



**ORIGINAL RESEARCH PAPER**

**Medical Science**

**PREVALENCE AND AWARENESS REGARDING HYPERTENSION AND THEIR ASSOCIATED RISK FACTORS AMONGST THE MARGINALISED THARU TRIBE OF BIHAR, INDIA**

**KEY WORDS:** Hypertension, Obesity, Non-communicable diseases, Tribal, Bihar

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<b>ABSTRACT</b>	<b>Aims of study:</b> The present study aims to estimate the prevalence of hypertension and its associated risk factors, and to assess hypertension related knowledge, treatment, practices and risk behaviours of tribal adult population in Bihar, India.
	<b>Material and Methods:</b> A cross-sectional study was conducted on Tharu tribe of Bihar. Risk factors related to hypertension and knowledge and treatment practices were assessed using a pretested interview schedule. Logistic regression was used to ascertain various predictors of hypertension.
	<b>Results:</b> Out of 252 participants studied, the prevalence of hypertension and pre-hypertension was 32.5% and 45.6% respectively. Those adults who were found hypertensive during study only 37.8% were aware about their hypertension status and those hypertensive persons who were taking anti-hypertensive only 38.7% had adequately controlled level of blood pressure.
	<b>Conclusion:</b> Increased number of hypertensive and pre-hypertensive population along with lower awareness level among tribal population make them vulnerable for cardiovascular diseases (CVDs) and other complications.

**INTRODUCTION**

There are still a large number of populations living in isolation in natural and unpolluted surroundings far away from civilization with their traditional values, customs, beliefs and myths intact. They are commonly known as "tribals". [1] Tharu people are indigenous people living in the Terai plains on the border of Nepal and India. Most of their population resides in Nepal and a smaller number of Tharus live in India, mostly in West Champaran District of Bihar and some districts of Uttarakhand and Uttar Pradesh. The Tharu are recognized as Scheduled Tribes by the Government of India.[2] The total tribal population in Bihar consists of 1.28% and in West Champaran district they consists of 6.35%. [3]

India is currently passing through epidemiological transition. Although malnutrition and infections are still important health problems, chronic lifestyle diseases form substantial health burden and can no more be ignored. Hypertension is one of important risk factors for cardiovascular disease. Overall prevalence of hypertension in India in 2013 was 29.8%. [4] National Nutrition Monitoring Bureau (NNMB) tribal survey (2008-09) estimated the prevalence of hypertension among tribal men and women as 25% and 23% respectively. [5]

The etiologies of this disease are multi-factorial in nature. Some risk factors for hypertension are modifiable, such as smoking, diet, and overweight, whereas some are non modifiable, such as old age and genetic predisposition. Changing modifiable risk factors may result in a reduced burden of hypertension, and people have to know that they are at risk of hypertension to be able to make voluntary lifestyle changes. [6]

Given the increasing rates of coronary artery disease among Indians, especially at a younger age, understanding and successfully managing hypertension may hold the key to reduce cardiovascular mortality in India. In spite of incredible progress in the field of medicine, curative and preventive health measures; non communicable diseases like hypertension are on rise in general population and tribal population are also not exception. Tribal population are generally ignored in health related policy making. The data of hypertension and their associated risk factors were lacking in tribal population of Bihar.

Therefore, the present study was done among tribal population (Tharu tribe) of 20-60 years age group with following objectives:

1. To assess the prevalence and predictors of hypertension,
2. To assess knowledge, treatment practices and risk behaviours regarding hypertension.

**METHODS:**

Study design and setting: The present community based Cross sectional study was conducted in Sidhaw (Bagha 2) and Gaunaha block of West Champaran district of Bihar state in March 2018. West champaran was selected for this study because predominant population of Tharu tribes resides in this district. Gaunaha and Sidhaw are the two most populous blocks of tribal population of West Champaran [3]. The study population consisted of all tribal adults between 20-60 years of age group.

**SAMPLE SIZE CALCULATION:**

Sample size was calculated using population estimates, where 17% is the prevalence of hypertension among tribal population from previous study [7], 95% confidence level, 5% absolute precision and a non response rate of 10%. The final sample size was adjusted as 250.

**SAMPLING PROCEDURE**

Two blocks i.e. Sidhaw (Bagha 2) and Gaunaha with maximum number of tribal population from West Champaran districts were selected. Five villages from each block where tribal population resides were chosen and from each village 25 persons of 20-60 year age group and those who were willing to participate in the study were selected. Thus 125 participants from each block were enrolled for the study.

**STUDY TOOLS**

A pretested semi-structured questionnaire was used for data collection. It consisted of four parts. The first part was related to socio-demographic details of study participants like gender, age, education level, occupation, marital status and socio economic status. The socio-economic status was assessed by using modified BG Prasad classification. The second part consisted of questions related to knowledge and treatment practices related to hypertension. Third part consisted of risk factors of hypertension present in tribal adults. Fourth part consisted of various anthropometric and blood pressure measurement.

Knowledge & treatment practices about hypertension: Information on knowledge and treatment practices and risk behaviours was collected from all the selected study subjects using pre-tested and validated questionnaire interviews. The study subjects were asked that do they know about hypertension or raised blood pressure. Those who had heard about hypertension were further interviewed about the asymptomatic nature of hypertension, complications related to hypertension and effective management of hypertension with use of drugs. They were also asked about knowledge regarding their present status of hypertension. Information regarding other risk factors like consumption of alcohol, smoking and tobacco use was also collected. Level of physical activity was assessed and family history regarding hypertension was asked.

Blood pressure measurement: Three measurements of blood pressure at five minutes intervals in sitting position were taken by using mercury sphygmomanometer in selected individuals. Blood pressure was categorised according to JNC VII classification. [8] Persons with systolic blood pressure below 120 mm of Hg and diastolic blood pressure below 80 mm of Hg were taken as normal. Pre-hypertension is defined as mean systolic blood pressure (SBP) between 120-139 mm of Hg and/or diastolic blood pressure (DBP) between 80-89 mm of Hg. Hypertension grade I is defined as mean systolic blood pressure (SBP) between 140-159 mm of Hg and/or diastolic blood pressure (DBP) between 90-99 mm of Hg while hypertension grade II is defined as mean systolic blood pressure (SBP) above 160 mm of Hg and/or diastolic blood pressure (DBP) above 100 mm of Hg.

Anthropometric measurements: Height was measured by making the person stand upright, barefoot, on the ground with heels, buttocks, and shoulder touching the wall, with the head in Frankfurt plane. The height was measured using a sliding stadiometer calibrated to an accuracy of 0.1mm. Weight was recorded using a spring balance calibrated to an accuracy of 0.1kg. Body mass index (BMI) was calculated using formula weight (in kg)/height<sup>2</sup> (in meter). As per Asian guidelines, Overweight was defined by BMI: 23–24.9 Kg/m<sup>2</sup> and obesity was defined by 25 Kg/m<sup>2</sup> and above. High BMI levels included overweight and obesity category. [9].

**METHOD OF STATISTICAL ANALYSIS –**

The data were entered into Microsoft excel spread sheet and analysis was done using SPSS Window (22.0) version. Hypertension or high BP is defined as mean systolic blood pressure (SBP) ≥140 mmHg and/or diastolic blood pressure (DBP) ≥90 mmHg i.e. includes hypertension grade I and Grade II. Frequency and percentage were calculated for demographic parameters and risk behaviour parameters related to hypertension. To find the association with the various risk factors, Pearson's chi-square test was applied. Logistic regression method was applied on factors found significantly associated to hypertension during chi square test to find out predictors of hypertension among tribal population. The statistical significance was evaluated at 5% level of significance.

**ETHICAL ISSUE:**

The study was approved by Institute Ethical Committee of Patna Medical College, Patna. The written consent was taken from each of the study participants. The subjects with high BP were counselled to restrict salt and fat intake in their diet and cessation of smoking and abstinence from alcohol and regular practices of physical activity. They were also advised to contact the physician for confirmation of diagnosis and treatment, if required.

**RESULTS**

The present study included two hundred fifty two (252) participants, which comprised of 105 males and 147 females. The age of the subjects ranged from 20 to 60 years with mean age of the subjects being 45.3 ± 11.7 years. The mean age of males and females were observed to be 46.7 ± 12.5 years and 44.3 ± 11.2 years respectively. Most of the study participants were female (58.3%). Around 46% participants belonged to 50-59 years age group, majority of them were illiterate (62.3%) and around 35%

were working as unskilled labourer. 85% study participants were living with their spouses and about 41% belonged to lower socio-economic class.( Table 1 )

**Table 1: Socio-demographic profile of study participants (N=252)**

Variable	Frequency	Percentage	
Gender	Male	105	41.7
	Female	147	58.3
Age(Mean+SD)	Male	46.7+12.5	
	Female	44.3+11.2	
	Total	45.3+11.7	
Age-group	20-29	24	9.5
	30-39	50	19.8
	40-49	63	25.0
	50-59	115	45.6
Education	Illiterate	157	62.3
	Primary	50	19.8
	Middle	11	4.4
	Secondary/high er secondary	25	9.9
	Graduate	9	3.6
Occupation	Unemployed	6	2.4
	Unskilled	88	34.9
	Semiskilled	7	2.8
	Farming	57	22.6
	Housewife	85	33.7
	Student	9	3.6
Marital status	Married	213	84.5
	Unmarried	13	5.2
	Widowed	26	10.3
SES	Upper	10	3.9
	Middle	139	55.2
	Lower	103	40.9

Around 30% study participants were either current smoker or past smoker and 39% were chewing tobacco either regularly or occasionally. Most of them were involved in low physical activities (49.2%). 86% of study participants were not aware about history of hypertension in their family. 184 (73%) persons had heard about hypertension, among them only 8 persons (4.3%) knew that hypertension can be asymptomatic, only 11 persons (5.9%) knew that hypertension leads to other complications and only 14 persons (7.6%) had knowledge that hypertension can be effectively managed with drugs. Out of 184 persons who had knowledge about hypertension 102 persons (55.4%) were not aware about their hypertension status. The control of hypertension was also assessed among hypertensive adults. Out of 82 hypertensive adults found during study only 31 persons (37.8%) were aware about their hypertension status and were on treatment. Out of 31 persons who were taking medication 12 persons (38.7%) had adequately controlled level of blood pressure. ( Table2 )

**Table 2: Risk factors and Awareness about Hypertension among study subjects (N=252)**

Risk factors	Status	Frequency	Percentage
Smoking status	Never taken	176	69.8
	Past smoker	34	13.5
	Current smoker	42	16.7
Tobacco chewing	Never	152	60.3
	Occasional	17	6.8
	Regular	83	32.9
Alcoholism	Never taken	205	81.3
	Occasional	29	11.5
	Regular	2	0.8
	Past	16	6.3
Physical activity	Low	124	49.2
	Moderate	118	46.8
	High	10	4.0

Family history of hypertension	Neither parent positive	28	11.1
	One parent positive	6	2.4
	Both parent positive	1	0.4
	Participant did not know	217	86.1
BMI	Underweight	42	16.7
	Normal	157	62.3
	Overweight & Obese	53	21.0
<b>Awareness about hypertension among study subjects (N=252)</b>			
Do you Know about Hypertension or raised blood pressure	Yes	184	73.0
Do you know that Hypertension can be Asymptomatic (n=184)	Yes	8	4.3
Are you aware that Hypertension can lead to other complications (n=184)	Yes	11	5.9
Do you know that it can be effectively managed with drugs (n=184)	Yes	14	7.6
Are you presently hypertensive (n=184)	Yes	31	16.8
	No	51	27.8
	Don't know	102	55.4
Hypertensive who were aware about their hypertension status and taking treatment(n=82)	Aware	31	37.8
Control of blood pressure of those hypertensive who were on medication(n=31)	Adequately controlled	12	38.7

The prevalence of hypertension was 32.5% while 43.5% tribal population were pre-hypertensive. The prevalence of hypertension was slightly more among male (35.2%) in comparison to female (30.6%). 53 persons (21%) were either overweight or obese. (Table 3)

**Table 3: Categorisation of blood pressure and BMI among study participants (N=252)**

Variables		Male	Female	Total
Blood pressure category	Normal	17 (16.2)	38 (25.9)	55 (21.9)
	Pre-hypertension	51 (48.6)	64 (43.5)	115 (45.6)
	Hypertension grade I	23 (21.9)	31 (21.1)	54 (21.4)
	Hypertension grade II	14 (13.3)	14 (9.5)	28 (11.1)
BMI	Underweight	9 (8.6)	33 (22.4)	42 (16.7)
	Normal	78 (74.3)	79 (53.7)	157 (62.3)
	Overweight/Obese	18 (17.1)	35 (23.8)	53 (21.0)

(The figures in parenthesis denotes percentage)

As the age increased the prevalence of hypertension also increased significantly ( $p < 0.001$ ). Prevalence of hypertension was significantly higher among persons who were either present or past smoker compared to non-smokers ( $p = 0.007$ ). The prevalence of hypertension was significantly higher ( $p = 0.042$ ) among overweight/obese persons (43.4%) in comparison to normal (32.5%) and underweight persons (19%). We have not found any significant association between gender, marital status, socio-economic status, tobacco chewing, alcohol consumption and physical activities with status of hypertension. Odds of presence of hypertension was 5.93 times more in 50-59 years age group in comparison to 20-29 years age group (95% C.I. 1.91-25.81) ( $p = 0.003$ ). Similarly Odds of presence of hypertension was 4.11 times more in overweight and obese category in comparison to underweight category (C.I.: 1.49-11.30). (Table 4 & 5)

**Table 4: Association of hypertension with various factors using Pearson's chi square test (N=252)**

Variables		Normotensive	Hypertensive	Chi square	P value
Gender	Male	68 (64.8)	37 (35.2)	0.597	0.44
	Female	102 (69.4)	45 (30.6)		
Age-group	20-29	21 (87.5)	3 (12.5)	28.863	<0.001
	30-39	42 (84.0)	8 (16.0)		
	40-49	49 (77.8)	14 (22.2)		
	50-59	58 (50.4)	57 (49.6)		
Marital status	Married	141 (66.2)	72 (33.8)	1.000	0.317
	Unmarried/separated	29 (74.4)	10 (25.6)		
Socio-economic status	Upper/Middle	106 (71.1)	43 (28.9)	2.25	0.13
	Lower	64 (62.1)	39 (37.9)		
Smoking status	Never taken	128 (72.7)	48 (27.3)	7.375	0.007
	Ever taken	42 (55.3)	34 (44.7)		
Tobacco chewing	Never taken	108 (71.1)	44 (28.9)	2.252	0.133
	Ever taken	62 (62.0)	38 (38.0)		
Alcohol intake	Never taken	79 (63.7)	45 (36.3)	0.010	0.919
	Present/past alcoholic	91 (71.1)	37 (28.9)		
Physical activity	Low	79 (63.7)	45 (36.3)	1.564	0.211
	Moderate/hard	91 (71.1)	37 (28.9)		
BMI	Underweight	34 (81.0)	8 (19.0)	6.329	0.042
	Normal	106 (67.5)	51 (32.5)		
	Overweight /Obese	30 (56.6)	23 (43.4)		

(The figures in parenthesis denotes percentage)

**Table 5: Logistic regression analysis showing predictors of hypertension**

Variables		Odd's ratio	95% C.I.	P value
Age group	20-29	1		
	30-39	1.37	0.32-5.77	0.67
	40-49	2.07	0.53-8.07	0.29
	50-59	7.02	1.91-25.81	<b>0.003</b>
Smoking status	Never	1		
	Ever	1.28	0.68-2.42	0.441
BMI	Underweight	1		
	Normal	2.23	0.92-5.41	0.077
	Overweight & Obese	3.99	1.46-10.87	<b>0.007</b>

**DISCUSSION**

In the present world even tribal communities haven't remained unaffected from urbanisation, which has led to changes in their lifestyle. Thus, health assessment of these communities is required time to time to see the pattern of chronic diseases among them. Nowadays hypertension is a major health concern in developing nations and an important modifiable risk factor for CVDs. Some studies have been published regarding prevalence of hypertension from rural area of Bihar but we have not found any literature related to status of hypertension among tribal population of Bihar. A study done by Singh R et al in rural area of Patna district reported a prevalence of 23.7% of hypertension.[10] Many studies have been done on tribal population in other parts of India. The prevalence of hypertension among tribal population was reported as low as 16% to as high of 51% from different part of India. [11-13] The present study also reported a higher prevalence of hypertension as 32.5% among tribal population. The prevalence of hypertension was slightly more among male (35.2%) in comparison to female (30.6%). A multicentric study (2015) conducted in 9 states reported prevalence of hypertension as 27.1 and 26.4 per cent among tribal men and women, respectively.[14]

Studies have revealed acculturation being one of the reasons for increased hypertension among tribals [15, 16]. Tribes that were adjudged to be acculturated and to have risk factors (like prevalent consumption of increased salt, smoking etc) displayed a higher prevalence. This finding was in line with the prevalent opinion that acculturation exposes traditional populations to diseases of modern lifestyle.

The higher prevalence of hypertension in our study supports the concept of 'shift from early adopters to late adopters' given by Howson et al.,[17] which explains that the burden of Cardio-Vascular Diseases shifts from richer sections of the society to the poorer sections of the society. The increasing burden of hypertension and pre-hypertension among tribal adult population is a serious concern as hypertension is an independent risk factor for several diseases like cardiovascular diseases, stroke, end-stage renal and peripheral vascular disease.

Prevalence of hypertension increased significantly with age; similar observation was reported in other studies [18-20] as age is considered as a non modifiable risk factor for hypertension. The prevalence of pre-hypertension in our study was 45.6%. Such a higher percentage of population are on increased risk of becoming hypertensive.

In the present study 184 persons (73%) had heard about hypertension or raised blood pressure. Only 45% of study subjects were aware about their hypertension status among those who had heard about hypertension. The control of hypertension was also assessed among hypertensive adults. Those adults who were found hypertensive during study only 37.8% were aware about their hypertension status. Those hypertensive persons who were taking anti-hypertensive only 38.7% had adequately controlled level of blood pressure. This shows that the awareness level was low among tribal population. Low rates of awareness among the population may be due to high rate of illiteracy (62.3%). A large number of population in pre-hypertension category mixed with low awareness level regarding hypertension among tribal population make them vulnerable for cardiovascular diseases (CVDs) and other serious complications. The situation seems to be alarming and should be properly dealt with.

Increasing age, cigarette smoking and obesity are significantly associated with hypertension. Hypertension was significantly associated with age, higher body mass index, waist to hip ratio, sedentary life style in different studies also. [10, 21, 22] In another study smoking which is a modifiable risk factor for hypertension was significantly associated with it. [23] We could not study association of family history with hypertension since 86% study participants were not aware about their family history of hypertension. Similarly alcohol consumption was also not associated with hypertension. The probable reason for this may be due to prohibition of alcohol consumption in Bihar and the participants were hesitant to disclose their real status regarding alcohol consumption although it is a common practice among tribal population. These may be considered as limitation of this study.

**CONCLUSION**

The higher prevalence of hypertension and pre-hypertension among Tharu tribal population is a matter of concern. Age, cigarette smoking and BMI were significantly associated with hypertension. Most of the individual were not aware of their own hypertension status. The low levels of awareness on hypertension and poor health seeking behaviours of tribals necessitate initiation of appropriate medical and social interventions. This would be useful for the prevention and control of cardiovascular morbidity and mortality in the community. There is a need for strengthening health education programs to promote chronic diseases awareness and emphasize preventive measures among this tribal population.

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