

## Role of Demographic and Personality Factors in Mediating Vulnerability to Suicide Attempts under Intoxication with Alcohol: A Record-based Exploratory Study

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### ABSTRACT

**Background:** Identifying those who are likely to make suicide attempts under alcohol intoxication has important implications for management and prevention of further suicidal behavior. **Aims:** To identify the frequency of suicide attempts made under the influence of alcohol and the percentage of impulsive suicide attempts among them. We also aimed to identify predictors of attempted suicide under intoxication with alcohol. **Setting and Design:** Record-based study carried out at a tertiary care hospital. **Materials and Methods:** The clinical charts of consecutive suicide attempters ( $n = 147$ ) who presented to the crisis intervention clinic from July 2013 to June 2014 were reviewed, and relevant data were extracted. The participants were divided into three groups – nonusers of alcohol ( $n = 85$ ), alcohol users who did not attempt under intoxication ( $n = 31$ ) and alcohol users who attempted under intoxication ( $n = 31$ ). These groups were compared on various sociodemographic and clinical variables. Logistic regression was done to identify predictors of suicide attempt under intoxication. **Statistical Analysis Used:** Chi-square ( $\chi^2$ ) test, one-way ANOVA ( $F$ ) test and backward stepwise logistic regression. **Results:** About 21.08% of all suicide attempts occurred under alcohol intoxication. Such subjects were more likely to be older ( $F = 12.428$ ,  $P < 0.001$ ), male ( $\chi^2 = 87.367$ ,  $P < 0.001$ ), married ( $\chi^2 = 6.787$ ,  $P = 0.034$ ), employed ( $\chi^2 = 41.778$ ,  $P < 0.001$ ), and fewer years of formal schooling ( $F = 3.312$ ,  $P = 0.039$ ). Physical methods (hanging) were used more often in this group ( $\chi^2 = 19.510$ ,  $P = 0.012$ ). In regression analysis, only marital status and living condition emerged as predictors of attempt under intoxication (odds ratios 4.52 [confidence interval (CI) 1.34–15.24,  $P = 0.015$ ] and 5.67 [CI 1.17–27.39,  $P = 0.031$ ] respectively). **Conclusion:** Certain demographic features may help us in identifying those who are more likely to make attempts under intoxication. The role of personality factors as potential mediators of such behavior needs further exploration.

**Key words:** Aggression, alcohol use, attempted suicide, impulsivity, personality, suicide

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## INTRODUCTION

Suicide is an increasingly prominent medico-social and public health issue. Alcohol use has been consistently linked to higher suicide rates across the globe.<sup>[1,2]</sup> Studies report that about two-thirds of suicide completers have detectable alcohol levels in the blood.<sup>[3]</sup> Similar reports exist for attempted suicide.<sup>[4]</sup> Alcohol use disorders have shown a robust link with almost the entire spectrum of suicidal behavior including suicidal ideation, nonfatal suicide attempts, and death by suicide but these rates vary substantially across cultures.<sup>[5-7]</sup> Though it has been inconclusively debated whether alcohol can itself drive a person to suicide *de novo*,<sup>[8]</sup> evidence shows that alcohol abuse may confer 60–120 times higher suicide risk compared to those with other medical illnesses.<sup>[9]</sup> Due to the sheer strength of these associations, the issue of alcohol in relation to suicide assumes significance.

Personality dimensions such as impulsivity and aggression have been postulated to act as a mediating variable in an individual's vulnerability to suicide and more pertinently, in the observed link between alcohol use and suicidal behavior.<sup>[10-12]</sup> Further, impulsive suicide attempts are overrepresented in those with alcohol use disorders.<sup>[13,14]</sup> Hence, it is plausible that personality dimensions may explain the proneness of certain individuals to suicide under the influence of alcohol, and this must be scientifically examined. However, these characteristics in those who attempt suicide under the influence of alcohol are poorly understood.

With this background, we carried out the present exploratory study to answer three questions related to suicide attempts under alcohol intoxication: (1) What percentage do they constitute of all suicide attempts from our cohort? (2) What percentage of these will qualify as impulsive suicide attempts? and (3) are there sociodemographic or clinical predictors of such attempts? For the last objective, we divided the suicide attempters into three groups – Group I: Nonusers of alcohol (who never used alcohol in their lifetime), Group II: alcohol users (with any use of alcohol in the past 1 month prior to the attempt) who did not attempt under intoxication, and Group III: alcohol users who were under influence of alcohol while attempting suicide. These groups were compared for differences on sociodemographic variables, attempt characteristics, and personality variables of interest such as impulsivity and hostility-aggressiveness.

## MATERIALS AND METHODS

### Setting of the study

This study was conducted in the Department of Psychiatry of a teaching cum tertiary care hospital

located in South India. The department runs a specialized crisis intervention clinic (CIC) catering to medically stabilized suicide attempters. The CIC uses the definition of “suicide attempt” as stated by Silverman *et al.*<sup>[15]</sup> The key element of this definition includes a self-inflicted act with direct or indirect evidence of intent to end one's life and helps to distinguish suicide attempts from self-harm and undetermined suicide-related behavior. The health-care team at the CIC comprises a psychiatry consultant, a psychiatry resident, and a social worker. Patients who are registered in the clinic are evaluated in detail using a structured proforma that aims to tap both sociodemographic and clinical parameters. Latter also included personality trait measures of impulsivity and aggressiveness. Information is gathered from the patient, his/her relatives and available medical records.

### Procedure

The present study included the chart records of consecutive patients registered in the CIC from July 2013 to June 2014. Information was extracted from the records by one of the authors (Shivanand Kattimani). Data obtained included demographic details, the mode, and reason of the attempt and information about whether the attempt was made under the alcohol intoxication. Any past or family history of suicide attempt was also extracted. Data extraction and evaluation of the clinical case records were done as per standard procedures.<sup>[16]</sup> Suicide intent was measured using the Beck Suicide Intent Scale (BSIS).<sup>[17]</sup> One of the items in the scale deals with the relation between alcohol intake and suicide attempt. Those who took alcohol sufficiently to impair judgment, reality testing, diminish responsibility, and then made suicide attempt were considered to have made attempts under the influence of the alcohol for the study purpose. This was decided based on the alcohol use history and circumstances of suicide attempt by psychiatry consultant (Shivanand Kattimani) after interviewing the patient and their attendant, and these were recorded in the proforma. These were rechecked for consistency of their documentation and correct classification by another psychiatrist who was not involved in the data collection (Anand Babu Arun). The suicide attempt was deemed to be impulsive if  $< \frac{1}{2}$  h had elapsed from the emergence of suicidal idea to the actual attempt as suggested by previous authors.<sup>[18]</sup> This information was available from the records. Specific trait personality attributes the presence of hopelessness, and stressful life events were measured using the following instruments.

### Instruments

BSIS: This is a twenty-item semi-structured interviewer rated instrument to assess the degree of suicidal intent following attempted suicide. The scale encompasses

items related to circumstances surrounding the suicide and self-reported seriousness of the suicide attempt. Total scores can be used for categorizing suicide attempt into three categories: Low Intent (15–19), medium intent (20–28), and high intent ( $\geq 29$ ).<sup>[17]</sup>

**Beck Hopelessness Scale (BHS):** This is a 20-item prevalidated scale used to measure the cognitive construct of hopelessness. It has 9 negatively framed statements and 11 positive framed statements to reflect current thinking. Response to each statement is scored 0 or 1, and total scores can range from 0 to 20.<sup>[19]</sup> The scale has been previously used in an Indian setting.<sup>[20]</sup>

**Presumptive stressful life events scale,** a 51-item scale validated in the Indian population.<sup>[21]</sup> The items, which include both desirable and undesirable stressful events, are quantified with weighted scores. We used the scale primarily as a checklist to elicit the number of stressful life events occurred in the past 1 year preceding the suicide attempt.

**Buss–Perry Aggression Questionnaire (BPAQ):** This is a 29 item self-rated questionnaire whose items yield four subscale scores, pertaining to various domains of aggression, namely physical aggression, verbal aggression, anger, and hostility.<sup>[22]</sup> Researchers have shown good test-retest reliability (0.72–0.80) and internal consistency (0.89) for total BPAQ scores as well as for the four subscales.<sup>[23]</sup>

**Barratt Impulsiveness Scale (BIS-11):** This is a thirty item self-report scale used to measure the personality construct of impulsiveness. The items are related to statements on how one thinks and behaves and based on the frequency each statement can be rated on a 4-point Likert-type scale. The scale has three-second order factors representing the multi-dimensional nature of impulsiveness namely: Attentional impulsivity, motor impulsivity, and nonplanning. A higher score in a particular subdomain of the scale suggests increased impulsivity in that subdomain. The BIS-version 11 was used for this research.<sup>[24]</sup>

### Statistical analysis

The statistical analysis was carried out using SPSS version 20 (IBM Corp., TX, USA). The demographic and clinical characteristics were represented using descriptive statistics. The scale and subscale scores were computed for various instruments. Thereafter, the three groups attempt under intoxication versus attempt not under intoxication versus nonusers of alcohol were compared for differences in sociodemographic and clinical parameters. Backward stepwise logistic regression was conducted to find the independent

predictors of attempt under alcohol intoxication. Missing value imputation was not carried out in this study. All statistical tests were carried out for two-tailed significance, and a  $P < 0.05$  was considered significant.

## RESULTS

A total of 156 patients were registered in the CIC during July 2013 to July 2014. Of these, suicidal intent could not be established in 9, and hence, the present analysis was restricted to 147 patients. Among these, 85 (57.8%) did not use alcohol (Group I), 31 (21.1%) were alcohol users but did not attempt under intoxication (Group II), and 31 (21.1%) attempted under intoxication of alcohol (Group III). The demographic characteristics of participants in the three groups are shown in Table 1. Differences were noted across the groups with regards to age, gender, marital status, educational status, employment status, and type of house. Alcohol users who attempted under intoxication were more likely to be older, married, employed, spent lesser years in education and live in Katcha houses than those who did not attempt under intoxication.

There were significant differences between the groups with respect to the methods used for suicide attempt and the stated reason for the same [Table 2]. There were no significant differences between the groups with regard to previous attempts, family history, hint given, or duration of planning before the attempt. The number of stressors, percentage of patients accessing health care providers in past 3 months and proportion of patients reporting physical ailments also were comparable between them. The BSIS and BHS scores did not differ significantly between the groups. Suicide attempters under intoxication did not differ from suicide attempters, not under intoxication on measured personality traits [Table 2].

Regression analysis was conducted to find the independent predictors of suicide attempt under intoxication among patients who were using alcohol [Table 3]. Only those variables were entered into the equation which showed  $P < 0.2$  on bivariate comparisons of the patients with alcohol use who attempted under intoxication versus alcohol users who were sober during the attempt. Backward logistic regression with Wald method was used due to the limited number of variables which showed trend level association. Regression analysis suggested marital status and living in Katcha house significantly predicted the attempt under intoxication. The model had 72.1% of correct classification rate and explained about 29.8% of the variance (Nagelkerke  $r^2 = 0.298$ ).

**Table 1: Demographic characteristics of patients**

Variable	Group I nonuser of alcohol (n=85), (%)	Group II alcohol users, attempt not under intoxication (n=31), (%)	Group III alcohol users, attempt under intoxication (n=31), (%)	Comparison Group I versus Group II versus Group III (P)	Comparison Group II versus Group III (P)
Age in years	25.2 (8.4)	30.6 (9.8)	34.5 (11.2)	$F=12.428 (<0.001)**$	$t=1.457 (0.150)$
Gender					
Male	19 (22.4)	31 (100)	31 (100)	$\chi^2=87.367 (<0.001)**$	$\chi^2=0.000 (1.000)$
Female	66 (77.6)	0 (0)	0 (0)		
Marital status					
Married	45 (52.9)	15 (48.4)	24 (77.4)	$\chi^2=6.787 (0.034)*$	$\chi^2=5.599 (0.034)*$
Not married	40 (47.1)	16 (51.6)	7 (22.6)		
Education in years	9.4 (4.5)	9.7 (5.0)	7.1 (4.2)	$F=3.312 (0.039)**$	$t=2.168 (0.034)*$
Employment					
Employed	32 (37.6)	27 (87.1)	29 (93.5)	$\chi^2=41.778 (<0.001)**$	$\chi^2=1.071 (0.585)$
Student/homemaker	39 (45.9)	3 (9.7)	1 (3.2)		
Unemployed	14 (16.5)	1 (3.2)	1 (3.2)		
Religion					
Hindu	81 (95.3)	30 (96.8)	31 (100)	$\chi^2=1.535 (0.464)$	$\chi^2=1.016 (1.000)$
Others	4 (4.7)	1 (3.2)	0 (0)		
Family type					
Nuclear	54 (63.5)	24 (77.4)	23 (74.2)	$\chi^2=2.588 (0.274)$	$\chi^2=0.088 (0.767)$
Others	31 (36.5)	7 (22.6)	8 (25.8)		
Residence					
Urban	18 (21.2)	5 (16.1)	8 (25.8)	$\chi^2=0.873 (0.646)$	$\chi^2=0.876 (0.349)$
Rural	67 (78.8)	26 (83.9)	23 (74.2)		
Type of house <sup>#</sup>					
Katcha	31 (36.5)	13 (41.9)	20 (64.5)	$\chi^2=9.793 (0.044)*$	$\chi^2=6.123 (0.047)*$
Semi-pucca	24 (28.2)	7 (22.6)	8 (25.8)		
Pucca	30 (35.3)	11 (35.5)	3 (9.7)		

<sup>#</sup>Katcha house – Thatched house; Semi-pucca – Semi-concrete house; Pucca house – Entirely concrete built house. \* $P<0.05$ ; \*\* $P<0.01$

## DISCUSSION

This chart-based study explored the percentage of suicide attempts happening under alcohol intoxication and their predictors. The frequency of suicide attempts under intoxication with alcohol in our 1 year data was 21.08%. These figures, though somewhat lower, are broadly consistent with other reports though all the comparable studies were carried out on suicide completers.<sup>[3,25,26]</sup> Our findings show that certain demographic and attempt characteristics may help us to identify those who are likely to make suicide attempts under intoxication with alcohol. Specifically, those who attempted under intoxication were more likely to be older, male, married, and have lesser years in formal education. Hence, such individuals may need careful monitoring for further attempts. We did not find any female alcohol user or females attempting suicide under intoxication contrary to Western literature.<sup>[27]</sup> This difference can be explained by the fact that in Indian culture, alcoholism is a gendered phenomenon and is culturally taboo among females. We did not notice any association between impulsivity trait with suicide attempts under intoxication and thereby questioning prior reports suggesting a link between alcohol use and high trait impulsivity.<sup>[28]</sup>

Violent physical methods (such as hanging) were more frequently reported among suicide attempters under intoxication. Previous studies, mostly done on suicide completers, also documented increased frequency of violent methods.<sup>[26]</sup> When alternate solutions are not available, restricting access to methods in conjunction with appropriate psychosocial interventions and support may help prevent attempts on one's life. Such an approach is worth further exploration in our Indian setup.

About 41.9% of the suicide attempts under intoxication were identified as impulsive attempts as per *a priori* definition. The frequency of impulsive suicide attempts did not differ significantly between the groups nor did it show any association with alcohol use. No difference was noted in the levels of personality variables such as impulsivity or hostility-aggressiveness across the groups. Impulsivity trait did not show any association with alcohol use or with suicide attempt under intoxication. This finding concurs with the findings of Simon *et al.*<sup>[29]</sup> who noted that alcohol consumption before the attempt did not significantly increase the risk of impulsive attempts. However, conflicting reports are also present.<sup>[30]</sup> Probably, other factors such as the increase in depressive feelings and thoughts such as

**Table 2: Clinical characteristics of patients**

Variable	Group I nonuser of alcohol (n=85), (%)	Group II alcohol users, attempt not under intoxication (n=31), (%)	Group III alcohol users, attempt under intoxication (n=31), (%)	Comparison Group I versus Group II versus Group III (P)	Comparison Group II versus Group III (P)
Method of suicide attempt					
Pesticide	41 (48.2)	24 (77.4)	22 (71)	$\chi^2=19.510$ (0.012)*	$\chi^2=3.287$ (0.349)
Physical methods	8 (9.4)	1 (3.2)	4 (12.9)		
Natural - plant products	15 (17.6)	6 (19.4)	4 (12.9)		
Prescription meds	11 (12.9)	0 (0)	0 (0)		
Others/unclear	10 (11.8)	0 (0)	1 (3.2)		
Reason of the attempt					
Inter personal relationship issues in the family	52 (61.2)	16 (51.6)	16 (51.6)	$\chi^2=16.906$ (0.031)*	$\chi^2=6.000$ (0.200)
Financial	6 (7.1)	5 (16.1)	4 (12.9)		
Love related	3 (3.5)	7 (22.6)	2 (6.5)		
Physical pain	16 (18.8)	2 (6.5)	7 (22.6)		
Others/unclear	8 (9.4)	1 (3.2)	2 (6.5)		
Buss-Perry scale					
Physical aggression	19.9 (7.0)	19.1 (8.0)	18.1 (5.3)	$F=1.027$ (0.365)	$t=0.600$ (0.550)
Verbal aggression	11.2 (5.1)	10.4 (6.6)	9.4 (4.7)	$F=1.686$ (0.189)	$t=0.729$ (0.469)
Anger	17.7 (4.4)	16.5 (4.2)	17.7 (4.5)	$F=0.239$ (0.787)	$t=0.952$ (0.345)
Hostility	18.9 (7.3)	17.9 (9.2)	17.5 (7.2)	$F=0.888$ (0.414)	$t=0.186$ (0.853)
Barratt impulsivity scale					
Attentional	13.9 (2.4)	13.5 (2.2)	13.6 (1.6)	$F=0.400$ (0.671)	$t=0.231$ (0.818)
Motor	9.4 (8.4)	8.1 (7.5)	6.6 (6.0)	$F=1.547$ (0.217)	$t=0.816$ (0.418)
Nonplanning	35.6 (4.8)	36.3 (4.6)	36.1 (5.6)	$F=0.242$ (0.785)	$t=0.174$ (0.863)

\* $P < 0.05$ **Table 3: Predictors of suicide attempt under intoxication among alcohol users (n=62)**

Variable	B	SE	Wald	Significant	Exp(B)	CI
Constant	-1.117	1.032	1.171	0.279	0.327	NA
Marital status	1.510	0.619	5.946	0.015*	4.519	1.345-15.248
House type Katcha	1.734	0.804	4.653	0.031*	5.666	1.172-27.399
House type semi pucca	1.622	0.918	3.124	0.077	5.065	0.838-30.618
Chronic pain and/ or physical illness	-1.410	0.818	2.973	0.085	0.244	0.049-1.213

SE – Standard error; CI – Confidence interval; NA – Not available; \* $P < 0.05$ 

hopelessness emerging during intoxication are equally important in triggering suicide as postulated by previous investigators.<sup>[31]</sup> Current levels of hopelessness, or attempt characteristics such as suicide intent at the time of suicide also failed to differentiate the groups. Though there is a dearth of comparable studies that have evaluated personality variables as possible predictors of suicide attempts under intoxication, it appears that they may be of limited clinical use in helping to identify such individuals. Further research is clearly needed to clarify the association between personality traits, alcohol use, and attempted suicide.

Being married and staying in a Kutcha house emerged as predictors of attempt under intoxication among those using alcohol. The relation between suicidal behavior and alcohol use as well as their impact on effective bonding and interpersonal relationships has been

examined by previous researchers.<sup>[8,32]</sup> Synthesizing these findings, alcohol usage appears to precede marriage and impairs a person's capacity to form robust bonds with partners resulting in marital dysfunction. A repeated pattern of negative marital interaction and conflicts may drive a person toward suicide. Marriage has been shown to be a risk factor for suicide attempts among Indian subjects.<sup>[33]</sup> Our study findings suggest that due importance needs to be given to role of marital interactions in the context of evaluating and preparing a management plan for suicide attempters to mitigate risk of further attempts. Though dwelling in a Katcha house appears to be a risk factor for suicide attempts under intoxication, the competing hypothesis could be that alcohol use leads to economic deprivation and social marginalization leading to poor living conditions. The present cross-sectional record-based study was not designed to answer this question and future studies with longitudinal designs may throw more light into this association.

Strengths of the study include a fairly large sample, examining a range of sociodemographic and clinical variables including personality dimensions. However, the findings of the study must be interpreted in the context of its many limitations. First, this was a record study from a single center and therefore carries some design limitations including possible recall bias. Second, we have not determined the blood alcohol concentrations

which would have been a fool proof method to establish attempts under intoxication. However, we used rigorous clinical definition counterchecked by two qualified psychiatrists to determine the same. Finally, no efforts were made to classify the severity of alcohol use in a dependent or nondependent pattern which may have improved our understanding of the association between alcohol and attempted suicide.

## CONCLUSION

Our study suggests that nearly a quarter of suicide attempts happen under influence of alcohol and less than half of these are impulsive attempts. Suicide attempters under intoxication are more likely to be older, male, married, and less educated. More frequent use of physical methods lends some scope for prevention by restricting access to methods during intoxication. Personality variables such as impulsivity and hostility-aggressiveness are unhelpful predictors of such behavior while some demographic factors such as marital status and living conditions have predictive value. Future work, preferably with longitudinal designs and community-based sampling, is required to clarify these associations further and identify robust clinical predictors of suicide attempt under alcohol intoxication.

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## Conflicts of interest

There are no conflicts of interest.

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