TREATMENT

Suicide Attempts During Heavy Drinking Episodes Among Individuals Entering Alcohol Treatment in Warsaw, Poland

Anna Klimkiewicz^{1,2}, Mark A. Ilgen^{1,3,*}, Amy S.B. Bohnert^{1,3}, Andrzej Jakubczyk¹, Marcin Wojnar^{1,2} and Kirk J. Brower¹

¹Department of Psychiatry, University of Michigan, 4250 Plymouth Road, Ann Arbor, MI 48109, USA, ²Department of Psychiatry, Medical University of Warsaw, 27 Nowowiejska st, Warsaw 00-665, Poland and ³VA Serious Mental Illness Treatment Resource and Evaluation Center (SMITREC), 2800 Plymouth Road, Ann Arbor MI 48109, USA

*Corresponding author: Tel: +1-734-845-3646; E-mail: marki@med.umich.edu

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Abstract — **Aims:** Acute alcohol intoxication itself may act as a trigger for suicidal thoughts and attempts among individuals at risk and may influence the potential lethality of the suicide attempt. This study in alcohol-dependent patients compared the correlates of suicide attempts during a heavy drinking episode with those of suicide attempts during relative sobriety. **Methods:** In two outpatient and two residential alcohol treatment programs in Warsaw, Poland, 113 patients who reported a suicide attempt during their lifetime were interviewed. The analyses focused on the patients' most serious suicide attempts and on whether these occurred during a heavy drinking episode. **Results:** Over two-thirds of the patients reported that their most serious suicide attempt occurred during a period of heavy drinking. A multivariable logistic model indicated that the following factors significantly distinguished those patients whose most serious suicide attempt occurred during a heavy drinking episode: male gender, younger current age, greater severity of alcohol dependence and the attempt being unplanned. **Conclusion:** Among the patients in treatment for alcohol dependence who made a suicide attempt, the most serious attempt was likely to have been unplanned and committed by men when it occurred during a heavy drinking episode.

INTRODUCTION

Alcohol-related suicides and suicide attempts are an important public health problem. Alcohol use disorders are consistent predictors of suicidal thoughts and behavior (Henriksson *et al.*, 1993, 1995; Inskip *et al.*, 1998; Sher, 2006; Ilgen *et al.*, 2010) and these disorders are more common among individuals who died by suicide than among those who have died of other causes (Conwell *et al.*, 1996; Pirkola *et al.*, 2000). Furthermore, alcohol use has been identified as a risk factor for suicide attempts among those with and without a history of alcohol use disorders (Wiley and Weisner, 1995; Hufford, 2001; Giancola, 2002). Thus, acute alcohol intoxication itself may act as a trigger for suicidal thoughts and attempts among individuals at risk (Moscicki, 1997).

Alcohol use at the time of suicide is common. In one prior study, alcohol was detected in the blood of 70% of suicide attempters and 66% of those who died by suicide (Roizen, 1993). Other researchers have also found that a high proportion (10–75%) of suicide victims have a positive blood alcohol concentration at the time of death (Hayward *et al.*, 1992; Bilban and Skibin, 2005). These rates vary substantially from one country to another. Two separate studies reported that 34–35% of suicide victims in Sweden had alcohol in their system at the time of suicide (Sjogren and Eriksson, 2000; Holmgren and Jones, 2010), which is similar to the rate of 32% reported in a German study of suicides (Boenisch *et al.*, 2010). Differences across Europe are substantial. In Slovenia, others have found that up to 75% of suicide victims were intoxicated at the time of death (Bilban and Skibin, 2005). Data also suggest a dose–response relationship for alcohol consumption and risk of suicidal behaviors (Borges and Loera, 2010). A study analyzing emergency room data found odds ratios [ORs; 95% confidence intervals (CIs)] for suicidal attempts that were 5.1 (1.0–25.8) with some recent alcohol consumption (up to

100 g of alcohol) relative to those without recent alcohol consumption and were 90.2 (7.6–461.0) for those who consumed 100 g of alcohol or more in the 6 h prior to the attempt relative to those who did not drink recently (Borges and Rosovsky, 1996). In a retrospective case–control study by Powell *et al.* (2001), the OR for attempting suicide within 3 h of using alcohol was 6.2 (3.2–11.8). As might be expected, the rates of alcohol-involved suicide attempts are higher in those with alcohol dependence, with data indicating that ~85% of suicide attempts occurred while intoxicated (Schuckit, 1986).

Alcohol may also influence the potential lethality of the method of suicide attempt. In a study of individuals with depression, alcohol and/or drugs were present at the time of the attempt for 25% of the individuals who attempted suicide using a method with low lethality, 36% of those who attempted suicide using a method with high lethality and 52% of those who died by suicide (DeJong *et al.*, 2010). In contrast, depressive symptoms were unrelated to the potential lethality of the attempt. The positive relationship between alcohol use and increased lethality of attempts has also been reported among adolescents (Hayward *et al.*, 1992; Arnau, 2010).

It is important for clinicians and public health specialists to know that the possible predictors of alcohol-related versus non-alcohol-related attempts deserve more research. In a cohort study, those who had been drinking alcohol prior to committing suicide were younger, more likely to be male and more likely to have experienced a breakup of a relationship, while less likely to have sought professional help than those who had not been drinking (Hayward *et al.*, 1992). Fudalej *et al.* (2009) found that suicide under the influence of alcohol was strongly connected with alcohol dependence among all suicide decedents in Warsaw, and alcohol dependence was associated with an OR for completed suicide while intoxicated of 4.63 compared with suicide when not intoxicated.

However, it is unclear to what extent these differences are due to broader differences between those prone to heavy alcohol use and those who do not drink heavily. One way to avoid this methodological problem is to study suicide attempts among those with alcohol use disorders, thus restricting the analysis to those with more severe patterns of alcohol use.

The existing literature from within addictions treatment programs indicates that suicidal behaviors are more likely in those with more severe patterns of substance use, poorer psychosocial adjustment and more psychopathology (Roy *et al.*, 1990; Koller *et al.*, 2002; Roy, 2002; Darke *et al.*, 2004; Ilgen *et al.*, 2004; Tiet *et al.*, 2006). Similar factors have not been explored as they relate to risk of alcohol-related suicide attempt.

The study of suicide attempts under the influence of alcohol is particularly relevant to Poland. With a population of 36 million, it is estimated that 600,000–900,000 individuals in Poland meet the criteria for alcohol dependence, and ~2 million drink hazardously or harmfully (PARPA, 2011a). Also, between 1993 and 2009, alcohol consumption in Poland increased almost by 50% (PARPA, 2011b). According to Polish police reports, during the year 2010, 4087 people died by suicide (Policja, 2011). In Poland, with a population 36 million, this translates to a rate of 10.75 cases of suicide per 100,000.

The present study examines the correlates of suicide attempts during a heavy drinking episode among alcohol-dependent patients in Poland. Specifically, the participants were compared on demographics, previous psychiatric or alcohol treatment, impulsivity of attempts, severity of alcohol dependence, age of onset of problem drinking and family history of suicide. On the basis of prior research in non-alcohol-dependent individuals (Hayward *et al.*, 1992), we anticipate that alcohol-related suicide attempts will be more common in those who are male and younger. Because of the link between alcohol use during a suicide attempt and the potential lethality of that attempt (Hayward *et al.*, 1992; Arnau, 2010; DeJong *et al.*, 2010), we hypothesize that factors that have previously been linked to suicide attempt in alcohol-dependent individuals (impulsivity and indicators of more severe alcohol and psychiatric problems) will have stronger positive associations with alcohol-related than non-alcohol-related attempts. Owing to the nature of the data available in this sample, previous alcohol treatment and family history of suicide will be used to measure psychiatric severity and alcohol treatment, severity of alcohol dependence and age of onset of problem drinking will be used as indicators of severity of alcohol-related problems.

METHODS

Participants and study design

Three hundred and sixty-six patients consecutively admitted to two outpatient alcohol treatment and two residential alcohol treatment programs in Warsaw, Poland, participated in this study. The programs were all abstinence-based and provided a mixture of safe detoxification services and individual and group psychosocial interventions. All adults entering these treatment programs were invited to participate in a research study. The therapy was based on drug-free and

abstinence-based programs. The participants were not paid or reimbursed for their time; participation in the study was confidential and voluntary.

The present analyses are limited to 113 participants who reported a suicide attempt during their lifetime. Only patients with a diagnosis of alcohol dependence were eligible to participate, which was determined according to DSM-IV criteria by the consensus of an addiction-specialized multidisciplinary team including a psychiatrist and an addiction therapist. After a complete description of the study was provided, written informed consent was obtained from all the participants. The protocol was approved by the Bioethics Committee at the Medical University of Warsaw and the University of Michigan Medical Institutional Review Board. The participants completed standardized interviews. There were 81 (72.6%) male and 32 (27.4%) female participants who met the criteria for inclusion in the present analysis of a prior suicide attempt. The average age was 41.4 (SD=9.6). All the study participants were European Caucasians.

Measures

Information about demographic characteristics, previous treatment for substance use and psychiatric problems and family history of suicidal behavior was obtained using a modified version of the University of Arkansas Substance Abuse Outcomes Module (SAOM), a self-administered questionnaire (Smith *et al.*, 1996, 2006). Questions about past addiction therapy, previous treatment for emotional/psychiatric problems, completed suicide or suicide attempt in the family and participants' lifetime suicide attempt were asked as part of the SAOM. All responses were categorized into dichotomous 'no/yes' indicators. Specifically, the participants were asked 'Have you ever before: been in addiction treatment? been treated for emotional/psychiatric problems? had someone from your family committed or attempted suicide? tried to commit suicide?'

Questions related to lifetime suicide attempts; number of attempts and circumstances surrounding those attempts were asked by the research team during structured interviews.

Patients with multiple lifetime attempts were asked to identify their most serious one. They were also asked whether they had planned the attempt and whether it had occurred during a period of heavy drinking or prolonged intoxication. The determination of heavy drinking period was based on the participants' opinion. The research staff conducting the interviews explained to participants that heavy drinking episodes should be considered a period of time (usually lasting at least one day) when they were drinking alcohol intensively to intoxication. The participants were asked to provide details about all of their suicide attempts. After describing all the attempts, the participants were asked to identify their most serious suicide attempt. If the participant indicated that they could not identify their most serious attempt, the investigator asked the participant to identify the attempt during which the participant wished most strongly to die. The choice of the most serious attempt was based on the participant and investigator agreement.

To evaluate severity of alcohol dependence, the Michigan Alcoholism Screening Test (MAST) (Selzer, 1971; Tulevski, 1989; Teitelbaum and Mullen, 2000) was used, which contains 25 items (Cronbach's α : 0.703).

Table 1. Comparison of individuals whose most serious suicide attempt was during a heavy drinking episode vs. those whose most serious attempt was not during a heavy drinking episode in a sample of 113 alcohol-dependent patients with a lifetime suicide attempt

Characteristic	Attempt during heavy drinking episode, <i>n</i> = 79, <i>n</i> (%)	Attempt not during heavy drinking episode, <i>n</i> = 34, <i>n</i> (%)	<i>P</i> -value
Male	65 (82.3)	16 (47.1)	<0.001
Married/partner relationship	34 (43.0)	12 (35.3)	0.44
Employed	52 (65.8)	23 (67.6)	0.34
Suicide attempt was not planned	57 (72.2)	17 (50.0)	0.023
Early-onset alcohol problems	62 (81.6)	20 (58.8)	0.017
Addiction therapy in the past	49 (62.0)	15 (44.1)	0.099
Treated for emotional/psychiatric problems	25 (31.6)	9 (26.5)	0.659
Completed suicide or suicide attempt in the family	21 (26.5)	4 (11.8)	0.091
	Mean (SD)	Mean (SD)	<i>P</i> -value
Number of suicide Attempts (lifetime)	2.2 (1.8)	2.1 (1.9)	0.864
Current age	39.8 (9.3)	45.1 (9.2)	0.006
Education level	12.1 (3.2)	12.5 (3.5)	0.489
Michigan Alcohol Screening Test	38.9 (8.2)	31.9 (10.2)	<0.001

P-value denotes significance level.

The patients were also asked 'At what age did you start to have problems with alcohol (beer, wine and vodka) or start to drink alcohol regularly?' The patients who reported regular or problem drinking before the age of 25 were categorized as 'early onset' for the purposes of this study.

Data analysis

The Stata software was used to analyze the data. The individuals lacking data on the outcome or covariates were excluded from the analyses using listwise deletion procedures. The patients were classified into two groups: those whose most serious suicide attempt occurred during a period of heavy drinking and those whose most serious suicide attempt occurred outside a heavy drinking period. Tests of bivariate associations between group status and other patient factors were conducted using χ^2 tests for categorical variables and *t*-tests for continuous variables. Variables that were significant in the bivariate analyses ($P < 0.05$) were entered into a multivariable binary logistic regression analysis to examine the independent associations between patient characteristics and the presence or absence of heavy drinking prior to the most serious suicide attempt. A two-sided *P*-value of 0.05 was used for all statistical significance testing.

RESULTS

In this sample of patients in alcohol treatment who had at least one suicide attempt during their lifetime, the most serious suicide attempts occurred during a heavy drinking episode for 79 (69.9%) of 113 respondents (80.2% of men and 43.8% of women) (Table 1). The mean number of suicide attempts was 2.11 in men and 2.06 in women. Among individuals whose most serious attempt was during a heavy drinking episode, 44.1% had more than one prior suicide attempt (mean number of attempts = 2.15, maximum number of attempts = 10), while among those whose most serious attempt occurred outside a heavy drinking episode, 45.6% had more than one prior suicide attempt (mean number of attempts = 2.09, maximum number of attempts = 10).

Those whose most serious attempt was during a heavy drinking episode were more likely to be male (82.3% as

Table 2. Multivariable logistic regression models of whether the most serious suicide attempt was during a heavy drinking episode, among 110 alcohol-dependent patients with a prior suicide attempt

	OR (95% CI)	<i>P</i> -value
Gender (male)	4.0 (1.16, 14.28)	0.028
Suicide attempt not planned	4.43 (1.49, 13.16)	0.007
Early onset of alcohol problems	1.37 (0.41, 4.63)	0.611
Younger current age	1.09 (1.03, 1.15)	0.006
Michigan Alcoholism Screening Test	1.06 (1.00, 1.13)	0.038

against 47.1%) and the attempt was more often unplanned (72.2% as against 50.0%). There was a significant age difference between the groups; the mean current age was 39.8 (SD = 9.3) years among those whose most serious attempt was during a heavy drinking episode and 45.1 (SD = 9.2) years among those whose most serious attempt was not. Further, 81.6% of those patients whose most serious suicide attempt was during a heavy drinking episode had early-onset alcohol-related problems, as against 58.8% of those whose most serious attempt was outside of a heavy drinking episode. Significant differences were not found on measures of prior addiction treatment, psychiatric treatment or family history of suicide. Those whose most serious attempt was during a heavy drinking episode had greater severity of alcohol dependence than those whose most serious attempt was not during a heavy drinking episode (Table 2).

In the multivariable logistic model, four of five patient characteristics remained significantly associated with the most serious suicide attempt occurring during a heavy drinking episode. The patients who made their most serious suicide attempt during a heavy drinking period were four times more likely to be male and nearly 4.5 times more likely than the other group of patients to have made an unplanned attempt. They were also younger (OR = 1.09, 95% CI = 1.03–1.15) at the time of interview and had greater severity of alcohol dependence, as measured by the MAST (OR = 1.06, 95% CI = 1.00–1.12) than the group whose most serious attempt occurred outside of a heavy drinking period. Overall, the model was statistically significant ($\chi^2 = 36.47$, *df* = 5, $P < 0.0005$) and explained between 28.2% (Cox and Snell *R* square) and 39.8% (Nagelkerke *R* square) of the variance.

DISCUSSION

Although the majority of serious suicide attempts during the lifetimes of adults seeking alcohol treatment occurred during periods of heavy drinking, our findings indicate that 30% of the patients in this sample reported that their most serious suicide attempt occurred outside of a heavy drinking episode. Several patient characteristics were associated with reporting that the most serious attempt occurred during a heavy drinking episode: greater severity of alcohol dependence and early onset of alcohol problems. Consistent with prior research on this topic (Hayward *et al.*, 1992), male gender was also associated with a higher risk that the most serious suicide attempt occurred under the influence of alcohol. In addition, the present results indicate that those individuals whose most serious suicide attempt occurred during a heavy drinking episode were more likely to report that the attempt was unplanned than those whose most serious attempt occurred when not under the influence of alcohol. These results suggest that alcohol may increase the likelihood of unplanned suicidal behaviors by increasing feelings of depression and anxiety as well as impulsivity (Bagge and Sher, 2008). Thus, while drinking heavily, individuals may experience significant increases in negative affect and diminished ability to control impulsive and potentially self-destructive behaviors, such as making a suicide attempt.

Overall, the findings highlight the important role that heavy drinking and prolonged periods of intoxication likely play in suicidal behaviors among those with alcohol use disorders, while also indicating that different factors may be particularly important in understanding the risk for suicidal behaviors that occur outside of a heavy drinking episode.

To our knowledge, only one prior study has examined the prevalence of suicide attempts during periods of heavy alcohol use among individuals with alcohol use disorders. Schuckit (1986) found that 85% of suicide attempts in men with an alcohol use disorder occurred while intoxicated. Similarly, 82% of the male participants in the present study reported that their most serious suicide attempt occurred during a heavy drinking episode. In contrast, only 44% of the women in the present study reported that their most serious suicide attempt occurred during a heavy drinking episode. This finding indicates the importance of considering the role of intoxication in suicide attempts among men with substance use disorders.

The suicide attempts that occurred during heavy drinking periods, as reported by the alcohol-dependent patients in this study, were less likely to be planned than those that occurred outside of heavy drinking periods. This is consistent with prior research on non-alcohol-dependent patients (Lejoyeux *et al.*, 2008). Similarly, Koller *et al.* (2002) found that high impulsivity was a risk factor for suicide among alcohol abusers. Our results indicate that this association found in non-alcohol-dependent patients may not simply be due to a common factor such as impulsivity, which increases the likelihood of both drinking heavily and making unplanned attempts, but may be more specifically related to the intoxicating effects of alcohol. Given that suicide attempts during heavy drinking episodes are mostly unplanned (72.2%), it is also important to examine risk and prevent suicidal behaviors among alcohol-dependent patients even when suicidal

thoughts are not currently being reported by the patients. For these patients, the likelihood of a suicide attempt may be related more to the risk of relapse or continued heavy drinking than to suicidal thoughts or plans reported during the sober state. The common practice among clinicians in emergency departments is to wait for intoxicated, suicidal patients to become sober prior to conducting the mental status exam and assessing their suicidality; however, an honest lack of intention or plan from the patient at this point in time may not be predictive of future intent or behavior once drinking resumes. Moreover, suicide attempts that occur among individuals with mood disorders while intoxicated are potentially more lethal (Sher *et al.*, 2009). Consequently, clinicians should be aware that the most potentially lethal suicidal behaviors among individuals with alcohol dependence may occur among individuals who have not recently indicated suicidal ideation or intent.

Assuming that post-treatment suicidal behaviors follow a pattern similar to those observed prior to treatment in this study, these findings point to potential ways of understanding suicidal behaviors following treatment. Specifically, the finding that attempts while intoxicated were also likely to be unplanned suggests that, for many individuals, particularly men, reducing heavy alcohol use may reduce suicide risk. However, the finding that some suicide attempts occurred outside of heavy drinking episodes indicates that for some individuals with alcohol dependence, achieving sobriety alone may not reduce suicide risk. It is possible that comorbid psychopathology may be a more salient predictor of suicide attempts than heavy alcohol use in some patients, particularly women, who typically have higher rates of depression and anxiety than men. While the present analyses examined prior treatment of emotional or psychiatric problems, this variable may not have been sufficiently sensitive to detect differences in psychiatric history between those whose most serious suicide attempt did and those whose did not occur during a heavy drinking episode.

One limitation of this study was that most of the data were self-report. Patients who had more than one suicide attempt were asked to describe details, such as whether attempts occurred during a heavy drinking episode, for only the most serious attempt. Because attempts while intoxicated may be more lethal, the frequency with which suicide attempts occurred during heavy drinking episodes may be overrepresented compared with an assessment process that involved randomly selecting one suicide attempt. Suicide attempts that occurred during intoxication may have been less reliably remembered than those that occurred when sober. If the attempt occurred during a blackout, for example, then the patient would have relied on what others said about it, including its seriousness. Moreover, in the absence of a clear memory due to intoxication, the planning stage may have been forgotten. Because these are lifetime attempts, it is unknown whether they occurred before or after the onset of alcohol-related problems.

Another limitation of the study is its relatively small sample size, especially for women. The available data obtained only from 32 women may not be generalizable to all women with alcohol dependence. Additionally, it is possible that the participants were reluctant to disclose information about their past suicidal thoughts/behaviors or alcohol use because of concerns about how this would influence

their present treatment. The measurement of suicidal behaviors and alcohol use at the time of the suicide attempt was potentially imprecise. In particular, the determination of the most serious suicide attempt and the definition of heavy drinking episode were subject to potentially different interpretation by participants. Therefore, the participants' and investigators' subjective opinion could have influenced the results. Finally, although our sample is entirely European Caucasians who adequately represent Polish individuals entering addictions treatment, our findings may not extrapolate to other countries or settings. These limitations could be addressed in future research by identifying larger and more varied samples and by improving the measurement of suicidal behaviors and alcohol use at the time of a suicide attempt. Ideally, future research would be longitudinal to identify the prospective relationships between alcohol, impulsivity, suicidal ideation and planned and unplanned suicidal behaviors.

The present study found that male sex, younger age and greater severity of alcohol use were associated with the likelihood of reporting that the most serious suicide attempt occurred during a period of heavy drinking among individuals in treatment for alcohol dependence. Clinicians should be aware of the role of these patient factors when assessing risk for suicide attempt. These results highlight the importance of attending to level of alcohol use when preventing suicidal behaviors in alcohol-dependent individuals. It would be easy for suicide-prevention efforts in alcohol-dependent adults to focus only on those with current suicidal ideation or depression. The present results highlight that addressing heavy drinking is also important in that certain individuals may progress from no suicidal plan to the point of making an attempt within a relatively rapid period of time. Future intervention development work is needed to understand how to decrease the likelihood of suicidal behavior in those currently using alcohol. This understanding can improve suicide prevention even when the mechanisms of the association between acute alcohol use and suicidal behavior are still not well understood (Cherpitel *et al.*, 2004).

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