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N.J. Xess, Dhansay, S.S. Kosariya and S. Das

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Authors and affiliations

[1]**Nisha Julie Xess,** Master student, Department of Anthropology and Tribal Development, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.). nishaxess3108@gmail.com

[2]**Dhansay**, Research Scholar, Department of Anthropology, Dr. Harisingh Gour Vishwavidyalaya Sagar, (M.P.) dhansayt@gmail.com (Corresponding Author)

[3]**Satyajeet Singh Kosariya,** Scientific Officer, Scene of Crime Mobile Unit, Korba (C.G.) satyajeetkosariya@gmail.com

[4]**Subal Das**, Assistant Professor, Department of Anthropology and Tribal Development, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.). dsubalvu@gmail.com

Alcohol Consumption and Nutritional Status of Women of Kansabel, Jashpur, Chhattisgarh, India

N.J. Xess[1], Dhansay[2], S.S. Kosariya[3] and S. Das[4]

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ABSTRACT

Women's alcoholism has significant impacts on society, affecting not only the individuals struggling with addiction but also their families and communities. The study aims to assess alcohol consumption and its effects on blood pressure, as well as to examine the nutritional status of women in Kansabel, Jashpur district, Chhattisgarh.

In this cross-sectional study, a total of 200 tribal women were personally interviewed to collect information and measured anthropometrically using standard procedures. Blood pressure was measured using an Omron digital blood pressure machine.

Out of total, 34.5% were identified as alcohol consumers, while 65.5% were not. Significant difference between alcoholic and non-alcoholic women was found in age ($t = 5.75$, $P<0.05$), hip circumference ($t = 2.13$, $P<0.05$), systolic blood pressure ($t = 4.76$, $P<0.05$), diastolic blood pressure ($t = 3.51$, $P<0.05$), BMI ($t = 3.68$, $P<0.05$), and WHR ($t = 3.52$, $P<0.05$). The significant higher systolic ($F=8.88$; $P<0.05$) and diastolic ($F=6.44$; $P<0.05$) blood pressure, BMI ($F=4.72$; $P<0.05$), and WHR ($F=5.88$; $P<0.05$) was reported among weekly and daily alcohol consumer. The combined prevalence rate of undernutrition, normal weight, overweight, and obesity was 22.5%, 64%, 10.5%, and 3% respectively. The prevalence of undernutrition was highest (37.5%) among occasionally alcoholic women. Similarly, the combined prevalence of overweight and obesity was greater among daily alcoholic women (28.6%).

Thus, the study concluded that there is significant association between alcohol consumption and variation in blood pressure. Alcohol consumption could potentially lead to weight gain and an increased risk of morbidities. The studied population seriously facing a double burden of malnutrition simultaneously.

Keywords: *Alcohol consumption, Body Mass Index, Underweight, Obese, Systolic and diastolic blood pressure, etc.*

INTRODUCTION

Alcohol is the leading cause of morbidity, mortality (Vidhukumar et al., 2016), and disability globally (Girish et al., 2010). A moral theologian might see alcoholism as a matter of vice, while sociologists see it as a social problem. It is considered a sin by religious people and a crime by law enforcement groups. It has been described as a problem of personality disorder by a psychiatrist. Excessive intake of alcohol, chewing tobacco, and smoking is a very common form of addiction among Indian societies, and such addictions pose direct or indirect adverse effects on individual health and behaviour, social norms, family harmony, education, and the economy of the person or society (Venkataraman et al., 2013; Alshammari, 2015; Gururaj et al., 2020). The AMBROSIA, a magazine for the alcove industry, posted on December 11, 2020, that women consume alcohol for various reasons, such as a desirable habit (43.7%) in the age group of 18-30 years, social norms (41.7%) in the age group between 31-45 years, and for emotional reasons (39.1%) in the 46-60 age group.

Tomson & Lip (2006) cited Ezzati et al. (2002), who stated that nearly four percent of the global disease burden is related to alcohol consumption, compared to the tobacco effect (4.1%) and increased blood pressure (4.4%). According to a WHO report (2018), nearly half (43%) of the global population aged 15 and above consumes alcohol, and nearly 3 million people die due to the harmful effects of alcohol consumption, contributing to 5.3% of all deaths globally every year (Mondal et al., 2018). Nowadays in India, as a developing country, alcohol consumption is the central key factor for many public health problems. It is recognized that alcohol is causally related to more than 60 medical conditions (Tomson & Lip, 2006), such as gastritis, liver disease, cardiomyopathy, anaemia, immunosuppression, oral and oesophageal cancer, and neurological complications (Wernicke encephalopathy, blackouts, dementia, etc.) (Eashwar et al., 2019).

Epidemiological and clinical studies have already been conducted to investigate the effects of regular alcohol consumption on blood pressure and obesity (Tumwesigye et al., 2020). The pioneering work on the relationship between alcohol intake and hypertension was reported by Lian, a French physician, in 1915 when he explained his findings among French wine drinkers (Mousa, 2005). The worldwide acceptance of the relationship between high blood pressure, hypertension, and obesity with alcohol intake has been documented (Tumwesigye et al., 2020). A J-shaped association was estimated between alcohol consumption and blood pressure, means low blood pressure linked to low alcohol consumption (Kusuma et al., 2009).

The nutritional health problem is one of the major concerns among tribal women (Sinha et al., 2018). Tribal communities are more vulnerable and discriminated against based on social, income, and educational inequalities. Undernutrition is the most severe consequence of poverty (Ghosh, 2016). Most tribal communities are isolated, living with minimal access to healthcare facilities. In today's developing nation, we are in a state of nutrition transition, facing the dual burden of malnutrition. This means that the problems of overweight and obesity are increasing alongside undernutrition. Tribal women face double marginalization within the caste and hierarchy system of Indian society, even though they contribute significantly to national progress and development. According to a survey *conducted by the Indian Council of Social Science Research, 48.53% of respondents stated that women serve the family first and eat last* (Ghosh, 2016). *The goal of 'Health for All' cannot be fully achieved unless we pay due attention to such a vulnerable segment of society, especially tribal women* (Sinha et al., 2018). Therefore, it is imperative to assess the nutritional status of this vulnerable group (Singh, 2019) to identify the groups at risk, as there is a lack of data on the nutritional status of tribal women (Ghosh, 2016).

Alcohol is the only psychoactive drug that provides empty calories (7.1 kcal/g) (Toffolo et al., 2012) because it does not supply any vitamins and minerals (Molina et al., 2003). Therefore, it is assumed that regular alcohol consumption increases the risk of weight gain (Navarro et al., 2010), abdominal fat (Rissanen et al., 1991; Jin et al., 2011), and obesity (Wakabayashi, 2009). It has been observed that metabolic and nutritional disorders are very common among alcohol consumers, which require a high resting energy expenditure (Addolorato et al., 1997) and use fat as the main source of energy (Addolorato et al., 1998).

However, it remains a topic of interest among researchers and academicians because sometimes there is an inverse or negative relationship (Colditz et al., 1991; Liu et al., 1994; Wannamethee et al., 2004; Rohrer et al., 2005; Skrzypczak et al., 2008; Gearhardt & Corbin, 2009), sometimes a positive relationship (Colditz et al., 1991; Arif & Rohrer, 2005; Breslow & Smothers, 2005; Lukasiewicz et al., 2005), and sometimes no association (Alcacera et al., 2008; French et al., 2010; Tolstrup et al., 2005) reported among both men and women (Toffolo et al., 2012). These different outcomes might be due to variations in alcohol consumption patterns, frequency, quantity, and types of alcohol; they could also depend on age and gender (Toffolo et al., 2012). Hence, it is suggested that the effect of alcohol intake on blood pressure, weight gain, higher BMI, and hip circumference of individuals needs further exploration (Kusuma et al., 2009;

Klobodu et al., 2014). With this context, the present study aims to assess alcohol consumption, its effect on blood pressure, and to examine the nutritional status of women.

MATERIALS AND METHODS

Study Area and Population

A cross-sectional study was conducted among the women of Kansabel block, a tribal-dominated area in the Jashpur district of Chhattisgarh. The Jashpur district, located in the northeast corner of Chhattisgarh, was a princely state during the British Raj, as per the Census of India in 2011. Out of the total population, 62.3 percent are scheduled tribes (Census of India, 2011). The district of Jashpur is divided into eight tehsils, with Kansabel being one of them. The total population of Kansabel is 76,735, with a sex ratio of 1,028 and a literacy rate of 68.65%, as reported in the Census of India in 2021.

The data was collected from women in four villages: Dandajor, Farsa Judwain, Bhaisbud, and Kansabel itself. A total of 200 women aged above 20 years were randomly selected from these villages. Most of these women belonged to the Oraon tribe, known by surnames like Ekka, Tigga, Barla, Kujur, Bara, and others. They were primarily engaged in agriculture, and their staple food consisted of rice with vegetable curry. Additionally, they made rice beer at home for consumption. Chewing tobacco and smoking were common practices among them. Locally, they spoke Kurukh and Chhattisgarhi.

Data Collection

Personal interviews were conducted to gather information on various factors, including age, alcohol consumption, family type, education, and occupation. Anthropometric measurements, such as height (cm), weight (kg), waist circumference (cm), hip circumference (cm), and Body Mass Index (BMI), were collected using standard tools and procedures. The height, waist circumference, and hip circumference of the subjects were measured to the nearest 0.1 cm, while weight was measured to the nearest 100 grams.

The World Health Organization's (WHO, 1995), BMI classification was used to determine the nutritional status of these women. BMI is calculated as body weight divided by height in square meters (BMI = W (kg) / H (m^2)). Similarly, the Waist-Hip Ratio (WHR) was calculated as the ratio of waist circumference to hip circumference (WHR = WC (cm) / HC (cm)). Systolic and diastolic blood pressure were measured using an Omron Digital blood pressure machine.

Statistical tools

The blood pressure is classified based on the Indian guidelines for the management of hypertension in 2001, as shown in Table 1 (Shah et al., 2020). A t-test was applied to assess the significant mean difference between alcoholic and non-alcoholic women in their anthropometric characteristics. Additionally, one-way analysis of variance (ANOVA) was used to analyse the mean differences in continuous variables, while Chi-square/Fisher's Exact test was employed to examine the relationships between discrete variables. All of these statistical analyses were performed using the Statistical Package for Social Science (SPSS) version 16.0. Statistical significance was considered at the $p<0.05$ level.

Table 1: Classification of blood pressure for adults age 18 and older (IGH, 2001)

Category	Systolic (mmHg)	Diastolic (mmHg)
Optimal	<120	<80
Normal	<130	<85
High-Normal	130-139	85-89
Hypertension Stage 1	140-159	90-99
Hypertension Stage 2	160-179	100-109
Hypertension Stage 3	>180	>110

RESULTS

Table 2: Socio-demographic Profile of Respondents

Age Group (years)	*N (%)*	**Education**	*N (%)*	**Occupation**	*N (%)*	**Marital status**	*N (%)*	**Family type**	*N (%)*
21-30	57 (28.5)	Illiterate	81 (40.5)	House Wife	23 (11.5)	Married	164 (82.0)	Joint	70 (35)
31-40	55 (27.5)	Primary	40 (20.0)	Agriculture	143 (71.5)	Unmarried	8 (4.0)	Nuclear	130 (65)
41-50	39 (19.5)	Middle	53 (26.5)	Wage labour	23 (11.5)	Widow	26 (13)		
51-60	32 (16)	Secondary	9 (4.5)	Govt. job	11 (5.5)	Separate	2 (1)		
>61	17 (8.5)	Higher Secondary and Above	17 (8.5)						
Total = 200									

Table 2 displays the socio-demographic characteristics of the studied population. The largest proportion (28.5%) of the study population fell within the 21-30 years of age group, while the smallest group (8.5%) comprised individuals aged 61 years and above. Among this population,

40.5% were illiterate, 20% had completed their primary education, followed by middle school (26.5%), secondary school (4.5%), and higher secondary education and above (8.5%).

The residents of this studied area were primarily engaged in agriculture, with the majority of women (71.5%) working in agricultural occupations, followed by housewives (11.5%), wage laborers (11.5%), and government jobs (5.5%). Of the total population, 82% were married, while only four percent were unmarried, remaining women categorized as widowed (13%) or separated (1%). 35% women lived in joint families, while the remaining 65% resided in nuclear families.

Table 3: Anthropometric Characteristics of the Respondents

Category	Alcohol Consumption		Difference	t value	p value
	Yes (69)	No (131)			
Age (Years)	47.93±11.54	37.31±12.38	10.62	5.75	0.000*
Height (cm)	152.15±6.67	150.42±6.64	1.72	1.23	0.220
Weight (Kg)	51.93±11.28	49.00±7.41	2.92	1.35	0.178
Waist Circumference (cm)	78.50±14.78	73.66±16.25	4.83	1.48	0.140
Hip Circumference (cm)	88.72±14.09	81.63±18.03	7.08	2.13	0.035*
Systolic (mmHg)	131.83±21.86	118.85±16.15	12.97	4.76	0.002*
Diastolic (mmHg)	84.92±13.92	79.17±9.10	5.75	3.51	0.001*
BMI (Kg/m^2)	22.75±4.21	20.79±3.19	1.95	3.68	0.000*
WHR	0.89±0.06	0.85±0.08	0.03	3.42	0.001*

**P<0.05*

Table 3 presents the anthropometric characteristics of the respondents. A total of 34.5% were identified as alcohol consumers, using alcohol for reasons such as fatigue relief. Among which, 11.59% consumed alcohol occasionally, 78.26% consumed it weekly, and 10.19% consumed it daily. In contrast, 65.5% respondents had never consumed alcohol.

The mean values for age, height, weight, waist circumference, hip circumference, systolic and diastolic blood pressure, BMI, and WHR for alcoholic women were as follows: 47.93±11.54 years, 152.15±6.67 cm, 51.93±11.28 kg, 78.50±14.78 cm, 88.72±14.09 cm, 131.83±21.86 mmHg, 84.92±13.92 mmHg, 22.75±4.21 kg/m², and 0.89±0.06, respectively. In comparison, non-alcoholic women had the following mean values: 37.31±12.38 years, 150.42±6.64 cm,

49.00±7.41 kg, 73.66±16.25 cm, 81.63±18.03 cm, 118.85±16.15 mmHg, 79.17±9.10 mmHg, 20.79±3.19 kg/m², and 0.85±0.08, respectively.

The mean (±σ) value of all anthropometric variables was found higher among alcoholic women than non-alcoholic women. However, a significant difference between alcoholic and non-alcoholic women was observed in age ($t = 5.75$, $P<0.05$), hip circumference ($t = 2.13$, $P<0.05$), systolic blood pressure ($t = 4.76$, $P<0.05$), diastolic blood pressure ($t = 3.51$, $P<0.05$), BMI ($t = 3.68$, $P<0.05$), and WHR ($t = 3.52$, $P<0.05$).

Table 4: Respondents Distribution with respect to their Blood Pressure (IGH, 2001)

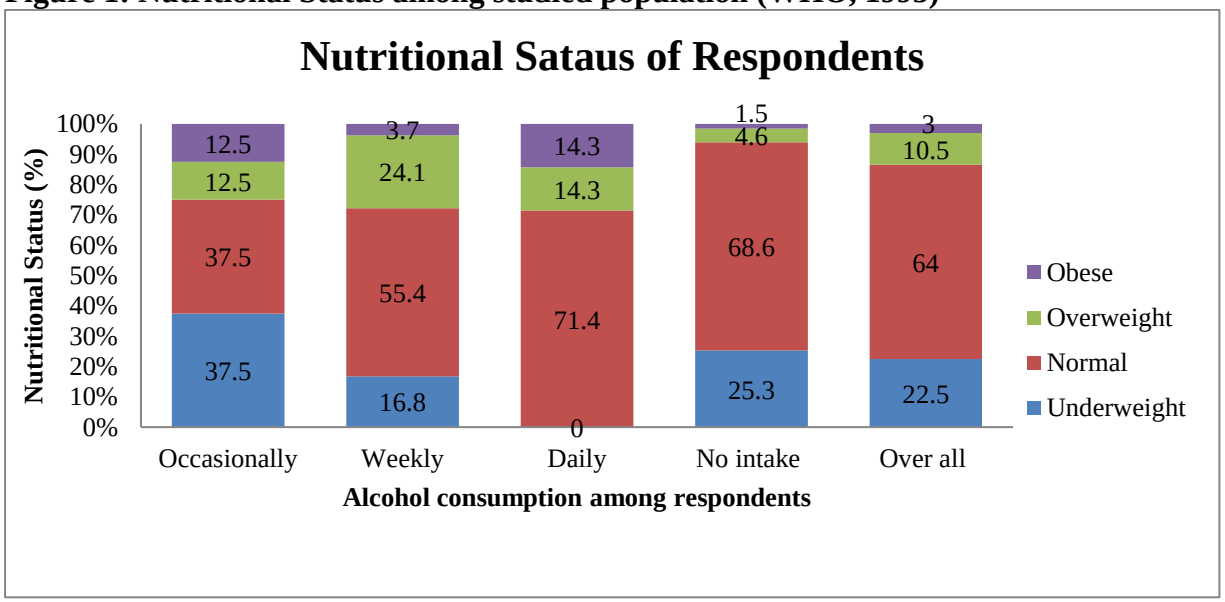
Category	Alcohol Consumption (N)				
	Occasionally (8)	**Weekly (54)**	**Daily (7)**	**Yes (69)**	**No (131)**
	Systolic Blood Pressure				
Optimum	5 (62.5)	15 (27.8)	3 (42.9)	23 (33.3)	83 (63.4)
Normal	1 (12.5)	13 (24.1)	2 (28.6)	16 (23.2)	28 (21.4)
High Normal	0 (0.0)	7 (13.0)	1 (14.3)	8 (11.6)	7 (5.3)
Hypertension stage 1	2 (25)	14 (25.9)	0 (0.0)	16 (23.2)	10 (7.6)
Hypertension stage 2	0 (0.0)	3 (5.6)	0 (0.0)	3 (4.3)	2 (1.5)
Hypertension stage 3	0 (0.0)	2 (3.7)	1 (14.3)	3 (4.3)	1 (0.8)
χ^2/Fisher Exact Test	22.652				
P value	0.000*				
	Diastolic Blood Pressure				
Optimum	4 (50)	20 (37)	4 (57.1)	28 (40.6)	79 (60.3)
Normal	1 (12.5)	11 (20.4)	2 (28.6)	14 (20.3)	27 (20.6)
High Normal	1 (12.5)	7 (13)	1 (14.3)	9 (13)	10 (7.6)
Hypertension stage 1	1 (12.5)	7 (13)	0 (0.0)	8 (11.6)-	10 (7.6)
Hypertension stage 2	0 (0.0)	6 (11)	0 (0.0)	6 (8.7)	5 (3.8)
Hypertension stage 3	1 (12.5)	3 (5.6)	0 (0.0)	4 (5.8)	0 (0.0)
χ^2/Fisher Exact Test	22.287				
P value	0.042*				

**P<0.05*

Table 4 provided a cross-tabulation of alcohol consumption and blood pressure (systolic and diastolic). The table showed that a greater portion of the studied population were fallen in the categories of optimum and normal blood pressure. The combined prevalence within the hypertensive stage (from high normal to hypertension stage 3) was lower (systolic 15.28% and diastolic 19%) than the normal (systolic 21.4% and diastolic 20.6%) and optimum (systolic 63.4% and diastolic 60.3%) blood pressure categories among women who did not consumed alcohol. In comparison, it was more or less equal or greater among women who were identified as alcohol consumers. The combined prevalence of hypertensive systolic blood pressure (from

high normal to hypertension stage 3) was found to be greater (43.4%) than the normal (23.2%) and optimum (33.3%) categories. The combined prevalence of hypertensive diastolic blood pressure (from high normal to hypertensive stage 3) was 39.1%, which was higher than the normal (20.3%) but, lower than in the optimum (40.6%) categories. The value of the Fisher Exact test also indicated a significant association between alcohol consumption and blood pressure (systolic: $\chi^2 = 22.652$, $P<0.05$, and diastolic: $\chi^2 = 35.74$, $P<0.05$).

Figure 1: Nutritional Status among studied population (WHO, 1995)



BMI classification is a fundamental criterion for assessing the nutritional status of individuals. In this study, the nutritional status of the population was classified based on the WHO (1995) guidelines, as depicted in Figure 1. Overall, 22.5% of women were identified as undernourished, 64 % as normal weight, 10.5% as overweight, and remaining 3 % were obese.

The prevalence of undernutrition was notably higher among occasionally alcoholic women (37.5 %) compared to weekly alcoholic women (16.8%) and daily alcoholic women (0%), while it was 25.3% among non-alcoholic women. Interestingly, the highest prevalence of normal weight was observed among daily alcoholic women.

When assessing the combined prevalence of overweight and obesity, it was found to be higher among daily alcoholic women (28.6%), followed by weekly alcoholic women (27.8%), occasionally alcoholic women (25%), and non-alcoholic women (6.1%). This suggests a potential link between habitual alcohol consumption and weight gain.

Table 5: Effect of Alcohol consumption on test variables of the studied women

Alcohol Consumption	Systolic (mmHg)	Diastolic (mmHg)	BMI (Kg/m^2)	WHR
Occasionally	121.38±19.44	84.44±16.84	22.47±5.32	0.83±0.10
Weekly	133.94±20.48	86.28±13.36	22.66±4.06	0.90±0.04
Daily	127.43±32.61	75.00±12.53	23.82±4.52	0.91±0.05
No intake	118.85±16.15	79.17±9.10	20.79±3.19	0.85±0.08
F value	8.88	6.44	4.72	5.88
P Value	0.000*	0.000*	0.003*	0.001*

**P<0.05*

Table 5 illustrated the effect of women's alcohol consumption on their systolic and diastolic blood pressure, BMI, and WHR. The results of the one-way ANOVA test indicate a significant variation in systolic ($F = 8.88$; $P<0.05$) and diastolic ($F = 6.44$; $P<0.05$) blood pressure, BMI ($F = 4.72$; $P<0.05$), as well as in WHR ($F = 5.88$; $P<0.05$) of women in this study. Systolic and diastolic blood pressure was significantly higher among weekly alcohol consumer. Whereas, the BMI and WHR was reported greater among daily alcohol consumer.

DISCUSSION

The prevalence of alcohol consumption in various cities and locations across India is tabulated in the table 6, based on studies conducted by different authors. Notable variations in alcohol consumption rates are evident, with Kolkata showing the highest prevalence rate 65.8%, while Vilupuram district reports the lowest rate 16.8%. In the present study, the prevalence of alcohol consumption was found to be 34.5%. This rate is lower than the reported rates in Kolkata (65.8%), Dehradun (44%), urban areas of Chennai (42.65%), Kanchipuram district (39%), rural Indore (38.2%), and Andaman and Nicobar Islands (35%), indicating that more people in those locations consume alcohol compared to the present study. On the other hand, the prevalence of alcohol consumption in Vilupuram district (16.8%), Puducherry (17.1%), Bangalore (23.7%) and Kerala (28.78%), is lower compared to the present study (34.5%).

Significant difference was found in anthropometric measurements between alcoholic and non-alcoholic women, with variation observed in age ($t = 5.75$, $P<0.05$), hip circumference ($t = 2.13$, $P<0.05$), systolic blood pressure ($t = 4.76$, $P<0.05$), diastolic blood pressure ($t = 3.51$, $P<0.05$), BMI ($t = 3.68$, $P<0.05$), and WHR ($t = 3.52$, $P<0.05$). The age disparities showed that the alcohol consumption was higher among elder women.

Table 6: Alcohol Consumption in different part of India

Author	City/Location	Prevalence of alcohol consumption (%)
Girish et al., 2010	Bangalore	23.7
Ghosh et al., 2012	Kolkata	65.8
Ganesh Kumar et al., 2013	Vilupuram district	16.8
Lakshmi et al., 2014	Urban area, Chennai	42.65
Vidhukumar et al., 2016	Kerala	28.78
Ramanan & Singh, 2017	Puducherry	17.1
Manimunda et al., 2017	Andaman and Nicobar Island	35
Bute et al., 2018	Rural Indore	38.2
Eashwar et al., 2019	Kancheepuram district	39
Teli & Joshi., 2019	Dehradun	44
Present study	Kansabel, Jashpur District	34.5

The result in the present study revealed that overall maximum proportion of the studied population were fallen in the categories of optimum and normal blood pressure. The combined prevalence of hypertensive stage (from high normal to hypertension stage 3) was lower (systolic 15.28% and diastolic 19%) than the normal (systolic 21.4% and diastolic 20.6%) and optimum (systolic 63.4% and diastolic 60.3%) blood pressure categories among women who did not consumed alcohol. In comparison, the combined prevalence of hypertensive blood pressure (from high normal to hypertension stage 3) of alcohol consumer was found to be greater or more or less equal (systolic 43.4% and diastolic 39.1%) than the normal (systolic 23.2% and diastolic 20.3%) and optimum (systolic 33.3% and diastolic 40.6%) categories. The value of the Fisher Exact test also indicated a significant variation in blood pressure (systolic: $\chi^2 = 22.652$, $P<0.05$, and diastolic: $\chi^2 = 35.74$, $P<0.05$) due to alcohol consumption.

Similarly, the mean ($\pm\sigma$) systolic ($F = 8.88$; $P<0.05$) and diastolic ($F = 6.44$; $P<0.05$) blood pressure was significantly higher among weekly alcohol consumer. This indicates a significant association between alcohol consumption and variation in blood pressure.

A small amount of alcohol consumption might cause minor increases in blood pressure, which can be reversible within a few hours of drinking. In this context, Maheswaran et al. (1991) concluded that recent alcohol intake raises systolic and diastolic blood pressure in both men and women. In contrast, previous alcohol intake does not appear to influence blood pressure. Okubo et al. (2001) also revealed a non-linear relationship between alcohol intake and changes in blood pressure among middle-aged normotensive Japanese workers. Bhattacharjee & Manna

(2015) reported that the prevalence of hypertension, pre-hypertension, isolated systolic hypertension, and isolated diastolic hypertension rates were 16.49%, 36.77%, 17.34%, and 4.38%, respectively, among the SC sweeper community of West Bengal. They also reported a significant correlation between blood pressure and alcohol consumption. Santana et al. (2018) reported a relationship between alcohol consumption and elevated blood pressure among men who consumed moderate (OR = 1.69; 95% CI 1.35-2.11) and excessive (OR = 2.70; 95% CI 2.04-3.59) alcohol and among women who consumed excess alcohol (OR = 2.86; 95% CI 1.77-4.63). In contrast to the studies mentioned above, Kusuma et al. (2009) summarized that there was no correlation between alcohol consumption and blood pressure among four ethnic communities in Vishakhapatnam, Andhra Pradesh.

The BMI classification reveals that 22.5% of women were undernourished, 64% were within the normal range, 10.5% were overweight, and the remaining 3% were obese. The prevalence of undernutrition was higher (37.5%) among occasionally alcoholic women. In contradiction, the prevalence of undernutrition among non-alcoholic women was 25.3%. The combined prevalence of overweight and obesity was greater among daily alcoholic women (28.6%), followed by weekly alcoholic women (27.8%), occasionally alcoholic women (25%), and non-alcoholic women (6.1%). The mean ($\pm\sigma$) BMI ($F = 4.72$; $P<0.05$) and WHR ($F = 5.88$; $P<0.05$) were significantly higher among daily alcohol consumers. This suggests that habitual alcohol consumption could potentially lead to weight gain and an increased risk of morbidities.

Prakruthi & Prakash (2013) disclosed that the prevalence of Chronic Energy Deficiency (CED), normal weight, overweight, and obesity among rural women was 18.7%, 42.3%, 27%, and 12%, respectively. Goswami (2015) also found a high prevalence of CED (59.5%) among Mankidia women in Myurbhanj, Odisha. In 2016, Ghosh reported that Santal-Munda tribal women in West Bengal had a prevalence of normal weight (76.27%), underweight (19.49%), and overweight (4.23%). Similarly, Sinha et al. (2018) found that 17.75% of tribal women in the Bastar region had a BMI less than 18.5. In 2019, Singh reported the nutritional status among tribal women in the reproductive age group; among them, 20.05% were normal weight, while 56.7% were suffering from CED.

CONCLUSION

The present study concluded that the prevalence of alcohol consumption was 34.5% among these tribal women. The study also found a significant association between alcohol consumption and variations in individual blood pressure (both systolic and diastolic).

Furthermore, alcoholism also affects individual health status, as significant differences were observed in mean blood pressure, BMI and WHR between alcoholic and non-alcoholic women. Alcohol consumption could potentially lead to weight gain and an increased risk of morbidities. The nutritional situation was found to be serious at one end, while at the same time, the presence of overweight and obesity was also observed among these women at the other end. This means the studied population faces a double burden of malnutrition simultaneously. However, the majority were within the normal weight range. Thus, the study will be somewhat helpful in creating awareness among the readers about the risk factors associated with alcohol consumption, particularly those effects that were analyzed in the present study. The study also calls for government officials and non-government organizations to focus their efforts on addressing this burden and conducting more studies, especially among tribal or isolated populations, to clarify the situation within Indian society.

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REFFERENCES

Addolorato, G., Capristo, E., Greco, A. V., & Stefanini, G. F. (1997). Gas barrini G. Energy expenditure, substrate oxidation, and body composition in subjects with chronic alcoholism: new findings from metabolic assessment. *Alcohol Clin Exp Res*, 21(6), 962–967.

Addolorato, G., Capristo, E., Greco, A. V., & Stefanini, G. F. (1998). Gas barrini G. Influence of chronic alcohol abuse on body weight and energy metabolism: is excess ethanol con sumption a risk factor for obesity or malnutrition? *J In Tern Med*, 244(5), 387–395.

Alcacera, M. A., Marques-Lopes, I., Fajo-Pascual, M., Puzo, J., Perez, B., Bes-Rastrollo, J., & Martinez-Gonzalez, M. (2008). Lifestyle factors associated with BMI in a Span ish graduate population: the SUN Study. *Obes Facts*, 1(2), 80–87.

Alshammari, M. (2015). Alcoholism and its Impact on the Individual and Society. *Internarional Journel of Bussiness and Social Science*, *6*(2), 37–38.

AMBROSIA. (2020). Binge drinking is cool for Indian women. Retrieved form https://www.ambrosiaindia.com on 2021, May 25.

Arif, A. A., & Rohrer, J. E. (2005). Patterns of alcohol drinking and its association with obesity: data from the Third National Health and Nutrition Examination Survey, 1988-1994. *BMC Public Health*, 5(1), 126. https://doi.org/10.1186/1471-2458-5-126.

Bhattacharjee, P., & Manna, P. C. K. (2015). Effect of Alcohol Consumption on the changes in the blood pressure level with in one scheduled caste community (Sweeper) of the District 24 PGS North, West Bengal, India. *International Journal of Novel Research in Life Sciences*, *2*(4), 14–20.

Breslow, R. A., & Smothers, B. A. (2005). Drinking patterns and body mass index in never smokers: National Health Interview Survey, 1997-2001. *American Journal of Epidemiology*, 161(4), 368–376. https://doi.org/10.1093/aje/kwi061.

Bute, J., Kori, S., Arora, V. K., & Sahasrabuddhe, A. (2018). Prevalence and pattern of alcohol consumption among males attending primary health care setting using AUDIT in rural Indore, Madhya Pradesh, India. *International Journal of Community Medicine and Public Health*, *5*(10), 4461–4469.

Census of India, Chhattisgarh. (2011). District Census Handbook, Jashpur: Village and Town wise Primary Census Abstract (PCA). *Directorate of Censu Operation, (C.G.)*. Part XII-B, Series-23.

Census India. (2021) *www.google.com*. Retrieved on september 8, 2021 from https://www.censusindia.co.in/subdistrict/kansabel-tehsil-jaspur-chhattisgarh-3256.

Colditz, G. A., Giovannucci, E., Rimm, E. B., Stampfer, M. J., Rosner, B., Speizer, F. E., Gordis, E., & Willett, W. C. (1991). Alcohol intake in relation to diet and obesity in women and men. *The American Journal of Clinical Nutrition*, 54(1), 49–55. https://doi.org/10.1093/ajcn/54.1.49.

Eashwar, V. M. A., Gopalakrishnan, S., Umadevi, R., & Geetha, A. (2019). Epidemiology of alcohol consumption in an urban area of Kancheepuram district, Tamil Nadu. *Journal of Family Medicine and Primary Care*, *8*(3), 1098–1105. https://doi.org/10.4103/jfmpc.jfmpc.

French, M. T., Norton, E. C., Fang, H., & Maclean, J. C. (2010). Alcohol consumption and body weight. *Health Econ*, 19(7), 814–832.

Ganesh Kumar, S., Premarajan, K. C., Subitha, L., Suguna, E., & Kumar, V. (2013). Prevalence and Pattern of Alcohol Consumption using Alcohol Use Disorders Identification Test (AUDIT) in Rural Tamil Nadu , India. *Journal of Clinical and Diagnostic Research*, *7*(8), 1637–1639. https://doi.org/10.7860/JCDR/2013/5521.3216.

Gearhardt, A. N., & Corbin, W. R. (2009). Body mass index and alco hol consumption: family history of alcoholism as a mod erator. *Psychol Addict Behav*, 23(2), 216–225.

Ghosh, J. (2016). Nutritional Status of Tribal Women : An Epidemiological Study Among Santal- Munda Tribes of North 24Th Parganas District of West Bengal , India. *International Journal of Scientific Research*, *5*(7), 48–51.

Ghosh, S., Samanta, A., & Mukherjee, S. (2012). Patterns of Alcohol Consumption among

Male Adults at a Slum in Kolkata, India. *International Centre for Diarrhoeal Disease Research*, *30*(1), 73–81.

Girish, N., Kavita, R., Gururaj, G., & Benegal, V. (2010). Alcohol Use and Implications for Public Health : Patterns of Use in Four Communities. *Indian Journal of Community Medicine*, *35*(2), 238–244. https://doi.org/10.4103/0970-0218.66875.

Goswami, M. (2015). Anthropometric Characteristics and Chronic Energy Deficiency of the Mankidias - A PTG of Nothern Odisha, India. *Taylor and Francis*, *13*(1), 88–93. https://doi.org/10.1080/0972639X.2015.11886715.

Gururaj, G., Gautham, M. S., & Arvind, B. A. (2020). Alcohol consumption in India : A rising burden and a fractured response. *Drug and Alcohol Review*, *August*, 1–17. https://doi.org/10.1111/dar.13179.

Indian guidelines management of hypertension.(2001). *Hypertension India* 2001;15:1–34.
Jin, L., Huang, Y., Bi, Y., Zhao, L., Xu, M., Xu, Y., & Chen, Y. (2011). Association between alcohol consumption and metabol ic syndrome in 19,215 middle-aged and elderly Chinese. *Diabetes Res Clin Pract*, 92(3), 386–392.

Klobodu, S. S., Steiner-Asiedu, M., Colecraft, E., & Anderson, A. K. (2014). Nutritional status of alcoholics in peri-urban areas of the greater Accra region of Ghana. *African Journal of Food Agriculture Nutrition and Development*, 14(63), 8821–8836. https://doi.org/10.18697/ajfand.63.12925.

Kusuma, Y. S., Babu, B. V., & Naidu, J. M. (2009). Association of Alcohol Consumption and Blood Pressure in Some Low Socioeconomic Groups from Andhra Pradesh, India. *Coll. Antropol.*, *33*(2), 417–422.

Lakshmi A, Daisy D, Duttagupta, Lendi J, Padmanaban., (2014). Drinking Habits, Health, Social and Behavioural Aspects of Alcohol Users in A Semi Urban Population in Chennai. *IOSR‑Journal of Dental Medical Science*, 13(12), 20‑22 doi:10.9790/0853-131212023.

Lian, C. L., (1915). alcoholisme, cause d'hypertensionarterielle. *Bulletin de l' Academie de Medicine*, 74, 525–528.

Liu, S., Serdula, M. K., Williamson, D. F., Mokdad, A. H., & Byers, T. (1994). A prospective study of alcohol intake and change in body weight among US adults. *American Journal of Epidemiology*, 140(10), 912–920. https://doi.org/10.1093/oxfordjournals.aje.a117179.

Lukasiewicz, E., Mennen, L. I., Bertrais, S., Arnault, N., Prezi Osi, P., Galan, P., & Hercberg, S. (2005). Alcohol intake in relation to body mass index and waist-to-hip ratio: the impor tance of type of alcoholic beverage. *Public Health Nutr*, 8(3), 315–320.

Maheswaran, R., Gill, J. S., Davies, P., & Beevers, D. G. (1991). High Blood Pressure Due to Alcohol A repid Reversible Effect. *Hypertension*, *17*(1), 787–792.

Manimunda, S. P., Sugunan, A. P., Thennarasu, K., Pandian, D., Pesala, K. S., & Benegal, V. (2017). Alcohol Consumption, Hazardous Drinking, and Alcohol Dependency among the Population of Andaman and Nicobar. *Indian Journal of Public Health*, *61*, 105–112.

https://doi.org/10.4103/ijph.IJPH.

Molina, P. E., Hoek, J. B., Nelson, S., Guidot, D. M., Lang, C. H., Wands, J. R., & Crawford, J. M. (2003). Mechanisms of al 207 208 cohol-induced tissue injury. *Alcohol Clin Exp Res*, 27(3), 563–575.

Mondal, N. A., Mog, M., & Khan, K. A. (2018). Alcohol Consumption in India : An Analysis of IHDS Data Alcohol Consumption in India : An Analysis of IHDS Data. *American Research Journal of Humanities and Social Sciences*, *4*, 1–15.

Mousa, H. A. L. (2005). Effect of Alcohol Consumption on Blood Pressure. *J Clin Basic Cardiol 2005;*, *8*, 75–77.

Navarro, F. B., Costa, F. D. A. da, Mulinari, L. A., Pimentel, G. K., Roderjan, J. G., Vieira, E. D., Noronha, L. de, & Miyague, N. I. (2010). Evaluation of the biological behavior of decellularized pulmonary homografts: an experimental sheep model. Revista Brasileira de Cirurgia Cardiovascular: Orgao Oficial Da Sociedade Brasileira de Cirurgia Cardiovascular, 25(3), 377–387. https://doi.org/10.1590/s0102-76382010000300015.

Okubo, Y., Suwazono, Y., Kobayashi, E., & Nogawa, K. (2001). Alcohol consumption and blood pressure change: 5-year follow-up study of the association in normotensive workers. *Journal of Human Hypertension*, *15*, 367–372.

Prakruthi, B. S., & Prakash, J. (2013). Nutritional status and dietary pattern of Indian rural women with reference to energy intake and expenditure. *Journal of Community Nutrition and Health*, *2*(1), 44–51.

Ramanan, V. V., & Singh, S. K. (2017). A study on alcohol use and its related health and social problems in rural Puducherry, India. *Journal of Family Medicine and Primary Care*, *5*(4), 804–808. https://doi.org/10.4103/2249-4863.201175.

Rissanen, A. M., Heliövaara, M., Knekt, P., Reunanen, A., & Aromaa, A. (1991). Determinants of weight gain and overweight in adult Finns. *European Journal of Clinical Nutrition*, 45(9), 419–430.

Rohrer, J. E., Rohland, B. M., Denison, A., & Way, A. (2005). Frequency of alcohol use and obesity in community medicine patients. *BMC Fam Pract*, 6, 17. https://bmcprimcare.biomedcentral.com/articles/10.1186/1471-2296-6-17

Santana, N. M. T., Mill, J. G., Velasquez-melendez, G., Moreira, A. D., Barreto, S. M., Viana, M. C., Carmen, M. del, & Molina, B. (2018). Consumption of alcohol and blood pressure : Results of the ELSA-Brasil study. *PLOSONE*, *13*(1), 1–13.

Shah, S. N., Munjal, Y. P., Kamath, S. A., Wander, G. S., Mehta, N., Mukherjee, S., Kirpalani, A., Gupta, P., Shah, H., Rohatgi, R., Billimoria, A. R., Maiya, M., Das, M. K., Goswami, K. C., Sharma, R., Rajapurkar, M. M., Chawla, R., Saboo, B., & Jha, V. (2020). Indian guidelines on hypertension-IV (2019). *Journal of Human Hypertension*. https://doi.org/10.1038/s41371-020-0349-x

Singh, N. (2019). Nutritional Status of Tribal Women of Reproductive Age Group in Naugarh

Block, Chandauli District, India. *International Journal of Current Microbiology and Applied Sciences*, 8(07), 953–966. https://doi.org/10.20546/ijcmas.2019.807.115.

Sinha, T., Singh, G., & Diwan, A. (2018). A Study about the Health Status of Tribal Women in Bastar Region, Chhattisgarh, India. *International Journal of Preventive, Curative &Community Medicine*, *4*(4), 5–8.

Skrzypczak, M., Szwed, A., & Pawlinska-Chmara, R. (2008). Body mass index, waist to hip ratio and waist/ height in adult Polish women in relation to their education, place of residence, smoking and alcohol consumption. *Homo*, 59(4), 329–342.

Teli S. A., Joshi Y., (2019). Prevalence of alcohol consumption in an urban population of Dehradun. *Asian Journal of Pharmaceutical Research*, 9 (2), 87‑89. doi:10.5958/2231-5691.2019.00014.5.

Tolstrup, J. S., Heitmann, B. L., Tjønneland, A. M., Overvad, O. K., Sørensen, T. I. A., & Grønbaek, M. N. (2005). The relation between drinking pattern and body mass index and waist and hip circumference. *International Journal of Obesity* (2005) , 29(5), 490–497. https://doi.org/10.1038/sj.ijo.0802874.

Toffolo, M. C. F., Aguiar-nemer, A. S. De, & Silva-Fonseca, V. A. (2012). Alcohol : Effects on Nutritional Status, Lipid Profile and Blood Pressure. *J Endocrinol Metab*, 2(6), 205–211. https://doi.org/10.4021/jem128e.

Tomson, J., & Lip, G. Y. H. (2006). Alcohol and Hypertension: An Old Relationship Revisited. *Alcohol & Alcoholism*, *41*(1), 3–4. https://doi.org/10.1093/alcalc/agh223.

Tumwesigye, N. M., Mutungi, G., Bahendeka, S., Wesonga, R., Katureebe, A., Biribawa, C., & Guwatudde, D. (2020). Alcohol consumption, hypertension and obesity: Relationship patterns along different age groups in Uganda. *Preventive Medicine Report*, 19.

Venkataraman, R., Satish, K. B., Kumaraswamy, M., Singh, R., Pandey, M., Tripathi, Priyank Sharath V1, J., George, V., Dahal, P., & Vaibhav, P. (2013). Smoking, Alcohol and Hypertension. *International Journal of Pharmacy and Pharmaceutical Sciences*, *5*(4), 28–32.

Vidhukumar, K., Nazeer, E., & Anil, P. (2016). Prevalence and pattern of alcohol use in Kerala – A district based survey. *International Journal of Recent Trends in Science a Al of Recent Trends in Science and Technology*, *18*(2), 363–367.

Wakabayashi, I. (2009). Impact of body weight on the relation ship between alcohol intake and blood pressure. *Alcohol Alcohol*, 44(2), 204–210.

Wannamethee, S. G., Field, A. E., Colditz, G. A., & Rimm, E. B. (2004). Alcohol intake and 8-year weight gain in women: a pro spective study. *Obes Res*, 12(9), 1386–1396.

WHO. (1995). Physical status: the use and interpretation of anthropometry, Report of a WHO Expert Committee. WHO Technical Report Series 854, World Health Organization, Geneva, Switzerland.