

Triggers for suicidal behavior in depressed older adolescents and young adults: Do alcohol use disorders make a difference?

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Abstract: Adolescent suicide is a major social and medical problem. Alcohol use disorders with comorbid major depression represent an especially high-risk profile for suicidal behavior, repeated suicidal behavior and completed suicide. We compared demographic and clinical characteristics, prevalence of interpersonal triggers and the number of triggers for suicidal behavior in depressed late adolescents and young adults with or without comorbid alcohol use disorders. *Methods.* 18-26-year-old subjects were recruited through advertising and referrals and participated in mood disorders research in a university hospital. Thirty-eight depressed suicide attempters without a history of any alcohol or substance abuse/dependence and 29 depressed suicide attempters with comorbid alcohol abuse or dependence participated in the study. Demographic and clinical parameters including parameters related to suicidal behavior were examined and recorded. *Results.* There was no difference with regard to demographic parameters between the two groups. Depressed suicide attempters with comorbid alcohol use disorders had higher aggression and impulsivity scale scores and were more likely to be tobacco smokers compared to their counterparts without alcohol use disorders. Additionally, there was a trend towards higher lethality of suicide attempts in subjects with alcohol use disorders compared to the other group. We found no difference in the prevalence of interpersonal triggers or in the number of triggers for suicidal behavior between the two groups. *Conclusion.* It appears that among 18-26-year-old depressed suicide attempters, individuals with comorbid alcohol use disorders are more impaired with regard to aggressiveness and impulsivity compared to persons without comorbid alcohol abuse/dependence.

Key words: adolescent, depression, alcohol, aggression, impulsivity, suicide

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INTRODUCTION

Adolescent suicide is a major social and medical problem. Suicide is the third leading cause of death among 15–24-year olds in the United States (1). Suicide attempts are considerably more common than suicide deaths, with an estimated 8.8% of high school youths attempting suicide in the last year according to the

anonymously completed Youth Risk Behavior Survey (2).

From the 1960s through the 1980s, a three-fold increase in the rate of adolescent suicide occurred within the US, and some observers have attributed this rise partly to concomitantly increasing occurrence of alcohol and other drug use by young people (3). One study reported that in multivariate analyses controlling for other psychiatric, sociodemographic and historical variables, alcohol dependence was significantly associated with suicide attempts in adolescents (4). Psychological autopsy studies demonstrated that more than 50% of the youth who completed suicide had a history of alcohol use problems (5). Brent et al (6) reported that the proportion of young suicide victims who had detectable blood alcohol levels rose 3.6-fold from 12.9% in 1968 to 1972 to 46.0% in 1978 to 1983. Alcohol with comorbid major depression represents an especially high-risk profile for suicidal behavior, repeated suicidal behavior and completed suicide in both youth and adults.

A model of suicidal behavior among subjects with alcoholism has recently been proposed (7). Predisposing factors that are presumed to increase (moderate) risk for suicide among individuals with alcoholism are aggression/impulsivity and alcoholism severity, which represent predominantly externalizing constructs, and negative affect and hopelessness, which represent predominantly internalizing constructs. Major depressive episodes and stressful life events – particularly interpersonal difficulties – are conceptualized as precipitating factors. This model is consistent with the stress-diathesis model of suicidal behavior (8). Partner-relationship disruptions are strongly associated with suicidal behavior in individuals with alcoholism (9-13).

Over the past several years, significant attention has been paid to the role of various triggers in suicidal behavior (14-16). This has an important practical implication: clinicians can facilitate suicide attempters' understandings of triggering internal and external events as well as the key cognitions occurring at the time of the attempts, thus potentially deactivating the suicidal mode and averting self-destructive behavior (15). Interventions can be further tailored to the unique clinical profile of suicide attempters as well as toward prevention of future suicidal behavior.

We compared demographic and clinical features of 18-26-year-old depressed suicide attempters with or without comorbid alcohol use disorders. We hypothesized that subjects with comorbid alcohol use disorders are more impaired compared to subjects without comorbid alcohol abuse/dependence. We also compared the prevalence of interpersonal triggers for suicide attempts in the two groups: a) events related to conjugal relationships; b) events related to interpersonal relationships other than conjugal; and c) events related to any interpersonal relationships (both conjugal and non-conjugal). We hypothesized that the prevalence of interpersonal triggers for suicide attempts will be higher in suicide attempters with comorbid alcohol abuse/dependence. In addition, we compared the prevalence of a) suicide attempters who always reported only one trigger for suicide attempt (i.e., subject with a "lower suicide threshold"), and b) suicide attempters who reported at least once more than one trigger for suicide attempt (i.e., subject with a "higher suicide threshold") in the two patient groups.

METHODS

Subjects were recruited through advertising and referrals and participated in mood disorders research in a university hospital. Participants were 18-26-year-old. Thirty-eight depressed suicide attempters without a history of any alcohol or substance abuse/dependence and 29 depressed suicide attempters with comorbid alcohol abuse or dependence participated in the study. Twenty-three subjects had alcohol dependence, and six subjects had alcohol abuse. They gave written informed consent as required by the Institutional Review Board for Biomedical Research. All met DSM-IV (17) criteria for a current major depressive episode. All subjects were free from alcohol or substance abuse for at least 2 months, therefore the current episode of major depression was independent, i.e., not alcohol- or substance- induced. The duration of the drug-free status of the subjects was established by a combination of urine and blood toxicological screenings, observation in hospital, and a history obtained from the participant, the participant's family and the referring physician.

Measures

DSM-IV Axis I disorders were diagnosed using the Structured Clinical Interview I (SCID-I) for DSM-IV (17). All subjects had a physical examination and routine laboratory screening tests, including urine and blood toxicological screenings to rule out neurological or medical illness that could affect their mental status. Current severity of depression was assessed by the Hamilton Depression Rating Scale (HDRS) (18) and the Beck Depression Inventory (BDI) (19). Lifetime aggression and impulsivity were assessed with the Aggression History Scale (Brown-Goodwin, revised) (20) and the Barratt Impulsivity Scale (21), respectively. A lifetime history of all suicide attempts, including number of attempts, triggers for suicide attempts, and degree of medical damage for each attempt, was recorded on the Columbia Suicide History Form (22). A lethality scale was used to measure the degree of medical damage caused by each suicide attempt (23). The scale was scored from 0 to 8 (0=no medical damage, 8=death), with different anchor points for various suicide attempt methods. A suicide attempt was defined as a self-destructive act that was committed with some intent to end one's life. The degree of suicide intent was rated with the Suicide Intent Scale (24). The Scale for Suicide Ideation (25) was used to measure the severity of suicidal ideation during the week prior to index hospitalization. Life events were scored on the St. Paul Ramsey Life Events Scale (22).

Statistical analysis

Clinical and demographic data were compared using Student's t-test, Wilcoxon test, and chi-square test, as appropriate. A general linear model was used to compare aggression scores in the two groups controlling for gender. We compared the prevalence of interpersonal triggers for suicide attempts in the two groups using the z-test for proportions. The prevalence suicide attempters who always reported only one trigger for suicide attempt and suicide attempters who reported at least once more than one trigger for suicide attempt was compared with chi-square test.

RESULTS

There was no difference with regard to demographic parameters between the two groups (see table 1). Depressed suicide attempters with comorbid alcohol use

disorders had higher aggression and impulsivity scale scores and were more likely to be tobacco smokers compared to their counterparts. Subjects with comorbid alcohol abuse/dependence had higher aggression scale scores after adjustment for gender ($df=2,56$, $F=8.1$, $p=0.001$). There was a trend towards higher lethality of suicide attempts in subjects with alcohol use disorders compared to the other group. We found no difference in the prevalence of interpersonal triggers between the two groups (see table 2). We also found no difference between the two groups with regard to the number of triggers (see table 3).

DISCUSSION

Our observation that young depressed suicide attempters with alcohol use disorders are more aggressive and impulsive compared to their counterparts is consistent with the scientific literature (26-28). It has been shown that depressed subjects with a history of alcoholism had higher lifetime aggression and impulsivity, and were more likely to report a history of suicide attempts, childhood abuse, and tobacco smoking (28). The greater frequency of suicidal behavior and severity of suicidal ideation in major depression with comorbid alcoholism appears to be related to their associated aggressive traits (28).

Our observation that depressed subjects with a history of alcoholism have higher lifetime impulsivity scores than subjects in the nonalcoholic group is consistent with reports that, apart from its role in suicidal behavior, impulsivity is an important risk factor for the development of alcoholism (29;30). This is most evident as depressed subjects with alcohol use disorders were more aggressive and impulsive compared to depressed individuals without alcohol use disorders despite the fact that both groups consisted of suicide attempters. The fact that there is a trend towards higher lethality of suicide attempts in depressed suicide attempters with alcohol use disorders indicates that subjects with alcohol abuse/dependence may have a higher chance to complete suicide compared to subjects in the other group. Higher aggression is associated with higher lethality of suicide attempts in depressed patients (31).

Contrary to our expectations, we did not find higher prevalence of interpersonal stressors that triggered suicidal behavior among subjects with comorbid alcohol use disorders. This may indicate that, among young individuals, stressful events related to interpersonal relationships may play an equal role as triggers for suicide attempts for people with and without alcohol abuse/dependence.

We also found no difference with regard to the number of triggers. This may be related to the fact that we studied young people. Each time the suicidal mode becomes activated, it becomes increasingly accessible in memory and requires less triggering stimuli to become activated the next time (15). This kindling, or facilitation, is consistent with reports from Leon et al (32) and Oquendo et al (33), where each succeeding suicide attempt is associated with a greater probability of a subsequent suicide attempt. Therefore, it is possible that our finding is applicable only to young people and cannot be generalized to older persons.

In summary, it appears that among 18-26-year-old depressed suicide attempters, individuals with comorbid alcohol use disorders are more impaired

compared to persons without alcohol abuse/dependence and that comorbid alcohol use disorders do not affect the type or number of triggers for suicide attempts. This is a pilot study and, therefore, the results should be treated with caution. Our study underlines the importance of clinical and biological research on suicidal behavior among young people with alcohol use disorders.

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REFERENCES

1. Anderson RN, Smith BL. Deaths: leading causes for 2001. *Natl Vital Stat Rep* 2003;52(9):1-85.
2. Grunbaum JA, Kann L, Kinchen SA, Williams B, Ross JG, Lowry R et al. Youth risk behavior surveillance--United States, 2001. *J Sch Health* 2002;72(8):313-28.
3. U.S.Public Health Service. Mental Health: A Report of the Surgeon General:<http://www.surgeongeneral.gov/library/mentalhealth/home.html>.
4. Glowinski AL, Bucholz KK, Nelson EC, Fu Q, Madden PA, Reich W et al. Suicide attempts in an adolescent female twin sample. *J Am Acad Child Adolesc Psychiatry* 2001;40(11):1300-7.
5. Shafii M, Carrigan S, Whittinghill JR, Derrick A. Psychological autopsy of completed suicide in children and adolescents. *Am J Psychiatry* 1985; 142(9):1061-4.
6. Brent DA, Perper JA, Allman CJ. Alcohol, firearms, and suicide among youth. Temporal trends in Allegheny County, Pennsylvania, 1960 to 1983. *JAMA* 1987;257(24):3369-72.
7. Conner KR, Duberstein PR. Predisposing and precipitating factors for suicide among alcoholics: empirical review and conceptual integration. *Alcohol Clin Exp Res* 2004;28(5 Suppl):6S-17S.
8. Mann JJ, Waternaux C, Haas GL, Malone KM. Toward a clinical model of suicidal behavior in psychiatric patients. *Am J Psychiatry* 1999; 156(2):181-9.
9. Duberstein PR, Conwell Y, Caine ED. Interpersonal stressors, substance abuse, and suicide. *J Nerv Ment Dis* 1993;181(2):80-5.
10. Heikkinen ME, Aro HM, Henriksson MM, Isometsa ET, Sarna SJ, Kuoppasalmi KI et al. Differences in recent life events between alcoholic and depressive nonalcoholic suicides. *Alcohol Clin Exp Res* 1994; 18(5):1143-9.
11. Murphy GE, Robins E. Social factors in suicide. *JAMA* 1967; 199(5):303-8.
12. Murphy GE, Wetzel RD, Robins E, McEvoy L. Multiple risk factors predict suicide in alcoholism. *Arch Gen Psychiatry* 1992;49(6):459-63.
13. Rich CL, Fowler RC, Fogarty LA, Young D. San Diego Suicide Study. III. Relationships between diagnoses and stressors. *Arch Gen Psychiatry* 1988;45(6):589-92.

14. Farooqi YN. Comparative study of suicide potential among Pakistani and American psychiatric patients. *Death Stud* 2004;28(1):19-46.
15. Forman EM, Berk MS, Henriques GR, Brown GK, Beck AT. History of multiple suicide attempts as a behavioral marker of severe psychopathology. *Am J Psychiatry* 2004;161(3):437-43.
16. Mann JJ. Searching for triggers of suicidal behavior. *Am J Psychiatry* 2004;161(3):395-7.
17. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*. Washington, DC: APA Press, 1994.
18. Hamilton M. A rating scale for depression. *J Neurol Neurosurg Psychiatry* 1960;23:56-62.
19. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry* 1961;4:561-71.
20. Brown GL, Goodwin FK. Human aggression and suicide. *Suicide Life Threat Behav* 1986;16(2):223-43.
21. Barratt ES. Factor Analysis of some psychometric measures of impulsiveness and anxiety. *Psychol Rep* 1965;16:547-54.
22. Oquendo MA, Halberstam B, Mann JJ. Risk factors for suicidal behavior: utility and limitations of research instruments. In: First MB, ed. *Standardized Evaluation in Clinical Practice*, Vol. 22. Washington, DC.: APPI Press, 2003:103–30.
23. Beck AT, Beck R, Kovacs M. Classification of suicidal behaviors: I. Quantifying intent and medical lethality. *Am J Psychiatry* 1975; 132(3):285-7.
24. Beck RW, Morris JB, Beck AT. Cross-validation of the Suicidal Intent Scale. *Psychol Rep* 1974;34(2):445-6.
25. Beck AT, Kovacs M, Weissman A. Assessment of suicidal intention: the Scale for Suicide Ideation. *J Consult Clin Psychol* 1979;47(2):343-52.
26. Carballo JJ, Oquendo MA, Giner L, Zalsman G, Roche AM, Sher L. Impulsive-aggressive traits and suicidal adolescents and young adults with alcoholism. *Int J Adolesc Med Health* 2006;18(1):15-9.
27. Goldberg JF, Singer TM, Garno JL. Suicidality and substance abuse in affective disorders. *J Clin Psychiatry* 2001;62 Suppl 25:35-43.
28. Sher L, Oquendo MA, Galfalvy HC, Grunebaum MF, Burke AK, Zalsman G et al. The relationship of aggression to suicidal behavior in depressed patients with a history of alcoholism. *Addict Behav* 2005; 30(6):1144-53.
29. Cloninger CR, Sigvardsson S, Gilligan SB, von Knorring AL, Reich T, Bohman M. Genetic heterogeneity and the classification of alcoholism. *Adv Alcohol Subst Abuse* 1988;7(3-4):3-16.
30. Sher KJ, Gotham HJ. Pathological alcohol involvement: a developmental disorder of young adulthood. *Dev Psychopathol* 1999;11(4):933-56.
31. Baca-Garcia E, Oquendo MA, Saiz-Ruiz J, Mann JJ, de Leon J. A pilot study on differences in aggression in New York City and Madrid, Spain, and their possible impact on suicidal behavior. *J Clin Psychiatry* 2006; 67(3):375-80.
32. Leon AC, Friedman RA, Sweeney JA, Brown RP, Mann JJ: Statistical issues in the identification of risk factors for suicidal behavior: The application of survival analysis. *Psychiatry Res* 1990;31:99–108.

33. Oquendo MA, Galfalvy H, Russo S, Ellis SP, Grunebaum MF, Burke A, Mann JJ: Clinical predictors of suicidal acts after major depression: a prospective study. *Am J Psychiatry* 2004;161:1433-41.

Table 1: Demographic and clinical characteristics of depressed subjects with or without comorbid alcohol use disorders

| Variable name | Subjects without a history of alcoholism (n= 38) | | Subjects with a history of alcoholism (n=29) | | Analysis | | |
|--|---|-----------|---|-----------|----------|-------------|-------------------|
| | Mean or (N) | SD or (%) | Mean or (N) | SD or (%) | df | t/ χ^2 | P |
| Age (years) | 22.24 | 2.32 | 22.76 | 2.15 | 65 | 0.94 | 0.35 |
| Gender (% males) | (11) | (28.9) | (12) | (41.4) | 1 | 1.13 | 0.31 |
| Race (% white) | (25) | (71.4) | (19) | (76.0) | 1 | 0.16 | 0.77 |
| Marital Status (% married) | (5) | (13.2) | (3) | (10.3) | 1 | 0.12 | 1.00 |
| Total years of education | 13.53 | 2.73 | 13.41 | 1.55 | 61 | -0.21 | 0.84 |
| Hamilton Depression Rating Scale (HDRS) | 18.62 | 5.68 | 17.21 | 5.26 | 64 | -1.04 | 0.30 |
| Beck Depression Inventory (BDI) | 31.38 | 12.89 | 24.71 | 10.65 | 44 | -1.80 | 0.08 |
| Suicidal Ideation Scale | 16.31 | 11.05 | 17.95 | 10.13 | 52 | 0.56 | 0.58 |
| St. Paul Ramsey Scale (Life Events) | 3.93 | 1.02 | 4.36 | 0.73 | 50 | 1.69 | 0.10 |
| Cigarette Smoking (% smokers) | (7) | (20.6) | (18) | (66.7) | 1 | 13.21 | 0.001 |
| Age of onset of the first depressive episode | 15.09 | 4.50 | 16.17 | 5.54 | 62 | 0.87 | 0.39 |
| Age at first hospitalization | 19.16 | 3.52 | 19.33 | 4.44 | 50 | 0.16 | 0.88 |
| Suicide Intent Scale (SIS) in attempters | 15.31 | 4.63 | 16.04 | 4.93 | 61 | 0.60 | 0.55 |
| Maximum lethality in suicide attempters | 2.29 | 1.74 | 3.17 | 1.95 | 62 | 1.92 | 0.06 |
| Number of suicide attempts in attempters | 2.30 | 1.93 | 2.97 | 2.16 | 64 | 1.33 | 0.19 |
| Aggression History Scale | 18.09 | 5.10 | 23.40 | 5.70 | 57 | 3.76 | <0.0001 |
| Barrat Impulsivity Scale (BIS) | 55.82 | 14.47 | 65.86 | 18.71 | 48 | 2.14 | 0.04 |

Table 2. Triggers for suicide attempts in depressed late adolescents and young adults with or without comorbid alcohol use disorders

| | | Subjects with comorbid alcohol use disorders | | Subjects without comorbid alcohol use disorders | | Analysis | |
|--|--------------|--|----|---|----|----------|------|
| | | N | % | N | % | z | p |
| Events related to conjugal relationships | all subjects | 8 | 9 | 8 | 9 | 0 | 1 |
| | males | 3 | 10 | 2 | 13 | -0.29 | 0.77 |
| | females | 5 | 9 | 6 | 9 | 0 | 1 |
| Events related to interpersonal relationships other than conjugal | all subjects | 19 | 22 | 16 | 19 | 0.43 | 0.67 |
| | males | 6 | 20 | 5 | 31 | -0.94 | 0.35 |
| | females | 13 | 23 | 11 | 16 | 0.86 | 0.39 |
| Events related to any interpersonal relationships (both conjugal and non-conjugal) | all subjects | 27 | 31 | 24 | 28 | 0.49 | 0.63 |
| | males | 9 | 30 | 7 | 44 | -0.80 | 0.42 |
| | females | 18 | 32 | 17 | 25 | 0.98 | 0.33 |

| Table 3. Number of triggers for suicide attempts in depressed late adolescents and young adults with or without comorbid alcohol use disorders | | | | | | |
|---|--|---|--|-----------------|----------|------|
| | | Depression with comorbid alcohol use disorders | Depression without comorbid alcohol use disorders | Analysis | | |
| | | N | N | df | χ^2 | p |
| All subjects | Subjects always reporting only one trigger in attempting suicide | 20 | 29 | 1 | 0.7 | 0.4 |
| | Subjects reporting one, two or more triggers in attempting suicide | 6 | 5 | | | |
| Males | Subjects always reporting only one trigger in attempting suicide | 9 | 7 | 1 | 1.25 | 0.3 |
| | Subjects reporting one, two or more triggers in attempting suicide | 1 | 3 | | | |
| Females | Subjects always reporting only one trigger in attempting suicide | 11 | 22 | 1 | 3.5 | 0.06 |
| | Subjects reporting one, two or more triggers in attempting suicide | 5 | 2 | | | |