includes landlord, service, business, housewife, postman, teacher and white collar workers. Moderate activity includes labourer, other labourer, cultivator, artisan, mason, servant maid, tailor, rickshaw –puller, etc. Heavy activity includes blacksmith, stone cutter, railway gagman, wood cutter, mine worker etc.

Quintile

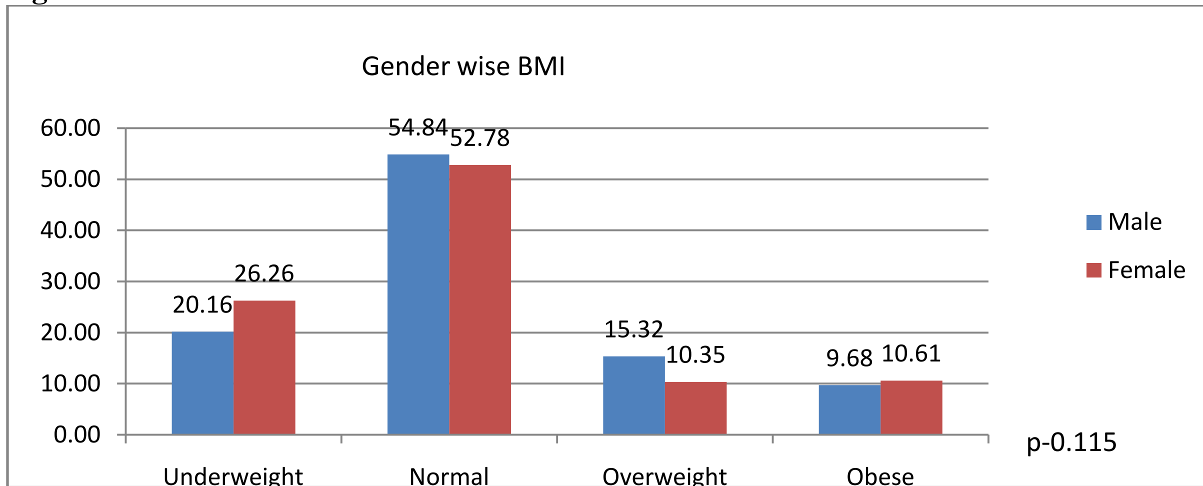
In the formation of quintile, five groups have been created such as poor, poor middle, middle, upper middle and upper. Quintile was calculated on the basis of type of house, type of fuel materials used for cooking, sanitation and household assets through principal components analysis (PCA) guidelines.

RESULTS

More than half (53%) of the study population were having their BMI in the normal range while 22.87 %, 13.12%, and 10.09%, % were in the underweight, overweight and obese categories,

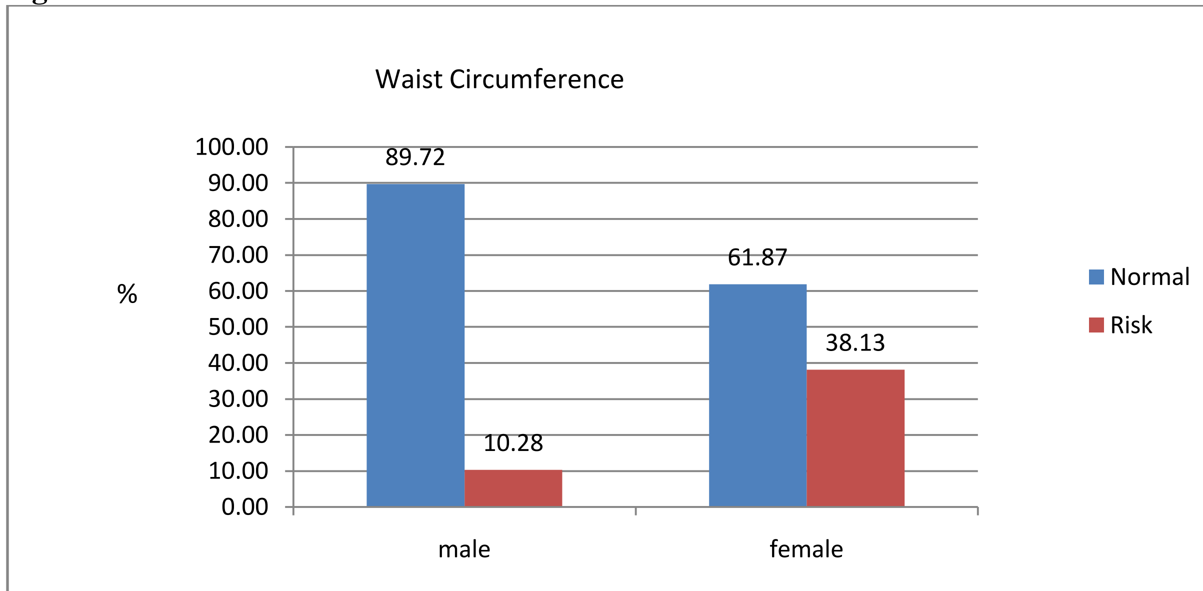
respectively. The mean (SD) BMI among males and females was 22.92 (3.14) and 21.10 (11.21), respectively. The proportion of obesity among the study population was 10%. It was more among females compared to males (P = 0.115) [Figure-1].

Figure-1



The abnormal obesity for males is 10.28% and for females 38.13% among study population [**Figure-2**].

Figure-2



The prevalence of hypertension among tribal population was 30.24 % for male population and 34.09 % for female population in study area **(Figure-3)**. In study female population was more hypertensive than male population. The mean (SD) average systolic blood pressure for male tribal population was 132.30(13.34) and 134.03(15.81) for female population. Again the mean (SD) average diastolic blood pressure for male population was 84.68(5.93) and 84.29(5.66) for female tribal population.

Figure -3

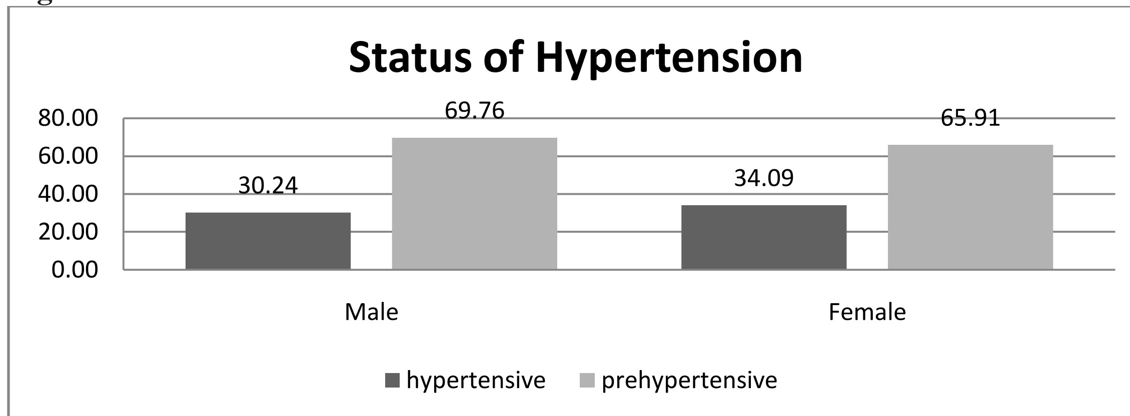


Table-1: Relation of hypertension with various socio-demographic, behavioural and anthropometric risk factors with unadjusted odds ratio

Variables	Total	HTN, n (%)	p	Unadjusted OR (95% CI)
Age Group(Yr)				
18-29(reference)	217	24(11.06)	0.000	
30-39	193	51(26.42)		2.88(1.69 4.91)
40-49	196	66(33.67)		4.08(2.43 6.84)
50-59	163	79(48.47)		7.56(4.47 12.76)
60-69	95	49(51.58)		8.56(4.77 15.37)
>=70	28	16(57.14)		10.72(4.53 25.34)
Gender				
Male(Reference)	496	150(30.24)	0.221	
Female	396	135(34.09)		1.19(.89 1.58)
Type of House				
Pucca(Reference)	202	71(35.15)		
Semipucca	459	140(30.50)	0.238	0.81(.57 1.14)
Kuchha	231	74(32.03)	0.494	0.87(.58 1.29)
Sanitary Latrine				
Present and in use(Reference)	185	74(40.00)		
Present but not in use	56	17(30.36)	0.194	.654(.34 1.24)
Absent	651	194(29.80)	0.009	0.64(.45 .89)
Type of Fuel Used				
Firewood(Reference)	758	243(32.06)		
LPG	35	15(42.86)	0.186	1.59(.79 3.15)
Others (Gul, dung cake etc.)	99	27(27.27)	0.336	.79(.49 1.26)
Type of Physical Activity				
Sedentary(Reference)	292	110(37.67)		
Moderate	550	163(29.64)	0.018	0.70(.51 .93)
Heavy	50	12(24.00)	0.066	.52(.26 1.04)
Quintile				
Poor (Reference)	349	127(36.39)		

Poor Middle	203	61(30.05)	0.130	.75(.52 1.08)
Middle	245	69(28.16)	0.036	.68(.48 .97)
Upper Middle	77	21(27.27)	0.130	.65(.37 1.13)
Upper	18	7(38.89)	0.830	1.11(.42 2.94)

Table-2: Relation of hypertension with various socio-demographic, behavioural and anthropometric risk factors with unadjusted odds ratio

Variables	Total	HTN, n (%)	p	Unadjusted OR (95% CI)
Education Status				
Illiterate	527	200(37.95)		
Read&Write	3	2(66.67)	0.335	3.27(.29 36.29)
1 - 4 Standard	87	24(27.59)	0.065	.62(.38 1.03)
5 - 8 Standard	135	40(29.63)	0.074	.69(.46 1.04)
9th- 12thStandard	114	16(14.04)	0.000	.27(.15 .46)
College	24	3(12.50)	0.020	.23(.07 .79)
NotApplicable	2	0		
BMI				
Underweight	204	80(39.22)		
Normal	481	138(28.69)	0.007	.62(.44 .88)
Overweight	117	36(30.77)	0.130	.69(.42 1.11)
Obese	90	31(34.44)	0.437	.81(.48 1.36)
Waist Hip Ratio				
Low Risk	246	74(30.08)		
High Risk	646	211(32.66)	0.460	1.13(.82 1.54)

Table -1 the unadjusted odds ratios and 95% confidence intervals from logistic regression analyses with hypertension as the dependent variable in sample population has been shown. Unadjusted effects on hypertension were shown in the table, moderate physical activity (odd ratio: 0.70, 95% confidence level: .51 .93), heavy physical activity (odd ratio: 0.52; 95% confidence level; .52 1.04, middle quintile (odd ratio: .68;95% confidence level: .48 .97), sanitary latrine absent (odd ratio: 0.64, 95% confidence level: .45 .89).P value is significant for age wise distribution and open defecation in the field of hypertension.

Unadjusted effects on hypertension were shown in the table-2, education level 9th- 12th Standard (odd ratio: 0.27, 95% confidence level: .15 .46), college education odd ratio: 0.23, 95% confidence level: .07 .46) and Normal BMI (odd ratio: .62, 95% confidence level: .44 .88). P value is significant for 9-12th standard education, college education and normal BMI for hypertensive tribal population.

DISCUSSION

Lifestyle-related NCDs are a growing worldwide phenomenon; therefore, it has become vital to understand their social, economic, behavioral, and demographic correlates at the community

level. The present study attempts to examine the prevalence of obesity and hypertension for tribal population in Birbhum district, West Bengal, India, emphasizing their association with selected socio-economic and demographic parameters.

The prevalence of overweight and obesity (23.20%) and hypertension (31.95%, SBP and DBP combined) in this tribal community is relatively high. Thus, we see that the cases of obesity and hypertension are on the rise even among the neglected tribal populations in the region. This is probably because of the shift from an agrarian society to a more urban lifestyle.

Our study reported age as one of the most critical confounders of BMI and BP. However, few studies in India have reported no significant effect of age on BMI (Khual GK et al, 2019, Das M et al, 2008). Conversely, BP seems to universally increase with increment in age. This is because as one grows older, there are structural changes in the arteries, making them stiffer, thus causing BP to rise (Pinto E, 2007).

More precisely, education had a negative impact on nutritional status and BP, indicating that Santhal tribal adults in study area placed in the higher education level had lower BP than their counterparts who are placed in the lower education level.Socio-economic status (SES) is one of the indicators of high blood pressure, as was previously assumed that hypertension was more prevalent in higher socioeconomic group. In the present study, no such association was observed between hypertension and SES.

It is increasingly been recognized that the poor, marginalized, and tribal communities are facing the burden of non-communicable diseases in general and hypertension in particular in India (NNMB Technical Report ,2006, Mukhopadhyay Bet al, 1997, Kusuma YSet al, 2004,Tiwari RR, 2008 , Kerketta AS, 2009)

Univariable regression analysis showed that age groups, type of activity, education standard,and absent of sanitary latrine were significantly ($p<0.01$) associated with risk of hypertension.

In addition to age, while gender and physical activity were found contributing significantly towards hypertension, on the other hand physical inactivity was found to be a risk factor for high BMI levels. Thus, awareness needs to be spread among the community regarding importance of physical activity.

CONCLUSION

The present findings show high prevalence of hypertension among Santhal tribal population. Nutritional transition and gene - environment interaction is blamed for high prevalence of hypertension in the recent times among marginalised, poor, and tribal communities. Combating CVDs, a major public health challenge among developing nations, requires intervention programmes including lifestyle and diet modifications. It is required to identify community risk factors that might help in implementation of health programmes at grass root level leading to reduction in the common disorders among tribal population.

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Conflict of interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

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