

AUDIT (Alcohol Use Disorders Identification Test) to Estimate the Pattern and Correlates of Alcohol Consumption among the Adult Population of West Bengal, India: A Community Based Cross-sectional Study

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ABSTRACT

Introduction: Pattern of alcohol consumption substantially changed in India with in last 20 to 25 years. Excessive alcohol consumption is a major risk factor for various morbidity and mortality. So, scientific study to identify alcohol consumption patterns and its correlates will be helpful to formulate preventive strategies.

Aim: To estimate the pattern of alcohol consumption and to determine its correlates, among the adult population of the state of West Bengal in India.

Materials and Methods: A community based cross-sectional study was conducted among the adult population of the state of West Bengal at Gram Panchayat (GP) level. Ninety-nine (n=99) adult (≥ 18 years) men and women of Guchati GP at Paschim Medinipur district, was selected using Lot Quality Assurance

Sampling (LQAS) technique. The study participants were interviewed using a pre-designed and pre-tested schedule.

Results: It was estimated that the prevalence of low risk drinking or abstinence (Zone I) was 65.5% (95% CI 55.5% to 75.5%) and the prevalence of alcohol use in excess of low-risk (Zone II) was 17.6% (95% CI 7.6% to 27.6%), and the prevalence of harmful and hazardous drinking (Zone III) was 8.5% (95% CI 0% to 18.5%) and the prevalence alcohol dependence (Zone-IV) was 8.4% (0% to 18.4%). Logistic regression model shows that "gender" ($p = 0.00$) and "employment status" ($p = 0.01$) added significantly to the model with adjusted odds ratio of 82.27 (95% CI 18.17-372.58) and 0.13 (0.03-0.66).

Conclusion: There is a need for comprehensive screening and treatment programme to deal with the problems of Alcohol Use Disorders among adults to achieve good health and well being for sustainable development.

Keywords: Alcohol dependence, Geographic information system, Lot quality assurance sampling

INTRODUCTION

Habit of alcohol consumption is increasing day by day not only in India, but world-wide also [1,2]. Often it has been seen that young boys and girls start to test alcohol just for fun but gradually they are engulfed by the addictive power of alcohol [3]. Consumption of alcohol has existed in India for centuries but the quantity, pattern and resultant consequences have changed substantially in last 20 to 25 years [1,4]. Studies conducted in last 10 years reveal that the epidemiological pattern of alcohol consumption in India is characterised by predominantly male drinker, preference to spirits containing high alcohol concentration, and frequent and heavy drinking [5,6].

Misuse of alcohol is a major risk factor for various morbidity and mortality [7-10]. Anaemia among women, nutritional deficiencies among adolescents and adults are associated with the harmful use of alcohol [11,12]. Alcohol consumption is a behavioural factor for the high prevalence of HIV in India [13]. Not only physical, but alcohol has great impact on the psychological and behavioural aspect also. Some of the health consequences of alcohol consumption are direct, like alcohol over dose, foetal alcohol syndrome and some are indirect, mediated through increase chance of accidents, increases vulnerability to chronic communicable and non-communicable diseases [6,9].

Furthermore alcoholism is also related to social pathology of crime, violence in the society [14]. One of the most important targets under goal 3 of the "Sustainable Developments Goals - 17 Goals to Transform Our World" is the "Strengthen the prevention and

treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol" which indicates that the United Nations also accept and give proper importance to this problems [15].

So, estimation of the prevalence of Alcohol Use Disorders (AUDs) in the society and its correlates will be a very effective endeavour to make appropriate interventional strategies in time. A detailed guidelines for the diagnosis of alcohol related disorders, like acute alcohol intoxication, harmful use, alcohol dependence syndrome, withdrawal state, and related medical and neuropsychiatric conditions, collectively called AUDs, have been provided in the tenth revision of the International Classification of Diseases (ICD-10) [16].

Alcohol Use Disorders Identification Test (AUDIT) is a screening tool developed by World Health Organization (WHO) to detect hazardous and harmful pattern of alcohol consumption including alcohol dependence among the patient and general population specially at primary care setting [17]. It also provides a framework for intervention in the form of health education, counselling or referral to help the potential drinkers to cease or reduce alcohol consumption and thereby avoid or minimize the harmful consequences of drinking [17]. With this background the current study has been conducted to estimate the pattern of alcohol consumption and to determine its correlates, among the adult population of the state of West Bengal in India.

MATERIALS AND METHODS

An observational descriptive study with cross-sectional design was conducted between the 1st July 2016 and 15th July 2016 among the

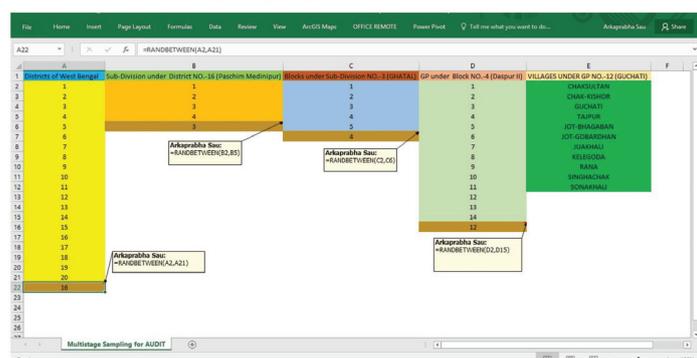
adult population (≥ 18 years) of a selected area of the state of West Bengal. A GP, lowest tier of the 3 tier Panchayati Raj System for local administration in India, namely Guchati under Daspur II block of Ghatal Sub-Division at Paschim Medinipur district in the state of West Bengal was selected using multistage sampling technique with the help of function "RANDBETWEEN" in Microsoft Excel [Table/Fig-1].

From the Guchati GP, Study population were selected using Lot Quality Assurance Sampling (LQAS) technique [18]. There are 11 villages under the Guchati GP [Table/Fig-2]. According to LQAS technique, each village under that GP was considered as a Lot. As per 2011 census total adult population of the Guchati GP was 11596. Considering desired level of confidence at 95% and desired level of accuracy at $\pm 10\%$, total sample size, as per LQAS, was 96. As the sampling fraction was 0.83% i.e., less than 10%, so 96 individuals were considered to be the final sample size. So, minimum Lot sample size was calculated as 9 individuals. Nine sampling points from every village were located using Arc GIS, a Geographic Information System (GIS) software, random point selection technique. During data collection each point was identified using a GPS (Global Positioning System) enabled android smart phone. One adult individual from each sampling point or nearest to the sampling point was randomly selected for the study purpose using "RAND" function in Epi Info (android smart phone application) [19]. Then He/she was interviewed after taking informed consent.

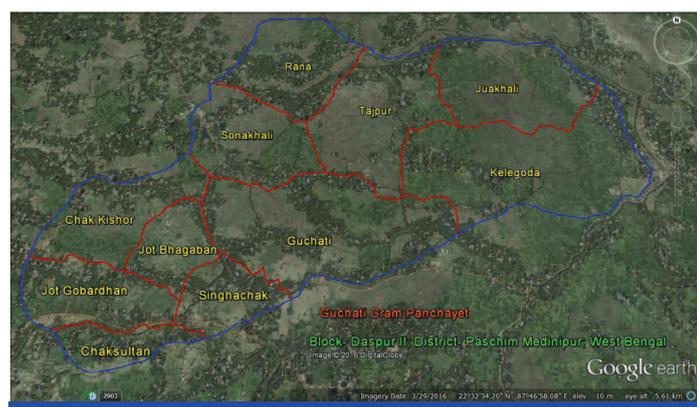
Those who are the permanent resident of that area were included in the study and those who never consumed alcohol in their life time were excluded from the study. Ethical approval was obtained from the Institutional Ethics Committee of RG Kar Medical College and Hospital, Kolkata, West Bengal, India.

Study Tools

Total 99 adult persons were interviewed using a pre designed and pretested, Epi Infobased digital schedule. That digital schedule was developed using Epi Info™7 software [19] in computer. The schedule had 2 parts, first part consisted of socio demographic and spatial information i.e., village, age, gender, education, employment status,



[Table/Fig-1]: Multistage Sampling for AUDIT.



[Table/Fig-2]: Guchati Gram Panchayat (GP) under Daspur II block.

per capita monthly income, and latitude, longitude and second part was AUDIT [17] questions. During data collection real time synchronisation between Epi Info application in smart phone and Epi Info™7 software in Windows platform based personal computer, was made using cloud computing (Microsoft Azure) technology. Collected data were recorded automatically into the computer Epi Info™7 database in real time manner.

Statistical Analysis Plan

Then recorded data were analysed by the R software and some relevant information were represented using ArcGIS maps [20]. During analysis age was grouped into "less than 40 years" and "More than or equal to 40 years", education status was grouped into "Illiterate" and "Literate", employment status was grouped into "Unemployed" and "Employed". Socio economic status was derived, as per Modified BG Prasad's social classification adjusted for May 2016 Consumer Price Index, from per capita monthly income (Indian Rupees). Then social class was grouped into "Lower and Lower middle" and "Upper and Upper middle and Middle". Outcome (dependent) variable i.e., AUDIT scores were grouped based on risk level according to WHO guideline. Total scores of 8 or more are recommended as indicators of hazardous and harmful alcohol use, as well as possible alcohol dependence [17]. So, AUDIT score between 0 to 7 i.e., Zone-I (Low risk drinking or abstinence) risk level was considered as one group and other group was having score between 8 to 40 i.e., Zone-II (8-15) (Alcohol use in excess of low-risk), Zone-III (16-19) (Harmful and hazardous drinking) and Zone-IV (20-40) (Alcohol Dependence) risk level. Appropriate statistical tests like Intraclass correlation, chi-square test, logistic regression and Bootstrapping were applied whenever necessary. Alfa (α) was set at 5% level.

RESULTS

Among 99 adult respondents, there were 54 (54.50%) men and 45 (45.50%) women. Mean (\pm Standard Deviation) age of the study population was 38.62 (± 11.05) (95% CI 36.44 to 40.76) year. Mean (\pm SD) per capita family income of the study population was 1544 (± 476) (95% CI 1454.39 to 1635.13). Among them 79.9% (95% CI 69.9% to 89.9%) were literate, 86.7% (95% CI 76.7% to 96.7%) were employed and 60.3% (95% CI 50.3% to 70.3%) belongs to "lower" and "lower middle" socio economic class as Modified BG Prasad's social classification adjusted for May 2016 Consumer Price Index.

Mean (\pm SD) AUDIT score of the study population was 7.11 (± 8.11) (95% CI 5.55 to 8.74). AUDIT score were consistent, as evident by Intraclass Correlation Coefficient (ICC) 0.93 (95% CI 0.84 to 0.98), between different villages.

Prevalence of hazardous and harmful use of alcohol among the study population was calculated as per Lot Quality Coverage Survey technique [Table/Fig-3].

Chi-square test for association between socio demographic factors and risk level:

Association between risk level of hazardous and harmful use of alcohol with various socio demographic factors show that there is statistically significant association ($\chi^2 = 32.675$, $p < 0.05$, $\alpha = 5\%$, $df = 1$) only with the gender of the study population [Table/Fig-4].

Regression Analysis

After testing the assumptions, binary logistic regression was performed to ascertain the effects of age, gender (women/men), employment status (employed/unemployed), education (literate/illiterate) and per capita family income on the likelihood that study population have in the High Risk level (AUDIT Score 8-40) i.e., in Zone-II, III, and IV risk level of hazardous and harmful use of alcohol. The logistic regression model was statistically significant, $\chi^2(5) =$

AUDIT- Risk Level	AUDIT Score	Number of individuals	Prevalence	95% Confidence Interval (95% CI)
Zone-I (Low risk drinking or abstinence)	0 to 7	61	65.5%	55.5% to 75.5%
Zone-II (Alcohol use in excess of low-risk)	8 to 15	16	17.6%	7.6% to 27.6%
Zone-III (Harmful and hazardous drinking)	16 to 19	14	8.5%	0% to 18.5%
Zone-IV (Alcohol Dependence)	20 to 40	8	8.4%	0% to 18.4%

[Table/Fig-3]: Distribution of study participants according to AUDIT risk level and score.

Socio Demographic Factors	Risk Level		Total	p-value
	Zone-I	Zone-II/ III / IV		
Age				
Less than 40 yrs	41	21	62	0.232
More than or equals to 40 yrs	20	17	37	
Gender				
Men	19	35	54	0.000*
Women	42	3	45	
Employment Status				
Unemployed	16	4	20	0.074
Employed	45	34	79	
Education				
Illiterate	13	11	24	0.389
Literate	48	27	75	
Prasad's Socio Economic Status				
"Lower" and "Lower middle"	42	23	65	0.396
"Upper" and "Upper middle" and "Middle"	19	15	34	

[Table/Fig-4]: Association between risk level of hazardous and harmful use of alcohol among the study population with various socio demographic factors. (n=99)
* Statistically significant association ($\chi^2 = 32.675$, $p < 0.05$, $\alpha = 5\%$, $df = 1$).

Independent variables	B	Wald	Sig	Exp (B)/Adjusted Odds ratio (CI - 95%)
Age (Years)	0.015	0.28	0.59	1.02 (0.95-1.08)
Gender (women/men)	4.41	32.75	0.00*	82.27 (18.17-372.58)
Employment status(employed/unemployed)	-2.02	6.04	0.01*	0.13 (0.03-0.66)
Education(literate/illiterate)	0.23	0.09	0.77	1.26 (0.28-5.97)
Per capita Family Income (Rs)	0.001	2.36	0.13	1.001 (1.000-1.003)

[Table/Fig-5]: Strength of association between risk level of hazardous and harmful use of alcohol with different socio demographic variables (Binary Logistic Regression). (n=99)
*Statistically significant association ($p < 0.05$).
N.B- "B" (Beta co-efficient), "Sig" (Significance level), "CI" (Confidence Interval)

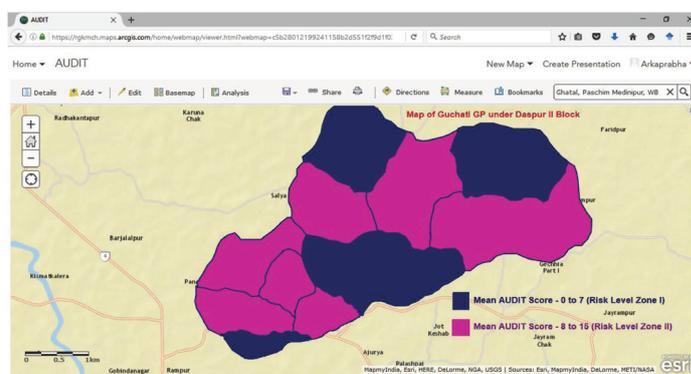
68.982, $p < .000$. The model explained 66.9% (Nagelkerke R^2) of the variance in pattern of alcohol consumption and correctly classified 87.9% of instances. The Wald test ("Wald" column) is used to determine statistical significance for each of the independent variables. The statistical significance of the test is found in the "Sig" column. From these results it has been noticed that only "gender" ($p = 0.00$) and "employment status" ($p = 0.01$) added significantly to the model with adjusted odds ratio of 82.27 (95% CI 18.17-372.58) and 0.13 (0.03 – 0.66) [Table/Fig-5].

GIS Mapping

A map was developed using the ArcGIS software, showing the distribution of the villages according to risk level group. Mean AUDIT score between 0 to 7 i.e., risk level Zone-I were in the village Chaksultan, Guchati, Juakhali, and Rana. Rest of the villages had mean AUDIT score between 8 to 15 i.e., risk level Zone-II [Table/Fig-6].

DISCUSSION

From this study, it was estimated that the prevalence of low risk drinking or abstinence (Zone I) was 65.5% (95% CI 55.5% to 75.5%) and the prevalence of alcohol use in excess of low-risk (Zone II) was 17.6% (95% CI 7.6% to 27.6%), and the prevalence of harmful and hazardous drinking (Zone III) was 8.5% (95% CI 0% to 18.5%) and the prevalence alcohol dependence (Zone-IV) was 8.4% (0% to 18.4%). So, the prevalence of hazardous and harmful use of alcohol including alcohol dependence in the study population was 34.5% (95% CI 24.5% to 44.5%). Study conducted by SD Rathod et al., in 2013-14, found that prevalence of hazardous and harmful use of alcohol among drinkers were 42% at Sehore district of Madhya Pradesh in India [6]. In a study, conducted by Pillai A et al., in northern Goa, they found that the prevalence of drinking habit was 74.3% of adult population aged between 30 to 33 years [5].



[Table/Fig-6]: Classification of villages according to mean AUDIT score.

Study Conducted by	Place of Study	Year of study	Prevalence of AUDs among adults	Factors significantly associated/ not associated with AUDs
Joseph et al., [21]	Haryana, India	2015	24.06%	20-35 years age group, tobacco use were significantly associated with AUDs
Rathod et al., [6]	Sehore, India	2014	42%	Male, urban residence, depression, high quality housing, tobacco use were significantly associated with AUDs
A Sijiv et al., [22]	Puducherry, India	2014	27.5%	No significant association with age group, education, socio economic status, employment status, type of family, and marital status
H Zavos et al., [23]	Colombo, Sri Lanka	2013	63.1%	Male gender, age, marital status, years of schooling significantly associated with AUDs but there is no significant association with urban residence and ethnicity
Martins et al., [24]	Piaui, Brazil	2007	91.1%	No association with gender, age group, family income but friends' influence has significant association.

[Table/Fig-7]: Significant result of different studies related to AUDs among adults [6,21-24].

Current study also revealed that habit and pattern of drinking in high risk level is much higher among men, which is consistent with the study conducted by Rathod et al., in Madhya Pradesh [5,6].

Individual association between various socio-demographic factors and risk level of hazardous and harmful use of alcohol shows that only gender have the statistically significant association ($p < 0.05$). Some other studies found significant association between educational status, employment status and socio economic condition with risk level of hazardous and harmful use of alcohol also [13]. Binary logistic regression model shows that "gender" ($p = 0.00$) and "employment status" ($p = 0.01$) added significantly to the model with adjusted odds ratio of 82.27 (95% CI 18.17-372.58) and 0.13 (0.03 – 0.66). This model also reveals that those who were employed, more prone to become high risk level drinker. To compare the results of this study, significant observations of similar studies have been tabulated in [Table/Fig-7] [6,21-24].

LIMITATION

There may be some amount of bias in the regression analysis due to confounding variables like stress factor and peer pressure. Moreover, larger cross-sectional study, involving other Gram Panchayats in India with larger sample size would have been closer to generalization.

CONCLUSION

Keeping the study results in mind, it can be concluded that there is a need for a comprehensive screening and treatment programme to deal with the problems of AUDs among adults to achieve good health and well beings to meet the Sustainable Development Goals (SDG).

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