Original Article

Underage Drinking, Prevalence and Predictors in Arunachal Pradesh, India: Analysis of National Family Health Survey (NFHS-5) Data

Vishal Tikhute[1], Kumaravel Ilangovan[2] and Sadananda Reddy[3]

ABSTRACT

Background: Previous studies indicate that, despite legal restrictions, northeastern states have the highest prevalence of underage drinking, with Arunachal Pradesh leading. Considering the harms associated with underage drinking, assessing its magnitude, and contributing factors is crucial.

Methods: Using the Minimum Legal Drinking Age (MLDA) and the state-level National Family Health Survey (NFHS-5), data from 7,398 individuals aged 15–20 years were used to assess the district-wise prevalence of underage drinking in Arunachal Pradesh. Further bivariate and multivariate regression analyses were undertaken to identify the significant predictors of underage drinking.

Results: The prevalence of underage drinking in Arunachal Pradesh ranged from 4% to 20% across the districts. The Upper Subansiri district had the highest prevalence (20%). Females were less likely to drink alcohol than males (adjusted odds ratio (aOR) 0.55; 95% confidence intervals (CI) 0.44, 0.69). The 18–20-year-olds (aOR 2.28; 95% CI 1.82, 2.86), married (aOR 1.99; CI 1.44, 2.76), rural residents (aOR 2.25; CI 1.62, 3.12), and those who belong to the poorest wealth quintile were more likely to drink alcohol. Tobacco use was also strongly associated with underage drinking. The odds of drinking alcohol were 30 times higher among tobacco users than non-users (aOR 30.45; 95% CI 24.22, 38.28).

Conclusions: Underage drinking is prevalent across all districts of Arunachal Pradesh. Socio-demographic factors are strongly associated with underage drinking. There is a pressing need for strict enforcement of the MLDA, restricting alcohol availability, and community-based interventions to create awareness among the young population and parents about the harms of underage drinking in Arunachal Pradesh.

Keywords: Alcoholism, adolescent, substance abuse, schools, universities, colleges, addiction

Key Messages:

- The study unveils a significant prevalence of underage drinking across Arunachal Pradesh, surpassing national averages and indicating a pressing public health concern.
- Socio-demographic factors such as age, gender, marital status, residence, wealth, and tobacco use are strongly associated with underage drinking, informing targeted intervention strategies.
- Findings provide critical insights for policymakers to develop evidence-based interventions aimed at curbing underage drinking, promoting adolescent health and well-being, and reducing alcohol-related harm in the region.

Alcohol consumption among the young population up to age 20, commonly referred to as underage drinking, represents a significant public health concern globally, with multifaceted implications for individuals, populations, and society as a whole.[1] Underage drinking poses substantial risks to the physical, mental, and social well-being of the young population.[2] The World Health Organization identifies alcohol as a leading risk factor for morbidity and mortality among individuals aged 15–49 years, highlighting its pervasive

[1]Research and Development Wing, Pragati Creations, Pune, Maharashtra, India. [2]John Snow India Private Limited, New Delhi, India. [3]Jindal School of Psychology and Counseling (JSPC), O.P. Jindal Global University, Sonipat, Haryana, India.

HOW TO CITE THIS ARTICLE: Tikhute V, Ilangovan K and Reddy S. Underage Drinking, Prevalence and Predictors in Arunachal Pradesh, India: Analysis of National Family Health Survey (NFHS-5) Data. *Indian J Psychol Med.* 2025;XX:1–8.

Address for correspondence: Kumaravel Ilangovan, John Snow India Private Limited, Plot No. 5 and 6, LSC Shopping Complex, Nelson Mandela Marg, Vasant Kunj, New Delhi 110070, India.
E-mail: kumaravelilangovan@gmail.com

Submitted: 05 Sep. 2024
Accepted: 21 Jul. 2025
Published Online: xxxx

ACCESS THIS ARTICLE ONLINE
Website: journals.sagepub.com/home/szj
DOI: 10.1177/02537176251364935

impact on global health outcomes.[3] Early initiation of alcohol use during adolescence is associated with adverse consequences, including impaired cognitive development, increased risk of injuries and accidents, engagement in risky sexual behaviors, alcohol use disorders, and heightened susceptibility to mental health disorders such as depression and anxiety.[4–6] Evidence on the impact of underage drinking extends beyond individual health outcomes to encompass broader social and economic dimensions.[7,8] Alcohol-related harm imposes a substantial burden on families, communities, and healthcare systems, contributing to increased healthcare expenditures, productivity losses, and social disruptions.[8]

In the Indian context, a systematic review highlights that the mean age for initiation of drinking ranged from 14.4 to 18.3 years, with the prevalence of ever or lifetime alcohol consumption ranging from 3.9% to 69.8% among adolescents aged 10–24 years.[9] The nationwide survey conducted by the Government of India showed the prevalence of underage drinking among those aged 10–19 years was 1.3% in 2019.[10] These findings reflect the complex interplay of sociocultural factors, geographical and economic disparities, and access to alcohol.[11] Fermented food and beverage consumption is deeply embedded in several culturally diverse and ethnic groups in the Himalayan regions of India.[12] Consumption of fermented beverages is normalized in day-to-day life and accepted during social, religious, and festive occasions. It is also a traditional custom practiced by several ethnic populations in the northeastern states of India.[13] One of the northeastern states, Arunachal Pradesh, with its diverse socio-cultural heritage, has a high burden of alcohol use. An epidemiological study has highlighted that high early alcohol initiation (mean age 12.4) among tribal youth reflects strong cultural acceptance, with underage drinking influenced by ethnicity, geography, and socio-cultural norms in Arunachal Pradesh.[14,15] An earlier assessment, which presented only inter-state variations, found that Arunachal Pradesh had the highest prevalence of underage drinking among all 36 Indian states.[16,17] Therefore, there is a need for an Arunachal Pradesh-specific, in-depth assessment presenting district-wise prevalence and associated risk factors of underage drinking. Despite the high burden across the state, no earlier study has assessed the district-wise prevalence and contributing factors of underage drinking in Arunachal Pradesh. To address this gap, the present study aimed to assess the prevalence and predictors of underage drinking in Arunachal Pradesh using the National Family Health Survey (NFHS-5) data.

Methods

Study Location

Arunachal Pradesh, located in the northeastern region of India, shares international borders with Bhutan, China, and Myanmar. It comprises 20 districts and is known for its rich ethnic diversity and challenging hilly terrain. As per the 2011 Census of India, the total population of Arunachal Pradesh was approximately 1.38 million. Of this, the population aged 15–21 years was around 196,000. The state remains predominantly rural, with about 77% of its population residing in rural areas and only 23% living in urban regions, reflecting limited urbanization and access to infrastructure in many parts of the state.

Study Design

We employed a cross-sectional study design to assess the district-wise prevalence and socio-demographic predictors of underage drinking in Arunachal Pradesh using state-level data from the India Demographic and Health Survey (DHS) 2021.[1]

Data Source

This study used India DHS 2021 data, also known as the NFHS-5, which was collected during the 2019–2021 period,[18,19] for the State of Arunachal Pradesh. The fifth round of NFHS provides information on population, health, and nutrition for India, covering all 36 states and union territories and 707 districts.[18] For Arunachal Pradesh, the data was collected from January 13, 2020, to March 21, 2020, and from December 7, 2020, to April 19, 2021. We retrieved the data from the DHS program in August 2024. The peculiarity of NFHS-5 is that it also provides data on alcohol use by the population of all age groups above 15 years old. The Government of Arunachal Pradesh has set 21 years as the Minimum Legal Drinking Age (MLDA).[20,21] Applying these criteria, a sample covering all 7,398 individuals aged 15–20 years from Arunachal Pradesh was selected.

Definition of the Underage Population

The Arunachal Pradesh Excise Act, 1993, considers 21 to be the MLDA.[20,21] Therefore, for this study, 21 years was considered the MLDA, and accordingly, a sample of 7,398 individuals aged 15–20 was referred to as the underage population.

Outcome Variable

The dependent variable for this study was alcohol drinking, that is, alcohol use by household members aged 15–20 years. It is a dichotomous categorical variable presented in the NFHS-5 household questionnaire as: Do you drink alcohol? (The responses were categorized as yes or no).

Explanatory Variables

The independent variables used in this analysis include age group (15–17 and 18–20 years); sex (male or female); educational status (no education, primary, secondary, and higher); place of residence (urban or rural); and house type[i] (kutcha, semi-pucca, and pucca); marital status (unmarried or ever-married); family structure (nuclear or non-nuclear); social categories (scheduled castes, scheduled tribes (ST), other backward classes, and others); religion (Hindu, Muslim, Christian, no religion, and others); wealth index (poorest, poorer, middle, richer, and richest); and tobacco use (yes or no). All these independent variables were derived from our previous national-level assessment[16] and from earlier available literature.[22]

Data Analysis

The data were analyzed using Stata Special Edition (StataSE) v12. Descriptive, bivariate, and multivariate statistical analyses were conducted to assess the district-wise population prevalence and socio-demographic predictors of underage drinking. The population prevalence of underage drinking was calculated

for each district as the total number of individuals in the sample population who reported alcohol drinking, expressed as a percentage of the total underage population in that particular district.

A first-step chi-square was performed for bivariate analysis between the outcome variable (underage alcohol use) and explanatory variables (age, sex, education, marital status, family structure, residence, house type, religion, social category, wealth index, and tobacco use) to assess factors correlated with underage drinking. Any variable significantly associated with underage drinking at $p < .05$ was considered for further multivariate analysis. A multivariate analysis was performed using a binary logistic regression model to determine the adjusted odds ratios (aORs) for alcohol drinking, yes or no. Odds ratios and 95% confidence intervals (CI) were used to identify predictors of underage drinking. We used the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) cross-sectional checklist to write this article.[23]

Ethics Approval

The researchers or authors of this article did not collect primary data directly from living individuals or humans in the field. The study used secondary data (collected by the DHS program, Inner City Fund [ICF], and International Institute for Population Sciences [IIPS]) from the India DHS 2021/NFHS-5 public-use dataset, which does not include individual identifiers and geographical details (individual names, contact details, addresses, house numbers, and Global Positioning System [GPS] coordinates) for the selected sample of 7,398 individuals. The authors of this study have obtained the authorization letter from the DHS program that provides permission to use secondary data (i.e., NFHS-5 data) for research publication purposes without needing separate Institutional Review Board (IRB) approval (as the DHS program has already followed IRB-approved procedures on maintaining privacy and confidentiality of individual data).

Results

Population Characteristics

The NFHS-5 data from 7,398 individuals in Arunachal Pradesh were analyzed, and their population characteristics are presented in **Table 1**. The mean age of the sample was 17 years (*SD* = 1.7). Male and female participants were equally represented in the sample. Of the total study population, 96% were literate. Among literate individuals (n = 7,103), the mean years of completed education was 4.3 years (*SD* = 1.7). The majority of the study population was unmarried (91%). More than three-fourths (78%) were from rural areas; about one-fourth

TABLE 1.

Population Characteristics of the Study Sample (n = 7,398).

Variable	*n*	%
Age (Years)[a]	**17.4 (1.7)**	
15–17	3,687	49.8
17–20	3,711	50.1
Sex		
Male	3,591	48.5
Female	3,807	51.4
Educational Status		
No education	295	3.9
Primary	395	5.3
Secondary	6,258	84.5
Higher	450	6.3
Marital Status		
Unmarried	6,762	91
Ever-married[b]	636	9
Family Structure		
Nuclear	4,681	63.3
Non-nuclear	2,717	36.7
Place of Residence		
Urban	1,660	22
Rural	5,738	78
House Type		
Kachha	2,151	29.2
Semi-Pucca	3,354	45.3
Pucca	1,893	25.5
Religion		
Hindu	1,743	23.6
Muslims	102	1.4
Christians	2,985	40.4
Non-religious	91	1.2
Others[c]	2,477	33.5
Social Category[d]		
SC	464	6.6
ST	5,816	82.4
OBC	321	4.6
Others	461	6.5
Wealth Index		
Poorest	1,432	19.4
Poorer	2,460	33.3
Middle	1,863	25.2
Richer	1,220	16.5
Richest	423	5.7
Tobacco		
Yes	711	9.6
No	6,687	90.4

[a]Mean (*SD*).
[b]Includes ever-married individuals (widowed, separated, and divorced).
[c]Others included Jains, Sikhs, Jews, Buddhists, and Zoroastrians.
[d]Missing entries for n = 336 responses were excluded.

lived in pucca houses. About one-third (33%) of the sample population followed other religions, such as Jains, Sikhs, Jews, Buddhists, and Zoroastrians (in the rest of India, these religions are considered religious minorities). The majority of individuals (82%) belonged to ST. Almost half (52%) were from the poorer and poorest wealth quintiles.

Prevalence of Underage Drinking

The prevalence of underage drinking was high across all 20 districts of Arunachal Pradesh (**Table 2**). The eight districts of Upper Subansiri (20%), Anjaw (15%), Upper Siang (14%), Namsai (12%), West Siang (12%), Longding (11%), Siang (11%), and Papum Pare (10%) had a higher prevalence of underage drinking than Arunachal Pradesh, that is, 9.8%.

Socio-demographics of Underage Drinking

Bivariate Analysis

The results of cross-tabulation are presented in **Table 3**, showing the comparison between individuals based on drinking alcohol about variables such as individual (age, sex, education), family-related (marital status, family structure), socio-economic (religion, social category, wealth index, house type), demographic (place of residence), and a substance use (tobacco use). All these variables, in bivariate analysis, have shown a significant association with underage drinking. Notably, tobacco use showed a strong correlation between tobacco and alcohol use, χ^2 (1, N = 7,398) = 2,400, p = .001. Suggesting that those who use tobacco also use alcohol and are vulnerable to alcohol and tobacco dependence disorders at a younger age.

Multivariate Analysis

The factors influencing underage drinking among the sample population are shown in **Table 4**. Based on the result of the chi-square test of association, the following variables were found to be significantly associated with the outcome variable. They were entered in the regression model: age, sex, social category, marital status, place of residence, wealth index, and tobacco use. Factors that were significant in bivariate analysis but not in multivariate analysis were removed from the model. These factors were: educational status, religion, family structure, and house type.

After adjusting for individual, family-related, socio-economic, demographic, and substance use in the multivariable analysis, the odds of drinking alcohol were significantly higher among 18–20-year-olds compared with the 15–17 age group (aOR 2.28; 95% CI 1.82, 2.86). The odds of underage drinking were significantly lower among females (aOR 0.55; 95% CI 0.44, 0.69) compared with males. The odds of drinking alcohol were significantly higher among ever-married individuals (aOR 1.99; CI 1.44, 2.76) compared with unmarried individuals. Those who lived in rural areas were more likely to drink alcohol than those who lived in urban areas (aOR 2.25; CI 1.62, 3.12).

Household wealth was also significantly correlated with underage drinking. Individuals from all four wealth index quintiles, ranging from the poorest to the richest, were less likely to drink alcohol as compared to those who belonged to the poorest quintile. Tobacco use was strongly associated with underage drinking. The odds of drinking alcohol were 30 times higher among tobacco users than non-users (aOR 30.45; 95% CI 24.22, 38.28).

TABLE 2.

District-wise Prevalence of Underage Drinking in Arunachal Pradesh.

District	Alcohol Users (*n*)	%	Total Population (*n*)
Upper Subansiri	65	20	325
Anjaw	48	15.6	307
Upper Siang	43	13.9	309
Namsai	58	12.4	468
West Siang	41	11.9	344
Longding	46	11	417
Siang	52	10.9	479
Papum Pare	37	10	369
Lower Subansiri	40	9.2	434
Dibang Valley	31	9.2	338
Changlang	41	8.7	473
East Kameng	37	8.5	434
West Kameng	34	8.2	413
Kurung Kumey	21	8.1	258
Lohit	37	7.8	476
Lower Dibang Valley	28	7	398
Kra Daadi	12	6.7	178
Tawang	20	6.6	304
East Siang	18	5	364
Tirap	14	4.5	310
Arunachal Pradesh (Total)	**723**	**9.8**	**7,398**

Discussion

This study delves into the prevalence and predictors of underage drinking in Arunachal Pradesh, drawing upon data from the NFHS-5 conducted in 2021. Despite the MLDA of 21 years, across all 20 districts, the prevalence of underage drinking ranges from 4% to 20% among the young population, underscoring the urgency of addressing this issue. The district-wise distribution showed that all 20 districts had a prevalence of underage drinking twice that of the national prevalence for India, which was reported in our earlier study.[17] This suggests the alarmingly high burden of underage drinking in the state.

Further, the analysis reveals significant associations between underage drinking and various socio-demographic factors, including age, gender, marital status, place of residence, household wealth, and tobacco use. The strong linkage between early initiation of alcohol use and multiple health and behavioral issues,[3] alcohol

TABLE 3.

Factors Correlated with Underage Drinking.

Variable	%	Chi-square	*p* Value
Age (years)		215.1	<.001*
15–17	4.7		
18–20	14.8		
Sex		196.7	<.001*
Male	14.7		
Female	5.0		
Educational status		31.6	<.001*
No education	15.6		
Primary	12.2		
Secondary	9.0		
Higher	14.9		
Marital status		54.4	<.001*
Unmarried	18.1		
Ever-married[a]	9.0		
Family structure		23.3	< .001*
Nuclear	8.5		
Non-nuclear	12.0		
Place of residence		62.5	<.001*
Urban	4.7		
Rural	11.2		
House type		32.4	<.001*
Kachha	11.3		
Semi-Pucca	10.7		
Pucca	6.4		
Religion		35.7	<.001*
Hindu	9.5		
Muslims	3.9		
Christians	7.9		
Non-religion	9.9		
Others[b]	12.4		
Social category		19.5	<.001*
SC	5.8		
ST	10.5		
OBC	9.4		
Others	5.9		
Wealth index		86.1	<.001*
Poorest	14.8		
Poorer	11.0		
Middle	8.1		
Richer	5.6		
Richest	5.2		
Tobacco		2,400	<.001*
Yes	61.2		
No	4.3		

[a]Includes ever-married individuals (widowed, separated, and divorced).
[b]Others included Jains, Sikhs, Jews, Buddhists, and Zoroastrians.

dependence and premature death in the later stages of life are evident from previous literature.[4,5] A study in Arunachal Pradesh reported that the age at initiation was below 15 years, with the highest prevalence of alcohol use among adolescents in the 13–17 age group.[23] In alignment with these findings, our study generated strong evidence of the presence of the widely practiced yet least discussed topic of underage drinking in Arunachal Pradesh.

The significant influence of gender, religion, and residency on alcohol use among the general all age population has been discussed in detail by earlier studies.[8,9] We could not find any significant association between religion and underage drinking. However, we found a substantial impact of gender and residency on underage drinking, suggesting a higher risk among males and rural populations.[24,25] Further, a strong positive association between underage drinking and tobacco use indicates the presence of cross-addiction. This adds higher vulnerability to premature death due to cardiovascular diseases and other complications related to alcohol and tobacco use at a younger age.[6]

Notably, variation in alcohol consumption patterns among the underage population highlights the need for tailored interventions providing behavior change communication on the harms of alcohol use. The earlier studies have pointed out high alcohol use and associated socio-cultural practices among diverse communities in Arunachal Pradesh.[13–15] This includes the custom of drinking *apong*, a local alcoholic fermented rice-based beverage that is accepted for mass consumption as a celebration during rituals, ceremonies, religious events, and harvest festivals.[14,15] Cultural norms and family practices play a pivotal role in shaping adolescents' attitudes toward alcohol. A systematic review by Nadkarni et al. highlighted that in India, early initiation of alcohol use is often linked to cultural acceptance, familial behaviors, including parental alcohol consumption.[9] Similarly, studies conducted in Kerala, Assam, and Mumbai found that parents' indulgence in consuming alcohol, tobacco, or both, and media exposure were found to influence early initiation of alcohol drinking by their offspring.[26–28] Further, some of the small-scale studies covering all age populations have presented associations between alcohol use and some of the socio-cultural and demographic factors, such as religion, ethnicity, gender, age, education, and occupation.[14,23,24] However, none of these studies covered the issue of underage drinking across all districts of Arunachal Pradesh.

The inter-district variation in underage drinking prevalence in Arunachal Pradesh, as observed in our study, can be attributed to a complex interplay of

TABLE 4.

Predictors of Underage Drinking in Arunachal Pradesh.

Variable	aOR	Std. Err.	*p* Value	95% C. I.	
				Lower	Upper
Age (Years)					
15–17®	1.000				
18–20	2.289	0.263	<.001	1.827	2.868
Sex	1.000				
Male®					
Female	0.554	0.063	<.001	0.443	0.693
Marital Status					
Unmarried®	1.000				
Ever-married[a]	1.997	0.332	<.001	1.442	2.765
Place of Residence					
Urban®	1.000				
Rural	2.250	0.377	<.001	1.620	3.126
Social Category					
SC®	1.000				
ST	2.302	0.615	.002	1.364	3.885
OBC	1.190	0.415	.618	0.601	2.357
Others	0.689	0.238	.281	0.350	1.355
Wealth Index					
Poorest®					
Poorer	0.688	0.093	.006	0.528	0.897
Middle	0.636	0.107	.007	0.458	0.884
Richer	0.492	0.114	.002	0.313	0.774
Richest	0.292	0.099	.001	0.150	0.568
Tobacco					
No®					
Yes	30.453	3.558	.001	24.220	38.290
Constant	0.004	0.002	.001	0.001	0.012

®Reference category.
[a]Includes ever-married individuals (widowed, separated, and divorced).

socio-cultural, geographic, and enforcement-related factors. Districts such as Upper Subansiri and Anjaw show higher prevalence, likely due to the strong cultural acceptance of traditional fermented beverages such as *apong*, which are integral to tribal rituals and social life.[15,16,29] Border districts may face weaker enforcement of excise laws and increased informal alcohol access.[19,20] Additionally, peer clustering of risky behaviors, such as tobacco use, significantly increases the likelihood of alcohol use among adolescents.[23,30] Educational and economic disparities across districts (e.g., Kurung Kumey, Tirap) may further exacerbate vulnerability through limited opportunities and psychosocial stress.[11] Parental alcohol consumption and cultural modeling of drinking also play a significant role in normalizing underage drinking within households and communities.[11,27,30] These factors, coupled with inconsistent implementation of the MLDA policies at the district level, underline the importance of targeted, culturally grounded interventions tailored to the unique profiles of each district.[20,29]

A previous national-level assessment on a similar topic showed that Arunachal Pradesh had the highest prevalence of underage drinking in India.[15–17] In alignment with literature from other parts of India,[27,28,31,32] we found that age, sex, marital status, place of residence, wealth index, and tobacco use had a significant association with underage drinking in Arunachal Pradesh.

Considering this, the study findings underscore the need for strict enforcement of MLDA, restricting alcohol availability and accessibility, including targeted interventions to mitigate alcohol-related harm among the underage population.[33] The strength of this study lies in its utilization of state-level representative data from the NFHS-5, which provides a large sample size, enhancing the reliability and generalizability of the findings. However, the study is limited by its cross-sectional design, precluding causal inference. Additionally, reliance on self-reported data may introduce response bias. The NFHS-5 covered information from the 15 and above population; the situation of individuals below 15 years of age could not be assessed. Our analysis was limited to the population between 15 and 20 years, suggesting a comprehensive assessment covering the under 15 population as well.[25] While this study provides valuable insights, future research should explore the role of cultural norms, frequency, type of alcohol use, peer influences, and environmental factors in shaping alcohol consumption among the underage population. Qualitative studies can provide deeper insights into social networks and youth perceptions of alcohol use. Addressing these gaps, future research can contribute to more comprehensive strategies for preventing underage drinking in Arunachal Pradesh and other northeastern states.

Conclusions

The burden of underage drinking is alarmingly high in Arunachal Pradesh. All districts, particularly eight districts, that is, Upper Subansiri, Anjaw, Upper Siang, Namsai, West Siang, Longding, Siang, and Papum Pare, have a significantly high prevalence of underage drinking. Considering the higher risks at a younger age, policymakers should prioritize integrated approaches to regulate alcohol use, increase access to de-addiction services, and community-based interventions on raising awareness of the harms of alcohol use at a younger age.[33] Targeted interventions, informed by identified risk factors, can address underage drinking and promote adolescent health and well-being. Efforts to reduce alcohol availability and restrict tobacco access among youth are paramount. Strict enforcement of MLDAs and further delaying the age limit is recommended.

Acknowledgments

We are grateful to the DHS program, Rockville, MD 20850 USA, for authorizing the use of the India DHS 2021 dataset for this study.

Declaration of Conflicting Interests

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

Ethical Approval

The researchers/authors of this article did not collect primary data directly from living individuals/humans in the field. The study used secondary data (collected by the DHS program, ICF, and IIPS) from the India DHS 2021/NFHS-5 public-use dataset, which does not include individual identifiers and geographical details (individual names, contact details, addresses, house numbers, and GPS coordinates) for the selected sample of 7,398 individuals. The authors of this study have obtained the authorization letter from the DHS program that provides permission to use secondary data (i.e., NFHS-5 data) for research publication purposes without needing separate IRB approval (as the DHS program has already followed IRB-approved procedures on maintaining privacy and confidentiality of individual data). For details, please refer to the attached DHS authorization letter (supplementary file) obtained for this study and DHS data use policies available here: https://dhsprogram.com/data/Terms-of-Use.cfm

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Prior Presentations

This article, as such, was not presented anywhere nor published.

Supplemental Material

Supplemental material for this article available online.

ORCID iDs

Vishal Tikhute https://orcid.org/0000-0002-5985-5498
Kumaravel Ilangovan https://orcid.org/0000-0003-0111-511X
Sadananda Reddy https://orcid.org/0000-0001-6111-750X

References

1. Harding FM, Hingson RW, Klitzner M, et al. Underage drinking: A review of trends and prevention strategies. *Am J Prev Med* 2016; 51(4): S148–S157.
2. World Health Organization. Regional Office for the Western Pacific. *Young people and alcohol: A resource book*. Western Pacific Region: World Health Organization; 2010.
3. World Health Organisation. *Harmful use of alcohol*. [cited May 7, 2024]. Available from: https://www.who.int/health-topics/alcohol
4. Dawson DA, Goldstein RB, Patricia Chou S, et al. Age at first drink and the first incidence of adult-onset DSM-IV alcohol use disorders. *Alcohol Clin Exp Res* 2008; 32(12): 2149–2160.
5. Hingson R and White A. New research findings since the 2007 Surgeon General's call to action to prevent and reduce underage drinking: A review. *J Stud Alcohol Drugs* 2014; 75(1): 158–169.
6. National Research Council (US) and Institute of Medicine (US) Committee on developing a strategy to reduce and prevent underage drinking. 3, Consequences of underage drinking. In: Bonnie RJ and O'Connell ME (eds) *Reducing underage drinking: A collective responsibility*. Washington (DC): National Academies Press (US), 2004. Available from: https://www.ncbi.nlm.nih.gov/books/NBK37591/
7. Van Der Deen FS, Carter KN, McKenzie SK, et al. Do changes in social and economic factors lead to changes in drinking behavior in young adults? Findings from three waves of a population-based panel study. *BMC Public Health* 2014; 14(1): 928.
8. Jyani G, Prinja S, Ambekar A, et al. Health impact and economic burden of alcohol consumption in India. *Int J Drug Policy* 2019; 69: 34–42.
9. Nadkarni A, Tu A, Garg A, et al. Alcohol use among adolescents in India: A systematic review. *Glob Ment Health* 2022; 9: 125.
10. Ambekar A, Agrawal A, Rao R, et al. *Magnitude of substance use in India-National survey on extent and pattern of substance use in India (2019)*. Ministry of Social Justice and Empowerment, Government of India, 2019 [cited April 25, 2024]. Available from: https://socialjustice.gov.in/writereaddata/UploadFile/Survey%20Report.pdf
11. Parmar A, Bhatia G, Sharma P, et al. Understanding the epidemiology of substance use in India: A review of nationwide surveys. *Indian J Psychiatry* 2023; 65(5): 498–505.
12. Tomar S, Pant K, Sharma P, et al. Unravelling the hidden ethnic fermented treasure of the Himalayas-A review on the traditionally fermented beverages of the Northwest Indian Himalayan Region. *Food Chem Adv* 2023; 2: 100254.
13. Shrivastava K, Pramanik B, Sharma BJ, et al. Ethnic fermented foods and beverages of Arunachal Pradesh. In: Tamang J (eds) *Ethnic fermented foods and beverages of India: Science History and Culture*. Singapore: Springer, 2020 [cited April 20, 2025]. pp.41–84. Available from: http://link.springer.com/10.1007/978-981-15-1486-9_2
14. Chaturvedi HK and Mahanta J. Sociocultural diversity and substance use pattern in Arunachal Pradesh, India. *Drug Alcohol Depend* 2004; 74(1): 97–104.
15. Chaturvedi HK, Bajpai RC and Pandey A. Predictors of substance use in the tribal population of Northeast India: Retrospective analysis of a cross-sectional survey. *J Addict Res Ther* 2016 [cited 2024 May 13]; 7(5). Available from: https://www.omicsonline.org/open-access/predictors-of-substance-use-in-the-tribal-population-of-northeast-india-retrospective-analysis-of-a-crosssectional-survey-2155-6105-1000295.php?aid=80599
16. Tikhute V. Underage drinking, prevalence and predictors in India: Analysis of Demographic and Health Surveys (DHS) data. *J Hum Behav Soc Environ* 2024; 1–13. [Epub ahead of print]. DOI: 10.1080/10911359.2024.2336109.
17. Balasubramani K, Paulson W, Chellappan S, et al. Epidemiology, hot spots, and socio-demographic risk factors of alcohol consumption in Indian men and women: Analysis of National Family Health Survey-4 (2015–2016), a Nationally Representative Cross-Sectional Study. *Front Public Health* 2021; 9: 617311.
18. *The DHS Program-Data [Internet]*. [cited April 25, 2024]. Available from: https://dhsprogram.com/Data/
19. Arunachal Pradesh Legislative, The Arunachal Pradesh Legislative Assembly. The Arunachal Pradesh Excise Act, 1993. 1993, p.4. Available from: https://eabkari.arunachal.gov.in/CommonUser/Portal_New_Portal_Acts_Rules_Cirular.aspx?type=33
20. Schess J, Bennett-Li L, Velleman R, et al. Alcohol policies in India: A scoping review. *PLoS ONE* 2023; 18(11): e0294392. DOI: 10.1371/journal.pone.0294392.
21. von Elm E, Altman DG, Egger M, et al. The strengthening the reporting of observational studies in epidemiology (STROBE) statement: Guidelines for reporting observational studies. *J Clin Epidemiol* 2008; 61: 344–349.
22. International Institute for Population Sciences (IIPS). *National Family Health Survey (NFHS-5) India Report*. [cited April 25, 2024]. Available from: https://iipsindia.ac.in/content/national-family-health-survey-nfhs-5-india-report
23. Ali A, Gujar NM, Deuri SP, et al. Prevalence of mental health problems and substance use among school-going adolescents of tribal ethnicity: A preliminary study from North-East India. *J Indian Assoc Child Adolesc Ment Health* 2024 [cited 2025 Jul 13]; 20(1): 18–25. Available from: DOI: 10.1177/09731342241239190.
24. Dhawan A, Pattanayak R, Chopra A, et al. Pattern and profile of children using substances in India: Insights and recommendations. *Natl Med J India* 2017; 30(4): 224. [cited 2025 Jun 18]. Available from: https://nmji.in/pattern-and-profile-of-children-using-substances-in-india-insights-and-recommendations/

25. Singh SK and Kumar S. Nature, pattern, and changes in alcohol consumption among men in India: Insights from NFHS-4 and NFHS-5. *J Ethn Subst Abuse* 2024; 23(4): 947–966. [cited 2025 Jun 18]. Available from: DOI: 10.1080/15332640.2022.2160853.
26. Jaisoorya TS, Beena KV, Beena M, et al. Prevalence and correlates of alcohol use among adolescents attending school in Kerala, India. *Drug Alcohol Rev* 2016; 35(5): 523–529.
27. Mahanta B, Mohapatra P, Phukan N, et al. Alcohol use among school-going adolescent boys and girls in an industrial town of Assam, India. *Indian J Psychiatry* 2016; 58(2): 157.
28. Prabhughate P, Srinivasan S, Ranga V, et al. Normalizing alcohol consumption among youth: Role of peers, media, and access to alcohol in Mumbai. *Health Educ Public Health* 2020; 3(1). [cited June 23, 2025]. Available from: https://healtheducationandpublichealth.com/normalizing-alcohol-consumption-among-youth-role-of-peers-media-and-access-to-alcohol-in-mumbai
29. Pisupati GS. Uniformity in legal drinking age across India: A necessity. *Jus Corpus Law J* 2022; 3(2): 564–569.
30. Chaturvedi HK, Bajpai RC and Tiwari P. Association of religion and cultural tradition with alcohol use among some tribal communities of Arunachal Pradesh, India. *J Ethn Subst Abuse* 2019; 18(2): 296–308.
31. Mohanan P, Swain S, Sanah N, et al. A study on the prevalence of alcohol consumption, tobacco use and sexual behaviour among adolescents in urban areas of the Udupi district, Karnataka, India. *Sultan Qaboos Univ Med J* 2014; 14(1): 104–112.
32. Khan J and Shaw S. Socio-economic context of alcohol consumption and the associated risky behavior among male teenagers and young adults in India. *J Subst Use* 2023; 28(1): 66–73.
33. Komro KA and Toomey TL. Strategies to prevent underage drinking. *Alcohol Res Health* 2002; 26(1): 5–14.