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Original Article

The Effect on Substance Abuse Associated with Nutritional Status and Blood Pressure in Santal Women

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Abstract

Background: The global burden of diseases and associated risk factors in developing countries has altered radically over the past decades, with a clear shift from communicable to non - communicable diseases. Hypertension is a major and probably increasing blood pressure as well as HT is the important risk factors of cardiovascular disease. **Objective:** This study was undertaken to study the effects of substance abuse associated with nutritional status and blood pressure in Santhal women. **Method:** A cross-sectional study was carried out on 100 adult females aged above 18 years were incorporated. This study was undertaken in the Baganpara village of Bolpur, under the Birbhum District. Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were also taken. The t-test analysis was made to determine the comparison of blood pressure levels by nutritional status. **Results:** However, the result of the present study in adult Santhal females revealed that the mean age was 36.86(±15.6) yrs. However, the mean height, weight, MUAC, MWC, MHC, BMI, and WHR were 151.8 (± 4.63) cm, 43.2 (±6.07) kg, 23.6 (±2.14) cm, 70.7 (±7.46) cm, 84.34 (±7.39) cm, 18.7(±2.17) kg/m^2 and 0.83 (±0.03) cm. Moreover the mean of SBP and DBP were 112(±13.0) mmHg and 76.2(±6.94) mmHg, respectively.. It was revealed higher mean SBP in alcohol consumption, as well as higher mean SBP and DBP in tobacco consumption among user. There was no significant ($P>0.05$) association of socio-economic variables with blood pressure. There was no significant difference ($P>0.05$) mean SBP & DBP, between thinness and normal where as revealed significant ($p<0.05$) difference in SBP and DBP between undernourished and normal individuals. **Conclusion:** The present study in Sathal women of Birbhum district revealed that the normal mean blood pressure of adult females was higher compared to thinness, and the mean SBP and DBP of undernourished women were lower than normal individuals.

Keywords:- Blood Pressure Variables, Nutritional Status, Santhal, Substance abuse

Introduction

The global burden of diseases and associated risk factors in developing countries has altered radically over the past decades, with a clear shift from communicable to non-communicable diseases (Abdulle *et al,* 2014). Hypertension is now accepted globally as a major public health problem (Wan *et al,* 2009) in terms of a well-known risk factor for non-communicable diseases (NCDs) like cardiovascular disease (CVD), type 2 diabetes mellitus, and renal disease (Monyeki *et al,* 2006).

For decades, arterial hypertension was considered as a typical disease of adulthood, related to aging and accompanying other clinically evident diseases like diabetes, ischemic heart disease, and chronic kidney disease (Litwin and Kułaga, 2015). Interestingly, not only in adults, hypertension in children and adolescents is also becoming a growing health problem (Riley and Bluhm, 2012) with an increasing prevalence and rate of diagnosis (Luma and Spiotta, 2006). Moreover, the negative and

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potentially severe consequences of hypertension as observed in adults were also detected in children (Lande *et al,* 2006; Drukteinis *et al,* 2007; Lande *et al,* 2009).

Blood pressure refers to the force exerted by circulating blood on the walls of the arteries. Blood pressure is classified into two types, SBP and DBP. The SBP is defined as the peak pressure in the arteries (which occurs near the beginning of the cardiac cycle), and the DBP is the lowest pressure (at the resting phase of the cardiac cycle). Epidemiologic and clinical studies have disclosed that a number of anthropometrically measurable attributes of the human body can be related to the risk of developing metabolic disorders and various illnesses. The commonly reported statistical association between different anthropometric variables like body mass index (BMI), waist circumference (WC), and waist hip ratio (WHR) and poor health may reflect a direct link between overweight, obesity, adipose tissue distribution, and disease. Alternatively, obesity, abdominal obesity, and adipose tissue distribution may indicate cumulative exposure to environmental or lifestyle related behavioral factors. Such factors may directly influence the risk of disease among genetically susceptible individuals. Whether direct or indirect, the association seems to be real and provides opportunities for prevention through individual and community interventions (Seidell *et al,* 2001). A number of studies focused on identifying anthropometric characteristics as the most predictive of disease risk. Body size, frame, adipose tissue patterning, and body composition measures are the key aspects in this regard (Lohman *et al,* 1988), as these are easy, relatively inexpensive, and non-invasive to measure and also easy to monitor over time (Seidell *et al,* 2001).

In India, several studies on nutritional status have been done, however, most of them use BMI as an anthropometric indicator of nutritional status. However, some studies also considered MUAC to understand nutritional status. In a recent study by Chakraborty *et al* (2009), among the adult Bengalee male slum dwellers of Kolkata, it was observed that the overall prevalence of thinness was 32.3%. (Chakrobarty, *et al,* 2009). In another recent study in the adult population of the Raika Community in Jodhpur, Singh *et al* (2009) found the prevalence of thinness to be 51.2 and 37.0 % in males and females, respectively. In a cross-sectional study by Bose *et al* (2006) in adult Santal males in Keonjhar District of Orissa, they found a high prevalence of thinness with a frequency of 26.2%, 3.3%, 3.9% and 19.0% having grades III, II & I & CED, respectively. According to MUAC cutoff points, the prevalence of undernutrition was 33.7%.

Objectives

In view of the above, the present work was undertaken among the adult Santal women of Baganpara, Santiniketan, and West Bengal with the following objectives:

1. To study the association of socio-economic variables with blood pressure variables.
2. To study the association of nutritional status with blood pressure variables.
3. To study the substance abuse and blood pressure.

Material and Methods

The present study was conducted on adult Santal women. Santals speak Santali, which belongs to the Austro-Asiatic language family. The study was undertaken in the Baganpara village of Bolpur, in Birbhum District. This study was cross-sectional; each individual was measured only once.

The Baganpara is a mono-ethnic population inhabited by the Santal. The total population of this Santal village is 356. They are endogamous. Of the 12 clans of Santals, we get 7 clans. The clans Soren and Marandi exhibit the highest number of individuals, and the clan Tudu exhibits the lowest number. The majority of people in this village are engaged in daily labor. Of these 356 individuals, 184 are male and 172 are female. However, for the present work, only adult females aged above 18 years were incorporated. Thus, the total sample was 100 adult females.

Socio-demographic variables

Socio-demographic variables include ethnicity, occupation, education, migration, monthly household income, tobacco, alcohol consumption, and food habits. These were measured using a pre-tested schedule. Age was ascertained by using a questionnaire.

Anthropometric measurements, namely height, weight, and circumference measurements at the mid-upper arm, minimum waist, and maximum hip, were obtained following standard techniques (Weiner

& Lourie, 1981). In brief, in order to measure height, each subject was instructed to stand perfectly straight with his arms relaxed by his sides and his ankles or knees together. The subject's head was positioned in the Frankfurt plane, and the anthropometer was positioned behind the subject so that its lower ends stood between the heels and the beam passed vertically between the buttocks, touching the back of the head. The subjects were asked to inhale deeply and maintain a fully erect position without altering the load on the heels. The movable rod was then brought onto the most superior point on the head with sufficient pressure to compress the hair. The body weight of lightly clothed subjects was recorded on the scale of the weighing machine. To measure the mid upper arm circumference, the subject's arm hangs in a relaxed condition just away from his/her side, and the circumference is taken horizontally at the marked level.

Body mass index: Body mass index (BMI) was computed as weight in kg divided by height in meter squared (kg/m^2).
BMI (Body mass index) = weight (kg)/height (m^2)

Physiological variable
The term blood pressure usually refers to the pressure measured at a person's upper arm. It is measured on the inside of an elbow at the brachial artery, which is the upper arm's major blood vessel that carries blood away from the heart. A person's blood pressure is usually expressed in terms of systolic pressure and diastolic pressure. The systolic pressure is the maximum pressure in an artery at the moment when the heart is beating and pumping blood through the body. The diastolic pressure is the lowest pressure in an artery in the moments between heartbeats when the heart is resting. Left arm blood pressure was taken from participants with the help of a sphygmomanometer and stethoscope. To obtain blood pressure, each participant was requested to sit for at least 5 minutes in a completely relaxed mood on a chair and was also requested not to change her posture during that relaxation period. After the completion of the relaxation period, each subject was requested to place her left arm in front of her, and the table was set at the level of the subject's heart. The blood pressure measurements were taken in a quiet room at room temperature.

Nutritional status
Nutritional Status was evaluated using internationally accepted WHO,s BMI guidelines (WHO, 1995). The following cut-off points were used.

Thinness-III <16.00
Thinness-II 16.00-16.99
Thinness-I 17.00-18.49
Normal 18.50-24.99
Overweight ≧ 25

Nutritional status was also evaluated based on internationally recommended (James *et al*, 1994) cutoff points for MUAC, according to which for woman, MUAC less than 22.0 cm indicates undernutrition and MUAC of 22.0 cm or more normal nutritional status.

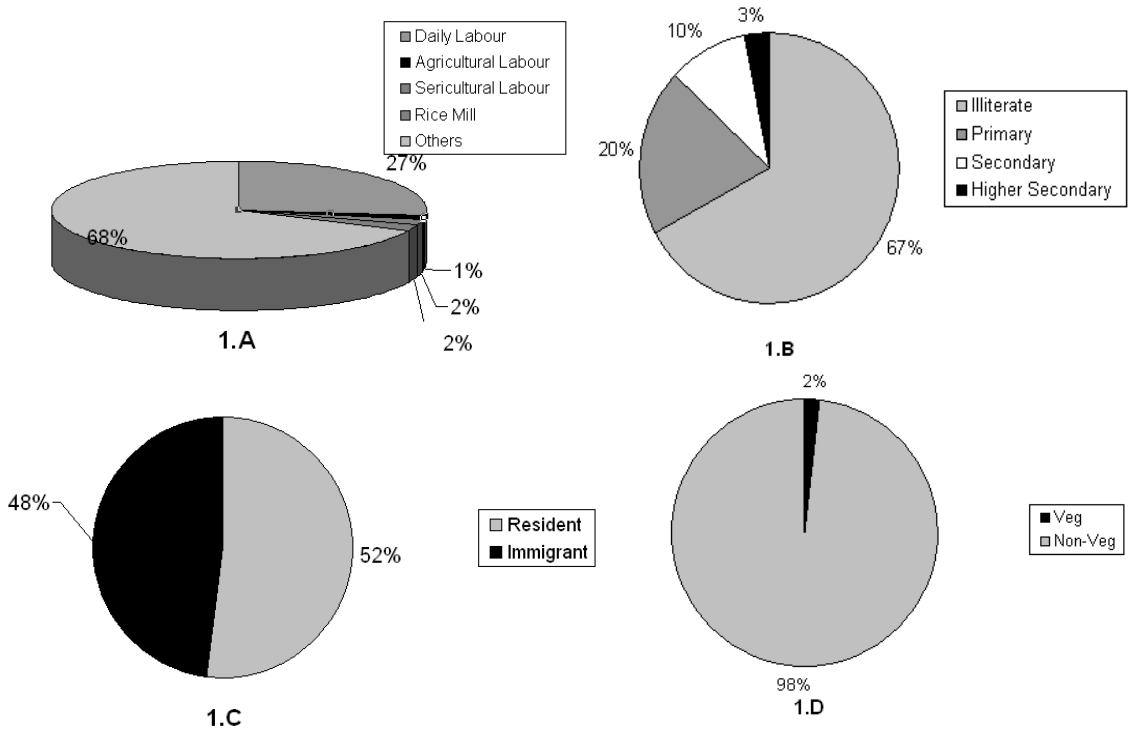
Statistical Analysis
Descriptive statistics includes mean, standard deviation and frequency distribution. Inferential statistics includes t-test and Pearson correlation coefficient.

Results
Table 1 – Shows the socio-demographic characteristics of the studied population, with regard to the occupational status, 27% are engaged in daily labor activity followed by agriculture 1%, sericulture 2%, rice mill labor 2% and 68% engaged in other occupational activities including house wife. However with regard to the educational status 67% adult females are illiterate, followed by 20% for primary, 10% and 3% females have passed secondary and higher secondary, respectively. With regards to the migration status 52% females are born and brought up in this village and 48% migrated

from outside the village. In the studied population 98% females are non-vegetarian and only 2% females are vegetarian. Most of the adult females 74% are non smoker, however 10% used tobacco by chewing and 16% is smoker. Like tobacco consumption, most of the females are not addicted by alcohol. 56% females never drink alcohol. However 21% females drink alcohol occasionally and only 12% and 11% females drink alcohol daily and frequently, respectively.

Table 1. Socio-demographic characteristics of the studied population.

Variables	N	%
A :Occupation		
Daily labour	27	27
Agricultural Labour	1	1
Sericulture Labour	2	2
Rice Mill	2	2
Others	68	68
B : Education		
Illiterate	67	67
Primary	20	20
Secondary	10	10
Higher Secondary	3	3
C : Migration		
Resident	52	52
Immigrant	48	48
D : Food Habit		
Veg	2	2
Non-veg	98	98
E : Tobacco Consumption		
Smoking	16	16
Chewing	10	10
Non-smoker	74	74
F : Alcohol Consumption		
Daily	12	12
Frequently	11	11
Occasionally	21	21
Never	56	56



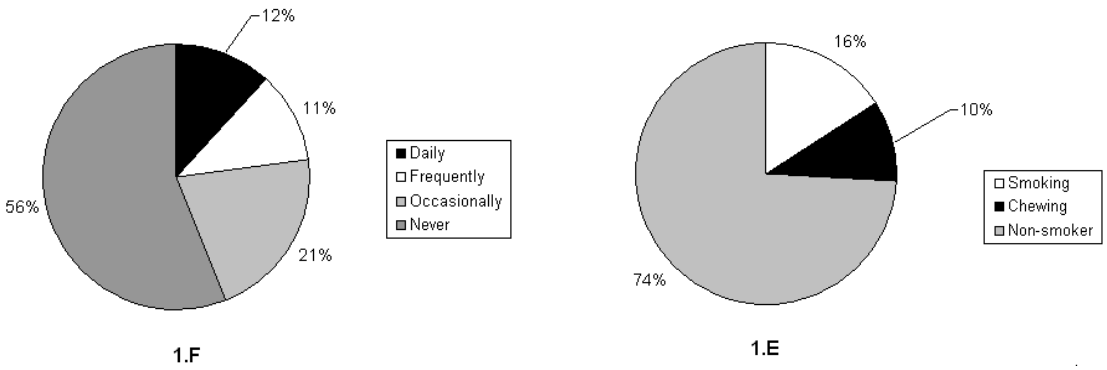


Figure 1. Socio-demographic characteristics of the studied population.

Table 2- shows the mean and standard deviation of physiological variables in terms of SBP and DBP, in the adult Santhal female. The mean SBP and DBP are 112 (± 13.0) and 76.2 (± 6.94), respectively.

Table 2. Mean and SD of systolic and diastolic blood pressure in the studied population.

Variable	Mean	SD
SBP(mm/Hg)	112	13.0
DBP(mm/Hg)	76.2	6.94

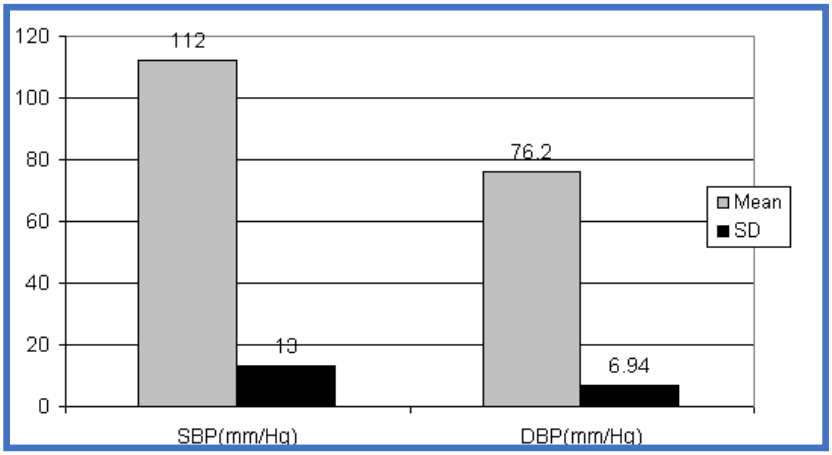


Figure 2. Mean and SD of systolic and diastolic blood pressure in the studied population.

Table 3 - shows the nutritional status by BMI in the studied population. The overall prevalence of thinness (BMI <18.49) in female is 45%. However the prevalence of normal (BMI 18.50-24.99) female is 54% and overweight (BMI ≥25) is only 1%.

Table 3. Nutritional status by BMI in the studied population.

Variable	N (%)
Under nutrition (<18.49)	45(45%)
Normal (18.50 – 24.99)	54(54%)
Overweight (≥ 25)	1(1%)

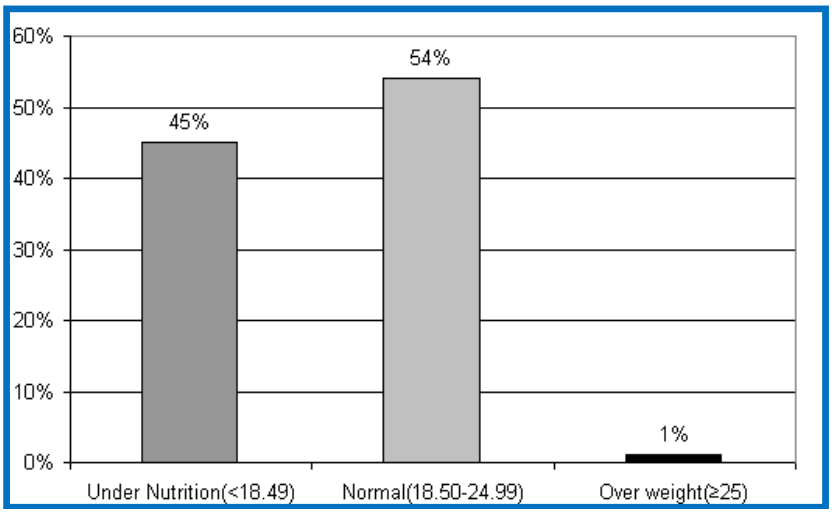


Figure 3. Nutritional status by BMI in the studied population.

Nutritional status by MUAC in the studied population is shown in Table 4. The overall prevalence of under nutrition (MUAC <22.0) is 17 %. However about 83% women were normal (MUAC ≥22.0).

Table 4. Nutritional status by MUAC in the studied population.

Variable	N (%)
Undernourish (<22.0)	17(17%)
Normal (≥22.0)	83(83%)

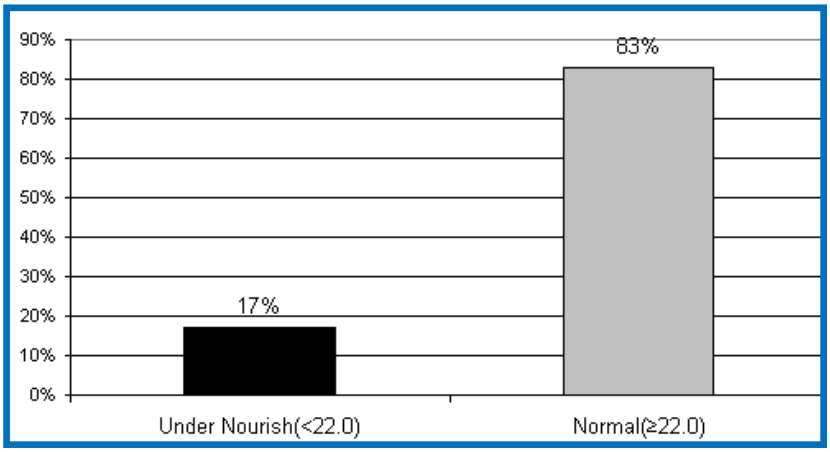


Figure 4. Nutritional status by MUAC in the studied population.

Table 5 - shows the comparison of blood pressure level by alcohol consumption status in the adult Santhal women. The mean SBP and DBP of the individuals who drink alcohol frequently, occasionally and never were 108.2(±16.1), 115.2(± 13.6) and 111.6(± 11.2) mmHg for SBP and 74.3 (± 7.27), 75.2 (± 8.13) and 77.5(± 6.10) mmHg for DBP, respectively.

Table 5. Alcohol consumption and blood pressure

Variable	SBP		DBP	
	Mean	SD	Mean	SD
Frequently	108.2	16.1	74.3	7.27
Occasionally	115.2	13.6	75.2	8.13
Never	111.6	11.2	77.5	6.10

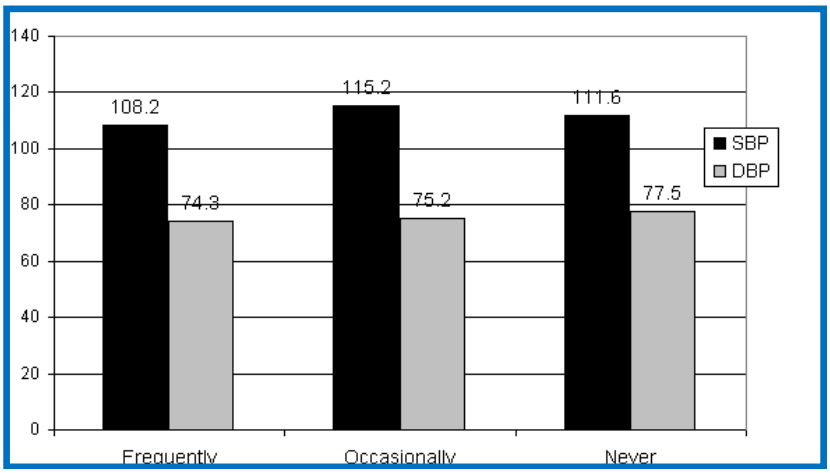


Figure 5. Alcohol consumption and blood pressure

Table 6 - Shows mean and standard deviation of physiological variables in terms to SBP and DBP in the studied population by tobacco consumption status. The mean SBP and DBP of tobacco user and non user are 113.4(± 17.8), 11.05 (±11.4) mmHg and 76.5(± 7.97), 75.9 (± 6.60) mmHg, respectively.

Table 6. Tobacco consumption and blood pressure

Variable	SBP		DBP	
	Mean	SD	Mean	SD
User	113.4	17.8	76.5	7.97
Non-user	110.5	11.4	75.9	6.60

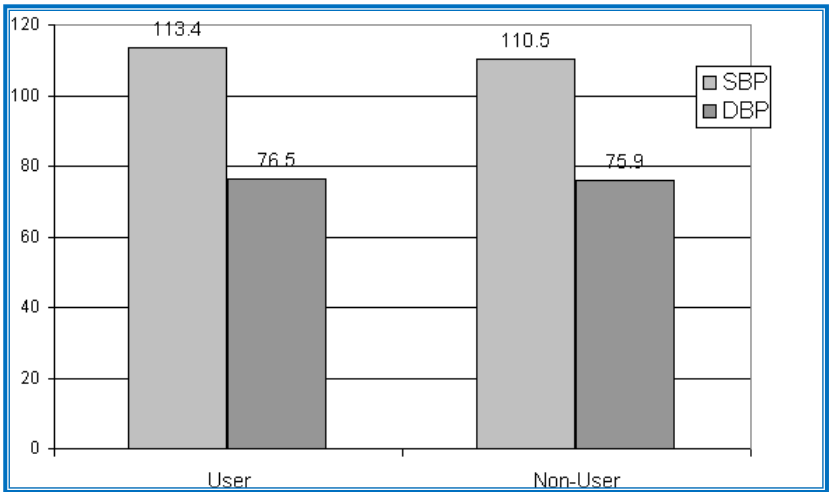


Figure 6. Tobacco consumption and blood pressure

Table 7 - shows the comparison of blood pressure level by nutritional status measured by BMI in the studied population. The mean SBP of thinness and normal of adult female are 110.9 (± 15.3) and 112.18 (± 11.0) mmHg, respectively. However, the mean DBP of thinness and normal of adult female are 75.9 (± 7.56) and 76.5 (± 6.47) mmHg, respectively. The result of the t-test analysis revealed no significant ($p>0.05$) difference in SBP and DBP between thinness and normal individuals.

Table 7. Nutritional status by BMI and blood pressures

Variables	SBP				DBP			
	Mean	SD	T	P	Mean	SD	T	P
Thinness (<18.49)	110.9	15.3	0.47	>0.05	75.9	7.56	0.42	>0.05
Normal (≥18.50)	112.18	11.0			76.5	6.47		

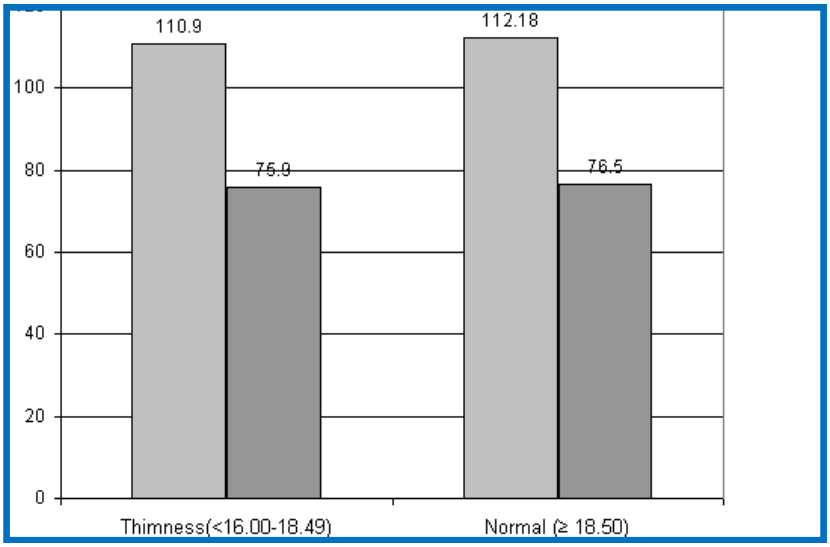


Figure 7. Nutritional status by BMI and blood pressures

Table 8 - shows the comparison of blood pressure level by nutritional status measured by MUAC in the studied Population. The mean SBP of under nourish and normal of adult female are 104.7(± 16.6) and 112.8 (± 11.8) mmHg, respectively. The mean DBP of under nourish and normal of adult female are 72.9 (± 7.71) and 76.7 (±6.64) mmHg, respectively. Results of the t-test analysis revealed significant ($p<0.05$) difference in SBP and DBP between undernourished and normal individuals.

Table 8. Nutritional status by MUAC and blood pressures

	SBP				DBP			
	Mean	SD	T	P	Mean	SD	T	p
Undernutrition (<22.0)	104.7	16.6	2.40	<0.05	72.9	7.71	2.09	<0.05
Normal (≥22.0)	112.8	11.8			76.7	6.64		

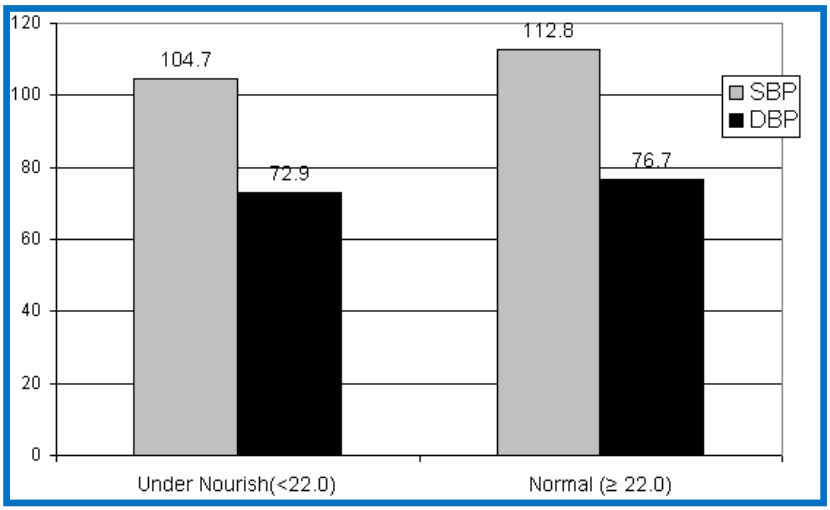


Figure 8. Nutritional status by MUAC and blood pressures

Discussion

Understanding the nutritional as well as health status of the population has a vital role in the overall socio-economic development of the country. In India, a number of studies have been done to understand the nutritional status. Several recent studies have utilized BMI to study the nutritional status of tribal populations. Some studies also used MUAC to understand nutritional status. Hypertension is a major and probably increasing cause of morbidity and mortality. Hypertension (HT), commonly referred to as 'high blood pressure', is a medical condition, in which the blood pressure is chronically elevated to 140(SBP)/90(DBP) mmHg or higher. Studies revealed that increasing blood pressure as well as HT are important risk factors for cardiovascular disease.

In the present study, an attempt has been made to study the association of socio-economic and anthropometric variables with blood pressure, as well as the association of nutritional status with blood pressure variables.

However, the result of the present study in adult Santhal females revealed that the mean age was 36.86 (±15.6) years. However, the mean height, weight, MUAC, MWC, MHC, BMI, WHR were 151.8 (±4.63) cm., 43.2(±6.07) kg., 23.6(±2.14)cm., 70.7(±7.46)cm., 84.34(±7.39)cm., 18.7(±2.17)kg./m^2 and 0.83(±0.03). Moreover, the mean of SBP and DBP were 112(±13.0) mmHg and 76.2(±6.94) mmHg. A comparison of different anthropometric indicators with blood pressure levels in rural Wardha revealed a comparatively higher mean for height, weight, WHR and MWC in the adult Santhal females of the present study. The lower mean for BMI and SBP in the adult Santhal females of the present study, however, the mean DBP was same in both populations. A comparison of different descriptive epidemiologies of blood pressure in the rural adult population in Northern Ghana revealed a comparatively lower mean for BMI, MWC,SBP and a higher mean for DBP in the adult Santhal females of the present study.

The result also revealed that 27% female are engaged in daily labour activity. However, with regards to educational status, 67% of adult females were illiterate. With regards to migration status, 52% of females are residents of the village, and 48% migrated from outside of the village. 74% of females do not use tobacco, 16% and 10% of females use tobacco by smoking or chewing. The majority of the female never drink alcohol.

With regard to nutritional status, the overall prevalence of thinness in the studied population was 45%. However, the prevalence of under nutrition was comparatively lower than thinness in adult Santhal women (17%).
In order to understand the association of socio-economic variables with blood pressure, the result revealed no significant ($p>0.05$) association of alcohol consumption, tobacco consumption, with blood pressure in adult Santhal women.

Conclusion

In order to understand the association of nutritional status with blood pressure variables, the result revealed no significant difference in mean SBP and DBP, between thinness and normal, whereas a significant ($p<0.05$) difference in SBP and DBP was revealed between undernourished and normal individuals.
. The effect on substance abuse It was revealed that there was a higher mean SBP in alcohol consumption, as well as a higher mean SBP and DBP in tobacco consumption among users. However, the mean SBP and DBP normals of adult females were higher compared to thinness. Contrary to that, the mean SBP and DBP of undernourished women were significantly ($p<0.05$) lower than normal individuals.

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