Suicide attempts and externalizing psychopathology in a nationally representative sample

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Abstract

Suicide is most often associated with internalizing disorders such as depression; however, recent evidence suggests that externalizing psychopathology (substance dependence disorders, antisocial personality disorder) may have an independent relationship with suicidal behavior. The aim in the present study was to examine the relationship between lifetime suicide attempts and lifetime externalizing psychopathology in the US National Comorbidity Survey data set (n = 5877). First, hierarchical regression was performed to explore the associations between internalizing and externalizing disorders and suicide attempts. Externalizing psychopathology was significantly associated with lifetime suicide attempts (adjusted odds ratio = 3.47; \( P < .001 \)) and significantly improved the model beyond that including only the sociodemographic variables and internalizing psychopathology (\( \chi^2 \) difference = 73.12; \( df = 1; \ P < .001 \)). A second logistic regression was used to investigate the association between specific patterns of psychopathology and suicidality. Externalizing disorders were significantly associated with suicide attempts even in the absence of internalizing disorders (adjusted odds ratio = 5.98; 95% confidence interval = 3.07-11.67; \( P < .001 \)). These findings add to the growing literature that suggests that externalizing psychopathology is an important psychiatric correlate of suicidal behavior.

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1. Introduction

Suicide was the second leading cause of death in the United States in 2000 for people 25 to 34 years old and the third leading cause of death for people 15 to 24 years old [1,2]. Identifying psychiatric factors uniquely associated with suicidal behavior is important to improve the ability to predict suicide risk and to facilitate effective and timely mental health service delivery.

Using data from the US National Comorbidity Survey (NCS), Kessler et al [3] completed one of the largest studies on the prevalence and correlates of suicidal behavior. The lifetime prevalence of suicide attempts in this nationally representative sample was 4.6%. Among the sociodemographic variables assessed in the NCS, Kessler et al found that suicide attempts were strongly associated with being a woman, having been previously married, being born in a recent cohort (e.g., year of birth between 1966 and 1975), and having a low education level. One of the most robust correlates of suicide attempts identified has been psychopathology [4-9]. Kessler et al found the association between suicide attempts and psychopathology to be substantially higher for mood disorders than for any other disorder. For example, the odds ratio for major depression was 11.0 compared with 5.7 for antisocial personality disorder and 5.6 for panic disorder. Thus, it is not surprising that investigations into psychiatric correlates of suicide have typically focused on internalizing psychopathology such as unipolar depression [4,8,10-13].

An association between externalizing disorders (substance dependence disorders and antisocial personality disorder) and suicidal behavior has been demonstrated in adolescent and adult populations [5,14-20]. Verona et al [20] used a recently developed framework for understanding psychopathology identified by Krueger [21]. By applying confirmatory factor analysis to the wide range of individual diagnoses assessed in the NCS, Krueger identified an internalizing factor and an externalizing factor. He also found that the internalizing factor was composed of 2 subfactors: anxious-misery disorders and fear disorders. Verona et al [20] examined the effects of unique and comorbid internalizing and externalizing psychopathology in relation to suicide attempts. They used a large community sample that extended previous research limited to selective samples of
The main finding from this new study was that externalizing disorders were related to suicide attempts, both independently and when comorbid with internalizing disorders. This novel and important finding has significant clinical implications. At present, externalizing disorders, especially when not comorbid with internalizing disorders, are typically not a focus of attention in psychiatric assessment for suicide risk. The findings of Verona et al reflect the need for further research and clinical attention in this area.

The NCS public use data set provides a unique opportunity to extend this line of research to a nationally representative sample. The NCS included a detailed and reliable assessment of a broad range of psychiatric disorders in addition to assessing lifetime suicidal behavior. The purpose of the present study was to attempt to replicate the Verona et al research on associations between externalizing disorders and suicide attempts and to extend it to the general population. In addition, Verona et al only examined the higher-order factor of internalizing disorders in their investigation. Within this higher-order factor, one might expect anxious-misery disorders (e.g., major depression) to have a stronger relationship with suicidality than do fear disorders such as phobias. Therefore, the 2 internalizing subfactors were investigated separately.

Two statistical approaches were undertaken in our investigation. First, hierarchical logistic regression was used to determine whether or not externalizing psychopathology could account for unique variance in suicide attempts beyond that contributed by internalizing disorders. The inclusion of internalizing disorders in earlier steps of the hierarchical regression provided a very stringent test of the association between externalizing disorders and suicidal behaviors. Second, a logistic regression was performed to examine the associations of comorbid externalizing disorders with suicide attempts and of pure externalizing disorders with suicide attempts. Unlike in the study of Verona et al, both subfactors of internalizing disorders (i.e., fear disorders and anxious-misery disorders) were considered in these analyses. It was hypothesized that externalizing psychopathology would be significantly associated with suicide behavior even after adjusting for the effects of internalizing psychopathology. It was further hypothesized that both pure and comorbid anxious-misery and externalizing disorders would be significantly associated with suicide attempts.

2. Method

2.1. Participants

The data for this study were obtained from part II of the NCS public use data set (n = 5877; age range = 15-54 years). The Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition (DSM-III-R), diagnoses were assessed in part I of the survey; a more detailed interview of the correlates of psychiatric disorders including suicide attempts was administered in part II of the NCS. The appropriate NCS part II statistical weight was used to ensure that the sample was representative of the American population according to federal census criteria. The response rate to the NCS was 82.4%, and 99% of those respondents asked to participate in part II agreed. Verbal informed consent was obtained from all participants, and parental informed consent was obtained in the case of individuals between the ages of 15 and 17 years.

2.2. Measures and procedure

Psychiatric diagnoses of respondents in the NCS were based on a modified version of the Composite International Diagnostic Interview (CIDI) [26-28]. This measure has been found to be highly reliable; all interrater k values for the applicable internalizing and externalizing disorder diagnoses in the CIDI were above 0.90 [27]. The CIDI is a structured diagnostic interview based on DSM-III-R criteria, which was designed for use by trained interviewers who were not clinicians. Independent variables were coded so as to allow for dichotomous categorization of participants into presence/absence groups [29]. Participants were classified based on Krueger’s model of psychopathology [21]. Lifetime history of an anxious-misery disorder was coded as present if an individual was diagnosed with any of the following DSM-III-R disorders: major depression, dysthymia, generalized anxiety disorder, or posttraumatic stress disorder (PTSD). It has been established in previous research that PTSD falls under the anxious-misery internalizing cluster; thus, this diagnosis was included in this group [30]. Lifetime history of a fear disorder was considered present if an individual was diagnosed with any of the following DSM-III-R disorders: simple phobia, social phobia, agoraphobia, or panic disorder. Lifetime history of an externalizing disorder was considered present if an individual was diagnosed with antisocial personality disorder, drug dependence, or alcohol dependence.

In the second analysis, a variable with 8 mutually exclusive levels was used to delineate pure and comorbid clusters of psychopathology. Participants were categorized into 1 of 8 groups based on the lifetime presence of the following specific types of psychopathology: (a) no lifetime history of disorder; (b) anxious-misery disorders only; (c) fear disorders only; (d) anxious-misery and fear disorders; (e) externalizing and anxious-misery disorders; (f) externalizing and fear disorders; (g) fear, anxious-misery, and externalizing disorders; and (h) externalizing disorders only.

The presence or absence of suicide attempts was assessed in the NCS by the following question in the life-event history section of the interview: “Have you ever attempted suicide?” Data were not available for 5 respondents on this item in the survey.

As previously noted, the sociodemographic variables found by Kessler et al [3] to be significantly associated with suicide were included in the regression models. These included the following: sex, marital status (currently married,
Anxiety-misery disorders included diagnoses of major depression, dysthymia, generalized anxiety disorder, and PTSD. Externalizing disorders included diagnoses of simple phobia, social phobia, agoraphobia, and panic disorder. Externalizing disorders included diagnoses of antisocial personality disorder, drug dependence, and alcohol dependence.

Odds ratios were adjusted for the effects of sociodemographic variables (sex, age cohort, marital status, education level, age of youngest child, and race/ethnicity).

Table 1
Hierarchical regression model predicting lifetime suicide attempts

<table>
<thead>
<tr>
<th>Predictor variable</th>
<th>Adjusted odds ratio b (95% confidence interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxious-misery disorders</td>
<td>6.60* (4.48-9.72)</td>
</tr>
<tr>
<td>Fear disorders</td>
<td>1.34 (0.97-1.85)</td>
</tr>
<tr>
<td>Externalizing disorders</td>
<td>3.47* (2.44-4.93)</td>
</tr>
</tbody>
</table>

a Internalizing anxious-misery disorders included diagnoses of major depression, dysthymia, generalized anxiety disorder, and PTSD. Internalizing fear disorders included diagnoses of simple phobia, social phobia, agoraphobia, and panic disorder. Externalizing disorders included diagnoses of antisocial personality disorder, drug dependence, and alcohol dependence.

b Odds ratios were adjusted for the effects of sociodemographic variables (sex, age cohort, marital status, education level, age of youngest child, and race/ethnicity).

* P < .001.

The hierarchical regression was aimed at determining whether or not externalizing psychopathology accounted for unique variance in suicide attempts beyond that contributed by sociodemographic variables and both forms of internalizing disorders.

In the second analysis, logistic regression was used to determine the associations between lifetime suicide attempts and the 7 categories of pure and comorbid psychopathology. In this analysis, those without any lifetime disorder were used as the reference category. This analysis included all possible combinations of internalizing and externalizing psychopathology and adjusted for sociodemographic variables.

Analyses were performed using the SUDAAN 8.0 statistical software, a program composed of procedures designed to analyze data from complex sample surveys such as the NCS [31]. The NCS used a complex sampling design and, therefore, SEs were recalculated using the Taylor Linearization Method available in SUDAAN. This procedure was followed to provide accurate estimates based on stratified sampling design effects. The stratification information is available in the NCS public use data set specifically for this purpose.

3. Results

The hierarchical regression was aimed at determining whether or not externalizing psychopathology accounted for unique variance in suicide attempts. These results are presented in Table 1. Consistent with expectations, the addition of externalizing psychopathology in the final block significantly improved the overall model from that yielded by sociodemographic variables and internalizing psychopathology (χ² difference = 73.12; df = 1; P < .001). The final model indicated that anxious-misery disorders (adjusted odds ratio = 6.60; P < .001) and externalizing disorders (adjusted odds ratio = 3.47; P < .001) were both significantly associated with suicide attempts but that fear disorders were not (adjusted odds ratio = 1.34; P > .05).

The findings from the logistic regression analysis investigating the association between suicide attempts and the 7 patterns of psychopathology are presented (along with

Table 2
Association between psychopathology types and lifetime suicide attempts

<table>
<thead>
<tr>
<th>Predictor variable</th>
<th>Frequency of attempts across psychopathology types [n (%)]</th>
<th>Adjusted odds ratio b (95% confidence interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No history of disorder</td>
<td>35/3315 (1.1%)</td>
<td>–</td>
</tr>
<tr>
<td>Anxious-misery disorders</td>
<td>72/740 (9.7%)</td>
<td>9.46* (5.42-16.53)</td>
</tr>
<tr>
<td>Fear disorders</td>
<td>16/691 (2.3%)</td>
<td>1.80 (0.91-3.56)</td>
</tr>
<tr>
<td>Anxious-misery and fear disorders</td>
<td>45/319 (14.1%)</td>
<td>11.86* (6.12-22.97)</td>
</tr>
<tr>
<td>Anxious-misery and externalizing disorders</td>
<td>33/134 (24.6%)</td>
<td>33.20* (17.93-61.47)</td>
</tr>
<tr>
<td>Fear and externalizing disorders</td>
<td>10/86 (11.6%)</td>
<td>10.98* (4.35-27.74)</td>
</tr>
<tr>
<td>Anxious-misery, fear, and externalizing disorders</td>
<td>35/97 (36.1%)</td>
<td>48.09* (25.39-91.10)</td>
</tr>
<tr>
<td>Externalizing disorders</td>
<td>25/491 (5.1%)</td>
<td>5.98* (3.07-11.67)</td>
</tr>
</tbody>
</table>

a Internalizing Anxious-misery disorders included diagnoses of simple phobia, social phobia, agoraphobia, and panic disorder. Externalizing disorders included diagnoses of antisocial personality disorder, drug dependence, and alcohol dependence.

b Odds ratios were adjusted for the effects of sociodemographic variables (sex, age cohort, marital status, education level, age of youngest child, and race/ethnicity).

* P < .001.
sample numbers and percentages) in Table 2. Anxious-misery disorders and externalizing psychopathology were significantly associated with suicide attempts, both when independent (ie, when occurring in the absence of other forms of psychopathology) and when comorbid with other disorders. Even after controlling for the sociodemographic variables identified by Kessler et al [3] and even in the absence of comorbid internalizing psychopathology, externalizing psychopathology was significantly associated with suicide attempts (adjusted odds ratio = 5.98; 95% confidence interval = 3.07-11.67; \( P < .001 \)).

4. Discussion

There were 2 key findings in the current investigation. First, based on the results of the hierarchical regression analysis, externalizing psychopathology accounted for unique variance in suicide attempts beyond that contributed by internalizing disorders and sociodemographic variables. Second, the subsequent logistic regression analysis revealed that externalizing psychopathology was associated with suicide attempts even in the absence of internalizing psychopathology. Previous findings from community and clinical samples were replicated and extended to a nationally representative survey in the current study. Unlike in the study of Verona et al [20], both subfactors of internalizing psychopathology (fear disorders and anxiety-misery disorders) were also examined separately. As expected, anxious-misery disorders were significantly associated with suicide attempts whereas fear disorders were not. The nonsignificant association with fear disorders was not surprising given the lack of research support for a relationship between disorders such as phobias and suicidal behavior (eg, Refs. [10,32,33]).

As Verona et al [20] noted, there is a need to understand the mechanisms underlying the relationship between externalizing psychopathology and suicidal behavior. Risk-taking behavior and/or impulse-control deficits known to be associated with externalizing disorders may be common factors that explain, in part, the relationship between externalizing disorders and suicidal behavior [18,34]. Other shared etiologic factors may include low social support [35], an increased likelihood of experiencing significant losses (eg, of status or relationships), or traumatic events caused by lifestyle variables [36]. Future research aimed at uncovering the factors that underlie the relationship between externalizing psychopathology and suicidal behavior could be used to develop intervention strategies that are more effective in reducing the risk of suicidal behavior among those with externalizing disorders.

Clinicians must be aware that patients presenting exclusively with externalizing disorders may present a significant risk for suicidal behavior. The obvious challenge for clinicians involves the difficulty in treating externalizing disorders. To date, no intervention has proven to be consistently effective in the treatment of antisocial personality disorder [37]. However, treatment of conduct disorder in childhood and adolescence may lead to a reduced risk for adult antisocial personality disorder and, thus, to a subsequent reduced risk for suicidal behavior [38]. Although there is little evidence for an effective treatment of antisocial personality disorder, there have been significant advances in the efficacy of treatment of substance dependence disorders in the last decade. Effective pharmacological [39-42] and brief psychological [40,43] interventions have been developed for the treatment of alcohol and drug abuse and dependence. Future research efforts aimed at examining the efficacy of interventions for externalizing disorders should also consider whether or not these interventions serve to reduce the risk of suicidal behavior.

Four important limitations in this study are worthy of note. First, a significant concern in the NCS is the lack of attention given to Axis II diagnoses. The NCS included the assessment of only one personality disorder diagnosis (ie, antisocial personality disorder). Among personality disorders, borderline personality disorder has a well-established association with suicidal behavior and may have been an important mediator in the relationship between externalizing psychopathology and suicidal behavior [44]. Although borderline personality disorder was not assessed in the NCS interview and thus it was not possible to formally examine this hypothesis here, such an examination is warranted in future research. Without the assessment of all Axis II disorders, the issue of countervailing comorbidity cannot be fully resolved.

A second potential limitation is the veracity of information received from respondents with antisocial personality disorder. Although this is an important consideration, we believe it was somewhat ameliorated by the fact that respondents were interviewed in the comfort of their own homes by neutral lay interviewers and, thus, there was little apparent motivation for these participants to provide misinformation in the data-gathering interview.

A third issue of concern is that the cross-sectional and retrospective design does not allow for causal inferences to be made on the basis of these results. Future prospective, longitudinal research is required to establish the existence of causal associations between these psychopathology clusters and suicidality. Suicidal behavior is often viewed as a consequence of psychopathology; however, it is also possible that suicidal behavior could lead to externalizing behavior. For example, distressed and suicidal individuals may use binge drinking (an externalizing behavior) as a form of self-harm. Alcohol-related problems could also develop from efforts to reduce negative affect by consuming alcohol.

Although highly trained professional interviewers conducted the diagnostic interviews and suicide assessments in the NCS interview, a final limitation in this study is that the interviewers were not clinicians. The use of clinicians may in some ways be ideal; however, the breadth and abundance of information accessed from a nationally representative sample, as in this data set, would likely be lost in the
tradeoff required if clinical raters were to be used. It should also be noted that the brief and direct question used to assess suicide attempt history, although common in epidemiological studies, may not be optimal in clinical practice and does not compare with the comprehensive assessment that would be completed in the clinical context.

In summary, in the current investigation of a large, nationally representative sample, significant associations were found between pure externalizing disorders and suicide attempts and comorbid externalizing and internalizing psychopathology and suicide attempts. Clinicians and mental health policymakers need to be aware that individuals who present with antisocial personality disorder and substance dependence disorders (with or without comorbid mood and anxiety disorders) may be at significant risk for engaging in suicidal behavior. Prospective studies are required to determine whether or not there exists a causal relationship between externalizing disorders and suicidal behavior. Future intervention studies should investigate whether or not existing treatments for externalizing psychopathology reduce the risk of suicidal behavior.

Acknowledgments

We wish to express our appreciation to Mr Ian P. Clara for his assistance with the SUDAAN statistical analyses. This research was supported by grants from the Canadian Institutes of Health Research (Ottawa), the Canada Foundation for Innovation and the Canada Research Chairs program (Ottawa) (Dr Cox), the Manitoba Health Research Council (Winnipeg) (Dr Sareen), and the Social Sciences and Humanities Research Council (Ottawa) (Ms Hills). The NCS (Dr RC Kessler, principal investigator) was sponsored by the US National Institute of Mental Health (Bethesda, Md), the National Institute of Drug and Alcohol Abuse (Bethesda, Md), and the W.T. Grant Foundation (New York, NY).

References


