

Predictors of Substance Use in the Tribal Population of Northeast India: Retrospective Analysis of a Cross-Sectional Survey

Himanshu K Chaturvedi*, Ram C Bajpai and Arvind Pandey

National Institute of Medical Statistics, Indian Council of Medical Research, New Delhi, India

*Corresponding author: Himanshu K Chaturvedi, National Institute of Medical Statistics, Indian Council of Medical Research, New Delhi, India, Tel: +91-11-26588928; Fax: +91-11-26589635; E-mail: chaturvedi_icmr@yahoo.com

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Abstract

Objective: Substance misuse is a wide-spread phenomenon that affects all levels of society. The household survey data of different tribes from Arunachal Pradesh, India were used to present the prevalence of substance use in different tribes and to examine the association between socio-demographic factors and substance use.

Materials and method: A sample of 3421 tribal individuals aged 15 years and older was extracted from earlier conducted substance use survey in Changlang district of Arunachal Pradesh, India. The multivariable logistic regression analysis was used to determine factors associated with substance use.

Results: The prevalence of any substance use was reported to 53.1% and significantly higher among men (67%) than among women (38%). Alcohol was started at early teenage (14 years) and accepted socially as a 'holy drink' shared with family members and others. Tobacco and opium was mainly introduced by their friends. Prevalence of any substance intake was significantly higher among Tutsa tribe (77%), aged 45 years or older (≥ 75%), among illiterates (61%), indigenous religion (71%), widow/widower (71%) and household size with 1-3 persons (63%). Subsequently, regression analysis showed that any substance use was significantly associated with ethnic group, religion, age, education, occupation and marital status of different tribal communities.

Conclusion: Overall, substance use was very high among the tribal people, indicating strong social, cultural and traditional belief. These findings have major policy implications, including the need to focus substance use interventions to young age tribal people.

Keywords: Tribes; Substance use; Prevalence rates; Socio-demographic correlates; Arunachal Pradesh; India

Introduction

Tobacco, alcohol and drug misuse (also known as substance misuse) is a universal phenomenon affecting all fragments of society [1]. There is evidence that substances have been used since ancient times for traditional, medical and mood-altering purposes. Increasing substance use might cause social, behavioural and health-related problems, both physical and mental as well as an increase in healthcare burden and cost [2]. Among the substance users, the risk of death at early age is higher compared with non-substance users [3,4]. Tobacco chewing or smoking, alcohol and drug misuse are important and major risk factors for cancers, coronary heart disease and stroke, mental health, sexual health, obesity, accidents and poor quality of life [3,5-11]. Despite of knowing the harmful effects of substance use on health, it is being consumed in many parts of world including Southeast Asian countries [12-15].

Despite the prohibition of non-medical use of all intoxicating substances in India, opium use has been reported in northeast and other Indian States [7,14-17]. However, tobacco and alcohol are more socially accepted and consumed at variant intensity [17]. According to WHO estimates, nearly 3-5% of the world's population aged 15-64 years used psychoactive substances with estimated global burden of

0.7% due to cocaine and opioids. The district level household survey (DLHS-IV) reported the high prevalence of tobacco chewing (30-87%), tobacco smoking (13-42%) and alcohol consumption (15-51%) in different States of Northeast India. Use of other addictive substances like heroin, tranquilizer and codeine has also been reported in some hospital-based and pilot studies of selected population from different parts of northeast India [18-21].

More than 550 tribal communities are enclosed in 227 ethnic groups residing in around 5000 villages of India in different forests and vegetation types [22]. Northeast India shares long international border (more than 4,500 km) with China in north, Myanmar in east, Bhutan in northwest and Bangladesh in southwest. Arunachal Pradesh is the largest state in this region with 83,743 km² area. Due to high mountain ranges and large forest cover, it is difficult to control the drug trafficking across the borders. According to the 2011 Census, the population of Arunachal Pradesh was 1,382,611 with a density of 17 persons per km². There are a large number of tribes in the state and each lives in a specific geographical location. They mostly remain limited to their own communities, speak their own native language and follow a diverse culture and rituals [23,24]. The population-based surveys have been one of the key tools adopted to provide epidemiological evidence on licit or illicit use of wide range of substances [25]. With this background, the present study is to assess the prevalence and socio-demographic correlates of different addictions (tobacco, alcohol and opium) among the tribal

communities of Arunachal Pradesh using the population based survey data.

Materials and Method

Study area

Changlang district of Arunachal Pradesh is closely located with the Myanmar border in the Northeast India, was selected as study area based on the pilot study and detailed methodology discussed elsewhere [17,26]. As per 2011 census, Changlang district had population of 148,226 of which male and female were 76,948 and 71,278, respectively with 36% tribal population and density of 32 persons per km² (see supplementary material for more details). District covered large area of reserve forest (73%), high mountain ranges (altitude varies from 200 to 4500 m above sea level), splendid natural rivers, typical climatic conditions varies from one place to another, rich natural resources, and affluent cultural and traditional legacy highlight the diversity of place and people.

General household survey on addictions

The analysis presents a summary of a survey conducted among the tribal communities in the Changlang district of Arunachal Pradesh. The household survey was carried out in 65 villages selected randomly from the sampling frame of all the census villages spread in 10 Primary Health Centre (PHC) areas of the district and households of each village was selected by using the method of systematic sampling. The head or senior most person of the household was interviewed to collect general household information, whereas the information related to habit of substance use (mainly tobacco chewing or smoking, alcohol consumption and opium use) was collected from all the household members' age >15 years using the pretested questionnaire. An individual who was currently consuming any addictive substances in any form and was a regular user for at least last one month was recorded as a substance user. Household members were interviewed separately to maintain privacy and accuracy of information regarding substance use, age of initiation, introducer and relationship with other users in the family, if any, and some general information of individual such as education, age, occupation, etc. However, the general household information on ethnicity, religion, family size source of income etc. was recorded from the head of the households. During the survey, opium users underwent counselling by the interviewer individually and were given appropriate advice [17].

A sample of 3421 individuals (aged ≥ 15 years) of different tribal communities were extracted from the substance use survey (1998-2000) in Arunachal Pradesh. The original data contained the records of 5135 individual respondents (including the nontribal communities). Of these 65 selected villages, Tangsa were concentrated in 34 villages, Singpho in 11 villages, Khamti in five villages, and Tutsas in three villages. The sample proportions of these tribes were similar to their proportion of the population in the district [27].

Description of predictor variables

Data collected from the individuals were analyzed to estimate the prevalence and pattern of substance use among the tribal communities across various socio-demographic categories. The socio-demographic variables used in the analysis were categorized such as ethnicity of tribes (Khamti, Singpho, Tangsa and Tutsa), age group (15-24 years,

25-34 years, 35-44 years, 45-54 years and >55 years), education (illiterate, primary, middle, and secondary or above), employment status (unemployed, house-wife, self-employed and employed), religion (Buddhist, Christian, Hindu, Indigenous), marital status (unmarried, married and widow/widower) and household size (<3 persons, 4-6 persons and ≥ 7 persons). Substance use related information included in the analysis were type of substance use (tobacco, alcohol, and opium), age of initiation (years), duration of taking substance (years) and main introducer of addiction.

Ethical Consideration

The survey on substance use was conducted by the Regional Medical Research Centre after obtaining approval from the Scientific Advisory Committee (SAC) constituted by the Indian Council of Medical Research and ethical requirements were followed. At village level, the consent of village headman was obtained prior to conducting the survey. At household level, individuals were appraised in the understandable language about the purpose of survey through a local help before interview to get consent and then interviewed. Addicts were counselled by the interviewer individually and advised appropriately [17].

Statistical Analysis

Respondents were stratified by different demographic characteristics and their sub-groups. Statistical test was used to assess the association between categorical variables and statistical difference between the mean ages, income, family size, age at initiation and duration of substance use of males and females. Spearman's all the baseline demographic characteristics were used as independent variables in the analysis. The widely accepted logistic regression model was applied to identify the associated factors with substance use [28]. The stepwise (backward LR) multivariable logistic regression analysis (including all independent variables) method was applied to estimate the adjusted odds ratios with 95% confidence intervals (CIs), respectively. The probability for the stepwise regression analysis was 0.05 for entry of the variables and 0.10 for removal of the variables from the model. All the tests were two-sided and the criterion for statistical significance was set at $p < 0.05$. The data were analyzed using the statistical software 'R' (version 3.3.0) and IBM SPSS (version 22.0) Armonk, NY, USA.

Results

The general profile of respondents such as age, sex, education, occupation, religion and marital status are presented in Table 1. Tangsa was the major tribal community (79%) followed by Singpho (12%). Illiteracy among the tribal community was high (54%) and majority of them follow Hindu religion (42%). About 12% of tribal people still followed Indigenous religion i.e. an old tradition to worship deities of nature. Majority of them were self-employed (44%), i.e., mainly engaged in farming and depend on forest products for their livelihood.

Variable	Categories	N	%
Number of respondents		3421	100
Ethnic group	Khamti	132	3.9
	Singpho	404	11.9
	Tangsa	2715	79.3
	Tutsa	170	4.9
Age group	15-24 years	1244	36.4
	25-34 years	766	22.4
	35-44 years	524	15.3
	45-54 years	404	11.8
	>=55 years	483	14.1
Gender	Female	1626	47.5
	Male	1795	52.5
Education	Illiterate	1845	53.9
	Primary	516	15.1
	Middle	899	26.3
	Secondary or above	161	4.7
Occupation	Unemployed	739	21.6
	Housewife	962	28.1
	Self-employed	1520	44.4
	Employed	200	5.8
Religion	Buddhist	831	24.3
	Christian	742	21.7
	Hindu	1437	42
	Indigenous	411	12
Marital status	Unmarried	1251	36.6
	Married	1940	56.7
	Widow/widower	230	6.7
House hold size	1-3 persons	638	18.6
	4-6 persons	1536	44.9
	≥ 7 persons	1247	36.5

Table 1: General socio-demographic characteristics of tribal population participated in the survey.

Gender wise comparison of prevalence of substance use and other characteristics are presented in Table 2. Prevalence of substance use (i.e., tobacco, alcohol and opium) was significantly higher ($p < 0.01$) among males than females. Use of multiple substance among males was very common (36% tobacco and alcohol; 8% tobacco and opium) which was comparatively low among women. The age of initiation of

alcohol use was much lower than tobacco and opium use among both male and female. Overall, mean duration of any substance (tobacco, alcohol and opium) use was quite similar for both male and female. However, the differential pattern of mean age of initiation of substance use and its duration was recorded for different tribes (Figure 1).

Variables	Total (N=3421)	Female (n=1626)	Male (n=1795)	P value
Categorical estimates (n, %)				
Substance use				
Tobacco	1298 (37.9)	356 (21.9)	942 (52.5)	p<0.001
Alcohol	1338 (39.1)	453 (27.9)	885 (49.3)	p<0.001
Opium	225 (6.6)	34 (2.1)	191 (10.6)	p<0.001
Single addiction				
Only Tobacco	354 (10.4)	134 (8.2)	220 (12.3)	p<0.001
Only Alcohol	466 (13.6)	246 (15.1)	220 (12.3)	p<0.001
Only Opium	37 (1.1)	10 (0.6)	27 (1.5)	p<0.001
Multiple addictions				
Tobacco and alcohol	855 (25.0)	204 (12.6)	651 (36.3)	p<0.001
Tobacco and opium	171 (5.0)	21 (1.3)	150 (8.4)	p<0.001
Alcohol and opium	99 (2.9)	6 (0.4)	93 (5.2)	p<0.001
Tobacco and alcohol and opium	82 (2.4)	3 (0.2)	79 (4.4)	p<0.001
Continuous estimates (Mean ± SD)				
Overall socio-demography				
Average age of respondents (years)	33.8 ± 16.1	33.3 ± 15.3	34.3 ± 16.7	0.082
Average family size (persons per family)	5.7 ± 2.3	5.7 ± 2.3	5.8 ± 2.3	0.107
Average individual income (Indian rupees)	2476.1 ± 1673	2138.5 ± 974.1	2489.8 ± 1694.3	0.294
Among tobacco users				
Average age of initiation (years)	17.5 ± 6.3	20.7 ± 8.3	16.8 ± 5.5	p<0.001
Average duration of taking opium (years)	3.7 ± 0.7	3.8 ± 0.6	3.7 ± 0.8	0.107
Among alcohol users				
Average age of initiation (years)	13.9 ± 5.3	14.8 ± 5.3	13.8 ± 5.3	0.248
Average duration of taking opium (years)	3.9 ± 0.4	3.8 ± 0.6	3.9 ± 0.4	0.462
Among opium users				
Average age of initiation (years)	23.7 ± 9.3	27.0 ± 9.9	23.3 ± 9.0	0.051
Average duration of taking opium (years)	3.4 ± 0.9	3.4 ± 0.9	3.5 ± 0.9	0.779

Table 2: Prevalence of substance use, related characteristics and their comparisons according to gender.

The result of multivariable logistic regression analyses for substance use with estimated adjusted odd ratios associated with various socio-demographic factors are presented by gender in Table 3. The most important correlates are ethnic group, age, occupation, religion and

household size. A higher odd ratio was recorded among older age compare to younger. It was also high for all the religion compare with Christian.

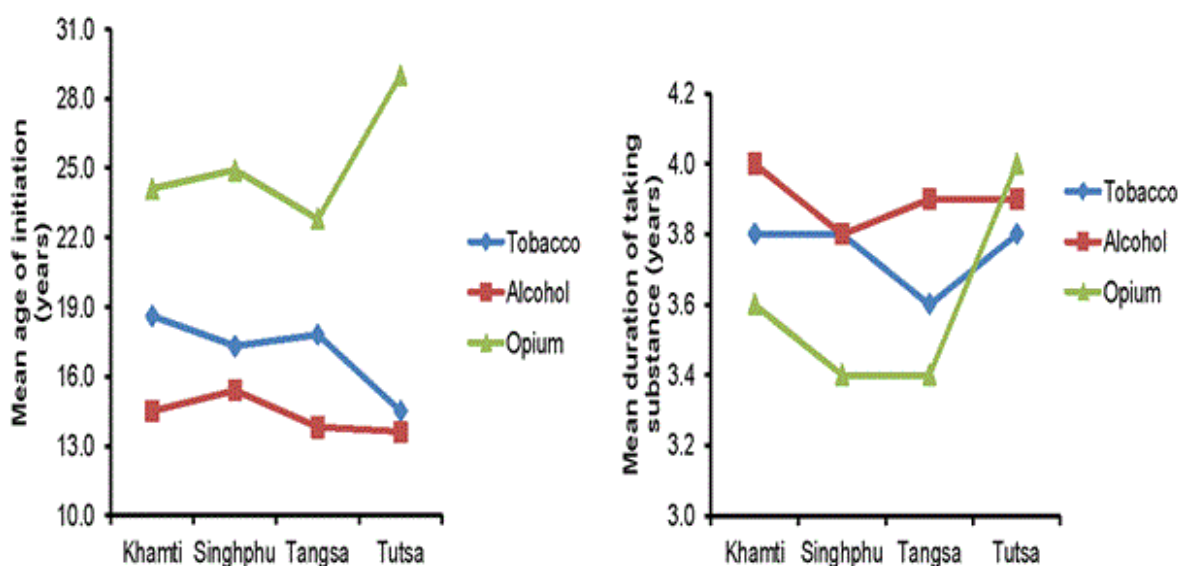


Figure 1: Mean age of initiation and duration of substance use according to different tribes.

Further, single variable and multivariable logistic regression analyses were also used to explore the association structure between different substance use (i.e., tobacco, alcohol and opium) with socio-demographic factors and are presented in Table 4. Unadjusted odds

ratios (OR) indicate the higher risk of tobacco, alcohol and opium use was significantly associated with age, gender, occupation, religion, ethnic group, marital status and household size.

Background characteristics	Male			Female			Combined		
	n	User (%)	aOR (95% CI)	n	User (%)	aOR (95% CI)	n	User (%)	aOR (95% CI)
Ethnic group									
Khamti	74	54.1	1 (Ref.)	58	20.7	1 (Ref.)	132	39.4	1 (Ref.)
Singhphu	214	57	1.0 (0.5-2.1)	190	32.1	1.9 (0.9-4.2)	404	45.3	1.5 (0.9-2.5)
Tutsa	105	82.9	8.4f (3.0-23.9)	65	67.7	15.9f (5.4-46.3)	170	77.1	9.8f (4.9-19.5)
Tangsa	1402	68	3.6f (1.6-8.0)	1313	37.9	4.0f (1.8-8.8)	2715	53.5	3.3f (2.0-5.7)
Age group									
15-24 years	634	36.9	1 (Ref.)	610	15.2	1 (Ref.)	1244	26.3	1 (Ref.)
25-34 years	420	76.4	2.5f (1.6-3.8)	346	35.5	1.4 (0.9-2.1)	766	58	2.7f (2.1-3.5)
35-44 years	266	83.8	3.4f (2.0-6.0)	258	54.7	2.7f (1.7-4.3)	524	69.5	4.8f (3.4-6.7)
45-54 years	205	91.7	6.7f (3.3-13.6)	199	57.8	3.0f (1.8-4.8)	404	75	6.3f (4.4-9.2)
>=55 years	270	87.8	4.2f (2.2-8.0)	213	67.1	4.3f (2.5-7.5)	483	78.7	7.2f (4.8-10.7)
Education									
Illiterate	710	81	0.6 (0.3-1.2)	1135	48.5	10.2e (1.2-87.1)	1845	61	0.8 (0.5-1.3)
Primary	371	72	0.9 (0.5-1.7)	145	18.6	6.6 (0.8-57.6)	516	57	1.2 (0.7-2.0)
Middle	586	49.1	0.6 (0.4-1.1)	313	11.8	5.0 (0.6-42.4)	899	36.2	0.8 (0.5-1.2)
Secondary or above	128	57	1 (Ref.)	33	3	1 (Ref.)	161	46	1 (Ref.)

Occupation									
Unemployed	484	28.5	1 (Ref.)	255	5.1	1 (Ref.)	739	20.4	1 (Ref.)
Housewife	-	-	-	962	48.5	3.6 (0.4-29.7)	962	48.5	NE
Self-employed	1141	83	8.4f (5.4-13.0)	379	34.3	1.2 (0.6-2.6)	1520	70.9	3.2f (2.3-4.4)
Employed	170	69.4	2.2f (1.3-3.6)	30	16.7	3.2 (0.8-13.2)	200	61.5	1.1 (0.7-1.8)
Religion									
Buddhist	438	62.3	8.8f (4.9-15.5)	393	35.1	10.3f (6.1-17.5)	831	49.5	7.1f (5.0-10.1)
Christian	386	43	1 (Ref.)	356	12.1	1 (Ref.)	742	28.2	1 (Ref.)
Hindu	746	77.6	17.6f (10.1-30.7)	691	47.3	13.0f (8.7-19.4)	1437	63	10.0f (7.7-12.9)
Indigenous	225	82.2	14.8f (10.0-21.8)	186	57.5	20.3f (11.9-34.6)	411	71	13.6f (9.6-19.2)
Marital status									
Unmarried	762	43.7	1 (Ref.)	489	9.2	1 (Ref.)	1251	30.2	1 (Ref.)
Married	966	83.7	1.6e (1.1-2.4)	974	48	1.9 (0.3-14.2)	1940	65.8	4.2f (3.0-5.7)
Widow/widower	67	91	1.5 (0.5-4.1)	163	62.6	8.0f (3.9-16.1)	230	70.9	1.1 (0.7-1.7)
House hold size									
1-3 persons	312	82.4	2.0f (1.3-3.1)	326	43.6	1.2 (0.9-1.9)	638	62.5	1.7f (1.3-2.2)
4-6 persons	809	68.6	1.6f (1.2-2.1)	727	39.9	1.3 (0.9-1.7)	1536	55	1.5f (1.2-1.8)
≥ 7 persons	674	58	1 (Ref.)	573	31.9	1 (Ref.)	1247	46	1 (Ref.)
Total	1795	67		1626	37.8		3421	53.1	

Table 3: Gender-wise prevalence and socio-demographic correlates of any substance¹ use among tribes using stratified multivariable logistic regression analysis.

However, education was only related with tobacco and opium use in the single variable regression analysis, i.e., without adjusting the effects of other variables. In the multivariable regression model, risk of tobacco was associated with the all the variables such as age, gender,

occupation, religion, ethnic group, marital status and household size. The adjusted and unadjusted odds associated with these variables for different substance use are presented in Table 4.

Background characteristics	Risk of tobacco use		Risk of alcohol use		Risk of opium use	
	unadjusted OR (95% CI)	adjusted OR (95% CI)	unadjusted OR (95% CI)	adjusted OR (95% CI)	unadjusted OR (95% CI)	adjusted OR (95% CI)
Ethnic group						
Khamti	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)	4.7f (2.9-7.6)	6.7f (3.1-14.7)
Singhpho	1.1 (0.8-1.7)	1.2 (0.7-1.9)	1.2 (0.7-2.3)	1.3 (0.7-2.4)	5.2f (3.8-7.0)	7.2f (3.8-13.7)
Tutsa	2.0f (1.2-3.1)	3.6f (1.9-7.0)	24.5f (12.9-46.6)	37.2f (17.2-80.6)	1.2 (0.6-2.5)	0.9 (0.4-1.8)
Tangsa	1.2 (0.8-1.8)	2.0e (1.2-3.4)	5.6f (3.3-9.7)	10.6f (5.6-19.9)	1 (Ref.)	1 (Ref.)
Age group						
15-24 years	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)
25-34 years	3.7f (3.0-4.6)	1.6f (1.2-2.2)	3.0f (2.5-3.6)	1.7f (1.3-2.3)	9.1f (4.5-18.8)	3.4f (1.5-7.9)
35-44 years	6.7f (5.3-8.5)	2.8f (2.0-4.0)	3.6f (2.9-4.5)	2.4f (1.7-3.4)	15.1f (7.4-30.9)	4.1f (1.7-10.0)

45-54 years	8.6f (6.7-11.1)	3.6f (2.5-5.2)	4.1f (3.3-5.2)	2.2f (1.6-3.3)	16.4f (7.9-33.9)	4.7f (1.9-11.6)
>=55 years	10.8f (8.5-13.8)	3.9f (2.6-5.7)	4.2f (3.4-5.3)	2.2f (1.5-3.3)	24.4f (12.1-49.3)	5.7f (2.3-14.4)
Gender						
Female	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)
Male	3.9f (3.4-4.6)	17.3f (10.7-28.1)	2.5f (2.2-2.9)	6.9f (4.9-9.7)	5.6f (3.9-8.1)	10.0f (4.1-24.0)
Education						
Illiterate	2.4f (1.6-3.4)	1.3 (0.8-2.1)	1.2 (0.8-1.6)	0.7 (0.4-1.2)	2.4 (0.9-6.1)	1.3 (0.5-3.6)
Primary	2.3f (1.5-3.4)	1.4 (0.8-2.3)	1.1 (0.8-1.6)	0.9 (0.5-1.5)	3.2e (1.3-8.2)	1.5 (0.5-4.3)
Middle	0.9 (0.6-1.3)	0.9 (0.6-1.5)	0.6 (0.4-1.1)	0.8 (0.5-1.2)	1.4 (0.5-3.6)	1.1 (0.4-3.1)
Secondary or above	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)
Occupation						
Unemployed	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)
Housewife	3.9f (3.0-5.2)	11.4f (5.8-22.6)	2.8f (2.2-3.5)	6.2f (3.4-11.1)	6.8f (2.1-22.6)	6.2e (1.2-33.1)
Self-employed	13.3f (10.1-17.4)	5.0f (3.5-7.3)	4.9f (3.9-6.0)	3.9f (2.7-5.6)	33.8f (10.8-106.1)	4.8e (1.3-18.3)
Employed	7.3f (5.0-10.6)	2.1f (1.3-3.4)	6.0f (4.3-8.4)	2.8f (1.8-4.6)	15.7f (4.4-56.1)	2.3 (0.5-9.5)
Religion						
Buddhist	1.9f (1.5-2.4)	4.0f (2.8-5.6)	3.0f (2.2-3.9)	11.2f (7.7-16.2)	10.3f (5.5-19.2)	2.7f (1.2-6.3)
Christian	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)
Hindu	2.1f (1.8-2.6)	3.6f (2.8-4.6)	11.1f (8.5-14.4)	20.1f (14.9-27.1)	3.1f (1.6-5.8)	3.5f (1.8-6.8)
Indigenous	2.3f (1.8-3.0)	3.2f (2.3-4.5)	16.7f (12.2-22.9)	28.3f (19.6-41.1)	7.2f (3.6-14.1)	7.9f (3.9-16.2)
Marital status						
Unmarried	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)
Married	4.5f (3.8-5.3)	1.5e (1.1-2.0)	3.0f (2.6-3.6)	2.0f (1.4-2.8)	7.4f (4.5-12.2)	2.4e (1.2-4.5)
Widow/widower	6.1f (4.5-8.2)	4.1f (2.3-7.4)	2.6f (1.9-3.4)	2.7f (1.6-4.4)	10.5f (5.7-19.4)	4.2f (1.7-10.3)
House hold size						
1-3 persons	2.2f (1.8-2.7)	1.7f (1.3-2.2)	1.3e (1.1-1.6)	0.9 (0.7-1.3)	1.6e (1.1-2.4)	1.1 (0.7-1.8)
4-6 persons	1.4f (1.2-1.7)	1.3e (1.1-1.6)	1.2e (1.0-1.4)	1.3e (1.1-1.5)	1.8f (1.3-2.5)	1.5e (1.0-2.1)
≥ 7 persons	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)

Table 4: Correlates of different substance use across various socio-demographic variables using univariable and multivariable logistic regression analysis.

Discussion

Overall, the prevalence of substance use (any form tobacco, alcohol and opium) among the tribal population was recorded high, i.e., 67% (53% tobacco, 49% alcohol and 11% opium) among males and 38% (22% tobacco, 28% alcohol and 2% opium) among females. High prevalence of tobacco and alcohol use in Arunachal Pradesh was also reported by others [29-31]. However, the prevalence of substance use in general population of India was reported as 57% tobacco and 32% alcohol among men and 11% tobacco and 2% alcohol among women, respectively [30]. The study indicates that use of substance among

tribal community was much higher compare to general population in both the gender.

The habit of alcohol and tobacco is very common among the tribal population, but they start taking alcohol at early age (14 years) than tobacco (17 years). More commonly used substance among female tribal community is alcohol and its consumption is high compare to general female population of India. It was possibly due to social acceptability of alcohol among the tribes and also traditional belief. Alcohol especially homemade rice brew was prepared in their home and consumed by family members and offered to guest or visitors as a

holy drink' [17,19,26]. Tobacco is cheapest and most easily available substance, shared commonly with friends and others, and used by smoking or chewing as a stimulant [17,29-32]. Though use of alcohol and tobacco started at early age as reflected by the mean age of initiation, but the prevalence of these substances among younger age group was comparatively low. This was possibly due to concerned of their privacy [17,19].

The multivariable regression analysis showed any substance use was strongly associated with increasing age, religion of tribes, type of tribes, household size with two to six persons, married males and widow females, and employment among males. But impact of education was significantly weak in both sexes. Similar such findings were also reported by others [33,34]. An increasing pattern of prevalence of any substance use was recorded with age and it was significantly higher among older compare with younger age group [26,35,36]. Religion of tribes is also significantly associated with substance use as reported by others [17]. Use of substance such as alcohol and opium was high among those who follow Hindu, Buddhist and Indigenous religion, whereas it was found low among Christian [26,37,38]. This implies that substance use rates, in general, increase with age and highly associated with their social belief and practices.

Association of substance use and levels of education has been reported worldwide [35,39,40]. The decreasing prevalence of substance use with increasing level of education was observed in this study, but the effect of education on substance use was not significant in multivariable regression analysis except illiterate females. However, in univariable analysis illiteracy was associated with tobacco use and primary education was related to both tobacco and opium use. The weak influence of education indicated the strong hold of traditional beliefs and practices among the tribal communities. Similar to education, occupation has also impact on substance use and have been observed in many studies [17,19,27]. Analysis revealed high prevalence of substance use (70.9%) among self-employed respondents, who had three times of higher risk compared to unemployed respondents. Among the employed respondents, higher risk was associated with tobacco and alcohol use. Occupation may be directly related to capacity of purchasing various addictive substances and showed respondent's income and affordability. Influence of income and occupation on substance use is well established and reported also by others [13,40-42].

This finding has major policy implications, including the need to focus substance use interventions especially for young age tribal people targeting primary and high school students [1,43,44]. Precluding early substance-related problems will reduce the risk of harmful effect on health in future at adult age as the magnitude of life stress increases with increasing age.

This study provides useful information on different substance use and their socio-cultural correlates that have public health implications. However, the findings of this secondary analysis should be generalized in the light of limitations and potential sources of bias. Information related to occupation was used as proxy of income, as the complete information about income was not available. Despite of some limitations, the study provides useful information which can help in formulation of a major community based study on substance use including the related morbidity burden. It also emphasizes the need of early intervention to motivate and educate youth about the harmful effects of substance use especially by involving the tribal youth leaders.

Conflict of Interest

Authors declare no conflict of interest.

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