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Alcohol dependence and suicide-related ideation/behaviors in an Israeli household sample, with and without major depression

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Abstract

BACKGROUND—Suicide-related ideation and behaviors (SRIB) are associated with both alcohol disorders and major depressive disorder (MDD). The objective of this study was to evaluate the relationship of alcohol dependence (AD) and major depression to the risk for lifetime SRIB.

METHODS—Data from a community-based sample of 1,237 adult Israeli lifetime drinkers assessed with reliable diagnostic measures were analyzed using logistic regression.

RESULTS—Lifetime SRIB was reported in 4.7%, and was more prevalent among participants with alcohol dependence (9.0%) than among those without alcohol dependence (4.1%); *p*-value=0.01. Although both alcohol dependence and major depression were associated with SRIB (AD: OR 2.2, 95% CI 1.1–4.4; MDD: OR 11.4, 95% CI=6.4–20.4), joint analysis showed that AD without MDD increased risk for SRIB as compared to those without AD or MDD (OR 3.1, 95% CI 1.1–9.1), but AD did not increase risk among those with MDD (OR 1.1, 95% CI 0.4–2.7). Among those with AD, the severity of subclinical depressive symptoms was associated with increased SRIB.

CONCLUSIONS—These findings show that alcohol dependence increases risk for SRIB among individuals without a history of major depression. Suicidal tendencies may be undetected and underdiagnosed in this group because of the absence of major depression, and therefore left

untreated. These findings should be considered when adopting suicide prevention or treatment strategies for this high-risk sub-population.

Keywords

suicide; alcohol dependence; major depressive disorder; prevention; control

Introduction

Suicide-related ideation and behaviors (SRIB) constitute a significant public health problem. Among U.S. adults, the lifetime prevalence of suicidal ideation ranges from 6–14%, while the range for attempts is 2–9% (Nock et al., 2008b). The lifetime prevalence of suicide in individuals with alcohol dependence (AD) ranges from 7–15% (Inskip et al., 1998) and postmortem psychological autopsy studies demonstrated alcohol-use disorders (AUDs) in 25%–35% of suicide victims (Cheng, 1995; Pirkola et al., 2000). Additionally, alcohol was detected in the blood of 20–48% suicide completers in different American and European samples (Garlow, 2002; Pirkola et al., 2003; Varnik et al., 2007). The risk for SRIB is also increased in individuals with AUDs, particularly AD (Borges & Loera, 2010). Though recent studies suggest distinct consideration of suicide-related ideation and suicide-related behaviors (Nock et al., 2013), many cases of each appear to lie on a continuum, representing similar psychopathology and sharing common characteristics (ten Have et al., 2009).

Another strong risk factor for suicide and SRIB (non-fatal suicidal behavior or ideation) is major depressive disorder (MDD) (Arsenault-Lapierre et al., 2004; Nordentoft et al., 2011). The risk for suicide completion in individuals with MDD is elevated, ranging from 2%–12% (Bostwick & Pankratz, 2000). Lifetime prevalence of a suicide attempt among individuals with MDD is approximately 15% (Oquendo et al., 2006) or 1,300:100,000 person years (Bolton et al., 2010), much more common than in individuals without MDD (11:100,000 person years) (Nock et al., 2008b).

Given the risk that both AUD and MDD pose for SRIB, understanding the complex etiology of suicidal behavior requires understanding the effects of each of these disorders in the presence or absence of the other. In studies of suicide completers, comorbid MDD and/or AD were often involved (Cheng, 1995; Beautrais et al., 1996; Aharonovich et al., 2002). In a case-control New Zealand study of treated serious suicide attempters and community controls, mood disorders (a combined category of unipolar and bipolar disorders) were associated with serious suicide attempt, with no additional contribution to risk from AD (Conner et al., 2003). Among participants with AD in a large U.S. genetics study of alcoholism, MDD was associated with suicide ideation (OR=4.0) and planning (OR=1.9), but not with actual attempts (Conner et al., 2007). These results arose in studies that varied widely in their measures and samples. In the U.S. general population, both AD and unipolar MDD were significantly associated with suicide attempt, but more complex aspects of the relationship of these two disorders to suicide-related behaviors were not addressed (Bolton & Robinson, 2010). Thus, more information on the relationship of AD and MDD to SRIB in community-based samples is needed, carefully restricting investigation to unipolar MDD and increasing the range of SRIB considered (suicide ideation and suicide attempts).

The goals of this study were to determine the association of AD and MDD with SRIB in a general population sample of drinkers. The specific aims were to: (1) examine the main effect of AD on risk for SRIB in the presence and absence of MDD; (2) evaluate the main effect of MDD on risk for SRIB in the presence and absence of AD. We conducted this study in an Israeli sample, which shows similar prevalence of SRIB to the U.S. and many European countries (Nock et al., 2008a).

Materials and Methods

Study procedures—Data were collected in 2007–2009 from 1,349 adult household residents; details are available elsewhere (Hasin et al., 2002b; Shmulewitz et al., 2010; Shmulewitz et al., 2012). This sample was designed to investigate environmental and genetic influences on alcohol-related traits, so males were oversampled because drinking among Israeli women is too limited to accomplish the study goals (Hasin et al., 1998; Spivak et al., 2007). Interviewers received structured training and administered face-to-face computer-assisted interviews, in Hebrew or Russian, after obtaining written informed consent as approved by relevant Israeli and American IRBs (Shmulewitz et al., 2010; Shmulewitz et al., 2011). The overall response rate was 68.9%. Quality control included field observation, reviews of recorded interviews, and telephone verification of responses.

Sample—The present analysis included 1,237 ever-drinkers (drank any alcohol, lifetime) with complete information on the alcohol, demographics, and depression variables, and without possible mania or hypomania. Only drinkers were examined since non-drinkers would not be informative about alcohol use disorders. Of these, 77.9% (N=963) were males; 25.4% (N=314) were 21–29 years old, 34.0% (N=421) were 30–44, and 40.6% (N=502) were 45+; 24.3% (N=300) were immigrants from the Former Soviet Union (FSU); 66.3% (N=820) were currently married or living together, 25.8 (N=319) were never married, and 7.9% (N=98) were previously married; 6.5% (N=80) had less than high school education, 59.8% (N=740) completed high school, and 33.7% (N=417) completed a university degree.

Measures

Suicide-related ideation and behaviors (SRIB)—SRIB was assessed using the major depressive disorder module of the Psychiatric Research Interview for Substance and Mental Disorders (PRISM) 6.0, which is highly reliable (Hasin et al., 2006) and valid (Torrens et al., 2004) in U.S. and other samples. The SRIB questions were asked of all respondents who ever felt depressed, uninterested in things, or unable to enjoy things for at least 2 weeks. SRIB was coded as “yes” if the response to any of these questions was “yes”: Did you try to kill yourself, or do something on purpose you knew could have killed you? Did you start to do something in order to kill yourself, even if you changed your mind and stopped, or if someone else stopped you? Did you think of any specific plan for committing suicide? Did you have any thoughts about suicide or killing yourself? Because SRIB is exceedingly rare among those who never had two weeks of depressed mood, lack of interest or anhedonia (Baca-Garcia et al., 2010), a negative value was imputed for SRIB among individuals who never experienced two weeks of these feelings.

Lifetime alcohol dependence (AD)—The Alcohol Use Disorders and Associated Disabilities Interview Schedule (AUDADIS; (Grant et al., 1995; Grant et al., 2003; Hasin et al., 2007)) was used to diagnose lifetime alcohol dependence (AD) following the DSM-IV guidelines (American Psychiatric Association, 2000b). Lifetime AD was diagnosed by the presence of 3 or more of the 7 dependence criteria within a 12-month period. Reliability of AUDADIS-IV AD diagnosis in clinical and general population samples (Grant et al., 1995; Chatterji et al., 1997; Hasin et al., 1997a; Grant et al., 2003) ranges from very good to excellent ($\kappa=0.70$ – 0.84). Convergent, discriminative and construct validity of AUDADIS-IV alcohol criteria and diagnoses is good-to-excellent in U.S. (Hasin et al., 1997c; Hasin & Paykin, 1999) and multi-national studies (Hasin et al., 1997b; Pull et al., 1997), including concordance of AUDADIS diagnoses with clinician reappraisals ($\kappa=0.60$ – 0.76 ; (Cottler et al., 1997; Canino et al., 1999)).

Major Depression—Using the PRISM 6.0 module, primary MDD was diagnosed by experiencing one or more DSM-IV major depressive episodes (MDE; (American Psychiatric Association, 2000a)). Lifetime DSM-IV MDD was defined as having at least one major depressive episode over the life course without history of manic, mixed, or hypomanic episodes (i.e., excluding bipolar 1 and bipolar 2 disorders). Individuals with an MDE with possible mania or hypomania were excluded from the analysis. The PRISM showed good-to-excellent test-retest reliability for MDD diagnosis ($\kappa=0.64\text{--}0.87$; (Hasin et al., 1996; Hasin et al., 2006; Morgello et al., 2006) and was validated in substance abusing samples (Torrens et al., 2004).

Analysis

Relationship between SRIB and alcohol dependence, major depression—

Logistic regression was used to investigate the association of AD or MDD with SRIB, adjusting for gender, age, FSU status, marital status, and education levels, which were related to SRIB (Rosen & Iancu, 2002; Amitai & Apter, 2012) and to drinking behaviors in Israel (Hasin et al., 2002a; Hasin et al., 2002b; Spivak et al., 2007). Results are reported as odds ratios (ORs) and 95% confidence intervals (95% CI), indicating the increase in the odds of SRIB given the presence of AD or MDD. Finding that both AD and MDD increased risk for SRIB, we created a four-category risk factor to investigate the joint effects: no AD and no MDD; AD without MDD; MDD without AD; AD and MDD, and used this variable in the logistic regression described above.

As sensitivity analyses, we analyzed the relationship of three additional alcohol-related variables to SRIB in the presence or absence of MDD. First, we created a count variable based on the number of AD criteria endorsed (AD severity, range 0–7). Second, we created two variables combining alcohol dependence and abuse: a dichotomous variable (any AUD) and a count variable based on the number of AUD criteria endorsed (AUD severity; range 0–11), previously found to be unidimensional in this sample (Hasin et al., 2002b). For the binary predictor (any AUD), ORs indicate the increase in odds of SRIB given the presence of any AUD; for count predictors (AD and AUD severity), ORs indicate the increase in odds of SRIB for a one-unit increase in the predictor.

Results

Among the sample, 4.7% (N=58) reported SRIB, 11.7% (N=145) were diagnosed with AD and 16.7% (N=206) were diagnosed with MDD.

Demographics and SRIB

The relationship between the demographic variables (gender, age, FSU status, marital status, and education level) and the SRIB variable was investigated by χ^2 -tests, using SAS 9.2 (www.sas.com). Age, FSU status, marital status, and education were not significantly related to SRIB, while females were more likely to have experienced SRIB (Table 1).

SRIB and alcohol dependence (AD)

SRIB was higher among those with AD compared to those without AD (9.0% and 4.1%, respectively; $p=0.010$). Using logistic regression and adjusting for demographic variables, AD was significantly associated with SRIB; respondents with AD had 2.18 (95% CI = 1.08–4.40) times greater odds ($p=0.03$) of SRIB.

SRIB and major depression (MDD)

The prevalence of SRIB was greater in those with MDD than without MDD, (18.9% and 1.8% respectively, $p < 0.0001$). Using logistic regression and adjusting for demographic variables, MDD was significantly associated with SRIB; respondents with MDD had 11.41 (95% CI = 6.37–20.42) times greater odds ($p < 0.0001$) of SRIB.

SRIB, AD, and MDD

Joint analysis of the combined AD/MDD risk factor (Table 2) indicated that all three groups increased risk of SRIB as compared to the no AD/no MDD group: respondents with AD but without MDD had 3.1 times greater odds of SRIB; respondents with MDD but without AD had 13.8 times greater odds of SRIB; and respondents with MDD and AD had 14.5 times greater odds of SRIB (Table 2). Among those with MDD, AD did not significantly affect SRIB risk (OR=1.05). To better understand the 3.1 times increased risk for SRIB by AD among the group with no MDD diagnosis, we examined the risk for SRIB due to depressive symptoms. In this group, those with SRIB had significantly more depressive symptoms than others (7.00 (s.d.=1.22) vs. 1.57 (s.d.=2.71), respectively, Kruskal-Wallis $\chi^2=14.76$, $p=0.0001$).

Results were very similar using the variables created for the sensitivity analyses; in the “no MDD” group only, significant association was observed between SRIB and both AD severity (OR=1.33; 95% CI 1.02, 1.74) and AUD severity (OR=1.24; 95% CI 1.02, 1.50). Results for binary AUD variable showed a similar trend (OR=2.46; 95% CI 0.94, 6.44).

Discussion

This large, household-based study showed a significant association between AD and SRIB, both before and after controlling for demographic variables. Joint analyses showed different relationships of AD to SRIB among participants with and without a lifetime history of MDD. Among those with MDD, AD was unrelated to SRIB. In contrast, among those with no history of MDD, AD had a strong association with SRIB risk, increasing this risk by at least three.

While AD is a well-established risk factor for suicidal behavior, findings suggest that among individuals with MDD, also a strong risk factor for SRIB, there may be no additional contribution of AD to the risk for SRIB. These findings expand the knowledge derived from the recent large-scale study in the U.S. general population (Bolton & Robinson, 2010), in which both AD and MDD were significantly associated with suicide attempts, but stratified analyses were not carried out to untangle the effects of MDD and AD in the presence or absence of each other. Our results differ from those from a community-based sample of completed suicide cases, which found that comorbid MDD and AUD increased suicide risk more than MDD alone (Cheng, 1995). However, this study varied in the outcome and also in many aspects of the methods. Our findings are consistent with (Conner et al., 2003), who showed no effect of AD on SRIB in the presence of the heterogeneous group of mood disorders in a clinical population. We suggest that the lack of association does not reflect a power issue, but rather a very weak effect (indicated by an odds ratio very close to 1.0). Future studies are needed to expand our knowledge of the roles of MDD and AD in various types of suicidal behaviors with different severity levels.

The finding that depressive symptoms are greater among individuals with AD and SRIB than among those with AD but no SRIB suggests that clinicians should be alert for substance-induced or sub-clinical depressive states in those with AD, since they may signal risk for suicidal behavior even in the absence of a formal primary MDD diagnosis, as was found by (Aharonovich et al., 2002). This finding is consistent with our previous findings of

the poor outcome of substance-induced depression (Nunes et al., 2006) and the growing interest in research of subthreshold depressive symptoms that do not meet criteria for a primary major depression, yet have significant negative prognostic value (Karsten et al., 2010).

This study had several limitations. First, data were collected by self-report, which may be subject to recall bias and other assessment issues common among epidemiologic studies. However, we used highly reliable and well-validated measures, as shown in studies in the U.S. and other countries. Second, cross-sectional studies such as ours cannot indicate causality, which requires longitudinal studies. However, the present study is essential to suggest directions for future longitudinal analyses. Third, only participants who passed the depression screening questions (two or more weeks of low mood, lack of interest, or anhedonia; N=438, 35.4%) were assessed for SRIB. However, because individuals in the general population who do not pass such a screener report suicide attempts very infrequently (<0.1%) (Baca-Garcia et al., 2010) this restriction is unlikely to affect our results. However, if we did “miss” subjects who might have endorsed SRIB in the non-MDD group due to the screening question, this is likely to have led to an underestimation of the effect of AD on SRIB in that group. Another possible weakness in measurement of SRIB was that AD-related impulsive SRIB might have been decreased in individuals with concurrent MDD (Conner et al., 2006). Fourth, the relatively small sample with SRIB (N=58) may have limited power to provide information on the relationship between AD and SRIB among those with MDD. For this reason, separate analyses for suicidal behavior and ideation were not done, although previous reports suggest that risk factors for suicide ideation and behaviors are not identical (Nock et al., 2013). Further studies in larger samples are warranted to confirm and extend these findings. Further, given our specific research question, we did not investigate other axis I comorbidities, as these would have been beyond the scope of the present paper. However, these could potentially be useful to explore in future studies. Finally, we did not address substance-induced MDD. However, similar to findings from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) (Grant et al., 2004), where substance-induced MDD was extremely rare, substance-induced MDD was also very rare in this household sample, limiting any analyses that would be informative.

Our study has also several strengths. Data collection involved stringent quality assurance procedures and resulted in a sizable sample with a good response rate. Results of the sensitivity analyses suggest that the AD results are robust.

This study comprehensively examines the roles of AD and MDD and the full range of non-fatal suicidal ideation (81% of the SRIB group) and behaviors in a general population sample. AD did not increase the risk for SRIB among individuals with MDD. Thus it seems that in the presence of depression, the contribution of AD to the SRIB risk is limited, possibly because MDD is a stronger risk factor for SRIB than AD. In contrast, the findings showed that AD increased risk for SRIB among individuals without a history of MDD. Furthermore, among those with AD, the severity of subclinical depressive symptoms was associated with increased SRIB. Suicidal tendencies may be underdiagnosed in this group because of the absence of a formally-diagnosed primary MDD, and therefore left untreated. These findings are particularly relevant to designing suicide prevention plans and adopting treatment strategies for this high-risk sub-population.

Studying the joint role of AD with MDD is essential to promoting community-based suicide prevention efforts. Despite the unique cultural and religious heterogeneity of Israel, an earlier national survey in Israel found that the role of MDD as a risk factor for suicidal behaviors (ideation, plan and attempt) was comparable to that observed in the U.S.

(Levinson et al., 2007). However, alcohol dependence was not reported in this earlier study. Therefore, the results of the present study contribute to the global literature on the relationships between major depression, alcohol dependence and SRIB, and can be used to suggest directions for further investigation and treatment development in different countries. Future studies are warranted to deepen our understanding of this relationship and to determine how AD may affect the risk for suicidal behavior among individuals without MDD.

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Table 1

Prevalence of demographic subgroups, alcohol dependence and major depression by suicide-related ideation or behaviors groups among ever-drinkers (N=1,237)

Variable	<i>Suicidal ideation or behaviors</i>		χ^2	p-value
	No (N=1,179)	Yes (N=58)		
	<i>Prevalence (%)</i>			
<i>Gender</i>			6.97	0.008
Female	21.5	36.2		
Male	78.5	63.8		
<i>Age</i>			3.89	0.143
21–29	24.9	36.2		
30–44	34.2	31.0		
45+	41.0	32.8		
<i>FSU immigrant</i>			0.42	0.517
No	75.6	79.3		
Yes	24.4	20.7		
<i>Marital status</i>			5.88	0.053
Currently married	67.0	51.7		
Previously married	7.8	10.3		
Never married	25.2	37.9		
<i>Education</i>			1.69	0.430
Less than high school	6.5	6.9		
Completed high school	59.5	67.2		
Completed a university degree	34.1	25.9		
Alcohol Dependence	11.2	22.4	6.72	0.010
Major Depressive Disorder	14.2	67.2	112.20	<0.0001

Table 2

Logistic regression of SRIB on alcohol dependence (AD) and major depressive disorder (MDD), among ever-drinkers (N=1,237)

Major depressive disorder	Alcohol dependence	SRIB		Odds ratio ^a (95% CI)	
		N	Prevalence (%) ^a	Joint analysis ^b	Major depressive disorder only ^c
No (N=1,031)	No (N=925)	14	1.5	1.0	--
	Yes (N=106)	5	4.4	3.09 (1.05–9.13) ^d	--
Yes (N=206)	No (N=167)	31	16.9	13.79 (7.08–26.86) ^e	1.0
	Yes (N=39)	8	17.6	14.52 (5.40–39.10) ^e	1.05 (0.42–2.65)

SRIB = Suicide-related ideation or suicide-related behaviors

^a adjusted for gender, age, former Soviet Union (FSU) status, marital status, and education

^b comparing risk for SRIB among: Major depressive disorder (MDD)=no, Alcohol dependence (AD)=yes; MDD=yes, AD=no; and MDD=yes, AD=yes; to the reference group (MDD=no, AD=no)

^c comparing risk for SRIB in AD=yes to AD=no (reference group), among those with MDD

p-values:

^d <0.05

^e <0.0001