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The association between insomnia and suicidal thoughts in adults treated for alcohol dependence in Poland

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Abstract

Background—Suicidal ideation is elevated for individuals with alcohol use disorders. Sleep problems are associated with suicide risk and alcohol use, and sleep problems may be associated with suicide risk in those with alcohol use disorders. For the present study, we hypothesized that self-reported sleep problems are associated with suicidal thoughts in a sample of adults seeking treatment for alcohol dependence in Poland.

Methods—The sample included 304 patients in addiction treatment programs in Warsaw, Poland who met criteria for alcohol dependence. Measures included demographic characteristics, frequency of alcohol use, psychiatric symptoms, suicidal ideation and two measures of insomnia, which differed by time frame: the Athens Insomnia Scale (AIS, past 1 month) and the Sleep Disorders Questionnaire (SDQ-7, past 6 months). Multivariable logistic regression models tested the association between insomnia and suicidal thoughts.

Results—In models that controlled for age, gender, and days of recent drinking, both measures of sleep problems were associated with suicidal ideation: AOR= 2.01 (95% CI: 1.50-2.70) [AIS] and 1.73 (95% CI: 1.29-2.31) [SDQ-7]. The association of sleep problems, as measured by the AIS, with suicide remained significant after adjusting for psychiatric symptoms, although the estimated effect size was smaller (AOR= 1.47; 95% CI: 1.05-2.06).

Conclusions—Among Polish adults with alcohol dependence, insomnia severity was associated with suicidal ideation. This finding highlights the need to assess for sleep problems, in addition to suicidal thoughts, in alcohol treatment settings and to further examine the potential consequences of poor sleep in this population.

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Keywords

Alcohol dependence; Suicidal thoughts; Sleep problems

1. Introduction

Worldwide, an estimated 900,000 adults die by suicide every year (WHO, 2010), and 4,384 Polish citizens died by suicide in 2009 (Policja Polska, 2010). Alcohol use disorders (AUDs) are a strong and consistent correlate of suicidality (Sher, 2006; Wilcox et al., 2004). Between 14 and 43% of Polish alcohol-dependent individuals have attempted suicide (Brodniak, 2006; Wojnar et al., 2009). Although research has demonstrated that individuals with AUDs are at elevated risk for suicide, research on which individuals with AUDs are at greater risk for suicidality is preliminary. Insomnia is one potential risk factor that has been examined in the general population (Wojnar et al., 2009), and is associated with psychiatric disorders (Agargun et al., 1997; Chellappa and Araujo, 2007; Danel et al., 2010).

In alcohol treatment samples, 36 to 91% have insomnia (Arnedt et al., 2011; Baekeland et al., 1974; Brower, 2003; Cohn et al., 2003; Foster and Peters, 1999). Insomnia occurs during alcohol withdrawal (Brower and Perron, 2010; Mello and Mendelson, 1970), but can persist during abstinence (Brower et al., 2011; Stein and Friedmann, 2005). Polysomnographic correlates of insomnia in alcohol dependent patients include decreased sleep efficiency and increased sleep onset latency (Brower, 2001). Disturbances in sleep and abnormalities in rapid eye movement sleep can persist for one or more years (Drummond et al., 1998).

Evidence suggests that sleep disorders are associated with the risk of suicidality among individuals with alcohol problems (Mann, 2003; Sher, 2003; Sher, 2001). Sleep problems may directly influence suicidal thoughts or behaviors, or psychiatric symptoms may explain this association. Several studies have found a significant relationship between sleep problems and suicidal thoughts or behaviors controlling for psychiatric conditions (Bernert et al., 2005; Goldstein et al., 2008; Li et al., 2010; Wojnar et al., 2009; Wong et al., 2011).

Given the association between insomnia and AUDs, insomnia may be important to suicide risk for those with AUDs. Much of the prior research has used single-item insomnia measures, not allowing for clear comparisons between different aspects of insomnia as indicators of suicide risk. Moreover, past research does not distinguish whether the chronicity of sleep problems influences current suicidal thoughts. The present study examines the potential link between two different measures of sleep problems with suicidal ideation among alcohol-dependent patients. We used insomnia scales with two different time frames (past 30 days and past six months) to examine the impact of duration of sleep problems on presence of suicidal thoughts. Because suicidal acts are often an escalation of suicidal thoughts, we examined suicidal ideation, hypothesizing that insomnia and suicidal ideation would be significantly associated after adjusting for other correlates such as age, gender, and psychiatric severity.

2. Methods

2.1 Participants

Participants were patients consecutively admitted to alcohol treatment programs (two outpatient and two residential) in Warsaw, Poland ($n = 304$), 54 of whom were court-ordered to treatment. Analyses included 282 participants with complete data. All participants had a DSM-IV-defined alcohol dependence (APA, 2000) diagnosis by an addiction-specialized multidisciplinary team. Exclusion criteria were: age < 18, a psychotic disorder,

acute alcohol withdrawal, current pharmacotherapy for psychiatric disorders, and <25 on the Mini-Mental State Examination (Folstein et al., 1975). Patients with aggressive or self-harming behavior were not treated in these programs for the safety of the individual, other patients, and staff. All participants were European Caucasians. The mean and median number of days since last drink at the assessment in the analytic sample was 102 (S.D. = 368.3) and 42. Treatment was abstinence-based, combining group and individual therapy, elements of 12-step facilitation therapy and relapse prevention.

2.2 Procedures

This study was designed to be a cross-sectional examination of insomnia and suicidal thoughts. All participants gave written informed consent. The Bioethics Committee at the Medical University of Warsaw and the University of Michigan Institutional Review Board approved the protocol.

2.3 Measures

All measures were self-administered. Demographics were from the University of Arkansas Substance Abuse Outcomes Module (Smith et al., 1996). Past two week suicidal ideation was measured by an item from the Beck Depression Inventory (Beck et al., 1961), with four possible responses: “I don’t have any thoughts of killing myself” (n=229), “I have thoughts of killing myself, but I would not carry them out” (n=51), “I would like to kill myself” (n=16), and “I would kill myself if I had the chance” (n=4). A binary variable indicated presence or absence of suicidal ideation. The use of this single item to assess suicidal ideation has demonstrated validity (Dahlsgaard et al., 1998; Kalichman et al., 2000). Number of drinking days during the prior three months were measured with the Time-Line Follow-Back Interview (TLFB) (Sobell et al., 1979; Sobell et al., 1988). The Brief Symptom Inventory (BSI) (Derogatis and Melisaratos, 1983) assesses psychiatric symptoms such as anxiety, depression, phobias, somatizations, psychosis, and poor concentration. We calculated a total score with suicide and sleep items removed. There is high convergence between BSI scales and similar domains of the Minnesota Multiphasic Personality Inventory (Derogatis and Melisaratos, 1983). Social support was measured using the Medical Outcomes Study Social Support Scale (MOSSSS) (Sherbourne and Stewart, 1991).

Severity of sleep problems was measured with Athens Insomnia Scale (AIS) (Soldatos et al., 2000) and a subscale of the Sleep Disorders Questionnaire (SDQ) (Douglass et al., 1994). See (Wojnar et al., 2008) for details on Polish translation. The AIS and SDQ-7 measure 30-day and six-month insomnia respectively. The AIS items measure time to fall asleep, awakening early, total sleep time, sleep quality, and daytime consequences of poor sleep. Originally, eight items were selected from the longer SDQ instrument (Brower, 2001), with one item, “I have been unable to sleep at all for several days,” dropped prior to this study because only 3.5% of patients endorsed it (Brower, 2001). The seven items included were: “I get too little sleep at night,” “I often have a poor night’s sleep,” “I have trouble getting to sleep at night,” “I wake up often during the night,” “I feel that my sleep is abnormal,” “I feel that I have insomnia,” and “I have a problem with my sleep.” The mean score on the AIS was 8.2 (SD = 5.2) with a range of 0-24; for the SDQ-7, the mean for was 12.1 (SD = 7.3) with a range of 0-28.

2.4 Data Analysis

After bivariate analyses (*t*-tests, χ^2 tests, and unadjusted logistic regressions), we conducted multivariable logistic regression analyses for each insomnia measure. We converted continuous variables to z-scores for regressions; the odds ratios for all standardized continuous covariates represent the change in odds associated with a one standard deviation increase. Additional analyses examined BSI as a mediator using the methods described in

Baron and Kenny (1986), which includes: 1) demonstrating that the variable of interest and the potential mediator are associated with the outcome, 2) demonstrating that the variable of interest is associated with the potential mediator, and 3) demonstrating that the association of the variable of interest with the outcome lessens in strength when controlling for the potential mediator in a multivariable model.

3. Results

Among the 282 participants, 67 (23%) reported current suicidal ideation. *T*-test showed that patients with suicidal ideation had significantly lower social support ($p=0.01$) and more psychiatric symptoms ($p<0.001$) (Table 1). The mean AIS score for the group with suicidal ideation was 3.8 points higher than among subjects without suicidal thoughts ($p<0.001$). Mean scores on the SDQ-7 were 4.2 points higher in the group with suicidal ideation than the group without ($p<0.001$).

In a multivariable model (Table 2) a one standard deviation increase in AIS-measured insomnia was associated with a 102% increase in odds of suicidal ideation and remained significant after BSI was added (AOR=1.47; 95% CI:1.05-2.06). Additionally, SDQ-7-measured insomnia was significantly associated with suicidal ideation (AOR=1.73; 95% CI: 1.29-2.31), but this relationship was no longer significant when BSI was added. Both insomnia measures were associated with psychiatric symptoms; in linear regressions of BSI, the AIS had a β of 0.46 (95% CI: 0.36-0.56; $p<0.001$) and the SDQ-7 had a β of 0.43 (95% CI: 0.33-0.54; $p<0.001$). Thus, psychiatric symptoms met the definition of a mediator.

4. Discussion

Sleep problems were associated with suicidal ideation among alcohol dependent individuals. However, after adjusting for psychiatric symptoms, only the AIS remained associated with suicidal ideation. The effect sizes were moderate, with a one standard deviation difference in sleep measure score associated with an odds ratio of 1.73 for the SDQ-7 and 2.02 for the AIS prior to adjusting for psychiatric symptoms and odds ratios of 1.22 and 1.47 after adjustment. Psychiatric symptoms had a stronger association with suicidal ideation, with odds ratios above 2.0 for a one standard deviation increase.

These findings are consistent with research in general population and clinical samples indicating that insomnia is potentially an independent risk factor for suicidality (Agargun et al., 1997; Bernert et al., 2005; Chellappa and Araujo, 2007; Fawcett et al., 1990; Goldstein et al., 2008; Hall and Platt, 1999; McGirr et al., 2007; Rocha et al., 2005; Wojnar et al., 2009). We found some support for an independent effect, but the results also highlight the potential role of psychiatric distress as a partial or full mediator. While causal inferences are outside of the scope of these data, it is possible that sleep problems increase psychiatric distress, which in turn increases suicidal ideation.

There are several possible explanations for why the AIS but not the SDQ-7 was associated with suicide ideation after adjustment for psychiatric symptoms. Unlike the AIS, the SDQ-7 items were designed to characterize sleep problems related to psychiatric problems (Douglass et al., 1994). Consequently, it is expected that the effect of SDQ-7-measured sleep problems on suicidal ideation would decrease when controlling for psychiatric symptoms. Additionally, the AIS's past 30-day time frame more closely approximates the past 2-week time frame of the suicidal ideation item than the SDQ-7's 6-months. Finally, the AIS requires a symptom to occur at least three times a week to be included, introducing a minimum severity level.

Improvement of sleep for alcohol-dependent patients can take several months (Brower et al., 2011) to more than two years (Drummond et al., 1998). Given the connection between sleep and suicidal ideation, suicide prevention is important even after sustained abstinence. It is important to monitor suicide risk not only in depressed patients but also in individuals with sleep symptoms without depressive symptoms. Treatment of insomnia among alcohol dependent individuals is complicated by cross-dependence between alcohol and benzodiazepines, a common treatment for insomnia (Arnedt et al., 2007). Although insomnia caused by psychiatric disorders is important, it should also be screened for and treated independent of psychiatric distress. Treating insomnia, regardless of cause, is also important for patients' wellbeing.

This study was cross-sectional, limiting causal inferences. No objective measures of sleep-related physiology were included (e.g., polysomnography), and discrepancies with subjective and objective measures are common (Conroy et al., 2006). However, polysomnography is not required to assess insomnia (Chesson et al., 2000) and subjective sleep measures are associated with relapse (Brower, 2003). Participants were instructed to report on sleep problems, suicide, and drinking behaviors in the time period immediately before entering treatment, and it is unknown how recall biases may have affected results. Most participants had been abstinent for at least a month at the time of assessment, and the impact of withdrawal symptoms on observed sleep problems in this study is unknown. Additionally, the study was based on adults in treatment in Warsaw, Poland and may not be generalizable. We examined suicidal ideation, and results may not apply to more significant suicidality. Another limitation is that patients with significant psychiatric symptoms are in Poland referred to psychiatric units. As a result, the depressive and other psychiatric symptoms may be lower in this sample than in the alcohol dependent population as a whole.

In conclusion, AIS-measured insomnia severity was associated with suicidal ideation among alcohol-dependent Polish patients after controlling for psychiatric symptoms. In addition to the known relationship between insomnia and relapse (Brower, 2001), this study highlights another salient reason to screen for insomnia and to investigate potential consequences of poor sleep in this population.

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Table 1

Comparison between groups with and without current suicidal ideation in a sample (n = 282) of alcohol-dependent patients.

	Current Suicide Ideation (n = 67)	No Current Suicide Ideation (n = 215)		Logistic Regression Modeling ^a
	Mean (S.D.)	Mean (S.D.)	p ^b	OR (95% CI)
AIS	11.1 (6.1)	7.3 (4.6)	< 0.001	2.03 (1.53, 2.70)
SDQ7	15.4 (7.6)	11.1 (6.9)	< 0.001	1.82 (1.37, 2.41)
Age	44.1 (0.5)	42.8 (9.5)	0.33	1.15 (0.87, 1.53)
Drinking Days (TLFB)	30.3 (28.5)	30.9 (26.2)	0.88	0.98 (0.74, 1.29)
Social Support (MOSSSS)	58.1 (19.0)	64.5 (17.3)	0.01	0.69 (0.52, 0.92)
Brief Symptom Inventory ^c	85.6 (43.3)	45.7 (36.8)	< 0.001	2.61 (1.93, 3.55)
	%	%		OR (95% CI)
Gender (males)	80.6	74.0	0.27	1.46 (0.74, 2.88)

(OR- Odds Ratio, AIS - Athens Insomnia Scale, SDQ7 - Sleep Disorders Questionnaire – 7, TLFB -Alcohol Time-Line Follow-Back Interview, MOSSSS -Medical Outcomes Study Social Support Scale)

^a All continuous variables were modeled as standardized z-score variables for regression analysis.

^b p-values from two-sided t-tests and chi-square tests

^c A measure of general psychopathology; suicidal ideation and sleep questions were removed from the total score.

Table 2

Association of sleep and other covariates with current suicidal ideation in a sample of alcohol-dependent patients; multivariate logistic regression models, $n = 282$.^a

Sleep Measure	AIS		SDQ-7	
	Without psychiatric symptoms	With psychiatric symptoms	Without psychiatric symptoms	With psychiatric symptoms
Pseudo r^2	0.104	0.179	0.075	0.167
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Insomnia	2.02 (1.50, 2.71)*	1.47 (1.05, 2.06)*	1.73 (1.29, 2.32)*	1.22 (0.88, 1.70)
Age	1.14 (0.84, 1.55)	1.23 (0.90, 1.68)	1.09 (0.81, 1.47)	1.21 (0.89, 1.66)
Gender (males)	1.36 (0.66, 2.77)	1.63 (0.76, 3.50)	1.37 (0.67, 2.77)	1.68 (0.79, 3.61)
Drinking Days (TLFB)	0.86 (0.64, 1.16)	0.96 (0.70, 1.31)	0.93 (0.69, 1.24)	1.02 (0.75, 1.39)
Social Support (MOSSSS)	0.77 (0.57, 1.04)	0.93 (0.68, 1.28)	0.75 (0.56, 1.02)	0.93 (0.68, 1.27)
Brief Symptom Inventory ^b	--	2.29 (1.61, 3.27)*	--	2.48 (1.74, 3.52)*

(AOR- Adjusted Odds Ratio, AIS - Athens Insomnia Scale, SDQ-7 - Sleep Disorders Questionnaire – 7, TLFB - Time-Line Follow-Back Interview, MOSSSS -Medical Outcomes Study Social Support Scale).

* $p < 0.05$

^a All continuous variables were modeled as standardized z-score variables.

^b A measure of general psychopathology; suicidal ideation and sleep questions were removed from the total score.