Full length article

Insomnia severity as a mediator of the association between mental health symptoms and alcohol use in young adult veterans

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A B S T R A C T

Purpose: Prior research has documented associations between mental health and alcohol use, mental health and insomnia, and insomnia and alcohol use. This study examined insomnia severity as a mediator of the association between mental health and alcohol-related outcomes in young adult veterans.
Procedures: Veterans aged 18–34 years ($N = 622$, 83% male) who reported drinking in the past year completed assessments at baseline and one-month follow-up as part of a larger intervention trial. Participants reported symptoms of depression and posttraumatic stress disorder (PTSD) at baseline, insomnia severity at one month, and alcohol use and related consequences at baseline and one month. Mediation analyses using bootstrapped confidence intervals were used to examine the indirect effects of baseline mental health symptoms on alcohol-related outcomes at one month via insomnia severity.
Main findings: Insomnia severity was associated with both drinking quantity and alcohol-related consequences. Greater depressive (but not PTSD) symptoms were associated directly with more alcohol-related consequences. Neither depressive nor PTSD symptoms had direct effects on drinking quantity when controlling for the other mental health symptoms (e.g., depressive symptoms did not predict drinking quantity when controlling for symptoms of PTSD). However, symptoms of depression and PTSD predicted drinks per week and alcohol-related consequences indirectly through insomnia severity.
Conclusions: Symptoms of depression and PTSD increase risk for alcohol use and related consequences in part by increasing symptoms of insomnia. Findings suggest that insomnia may be an appropriate target for prevention and intervention efforts among heavy-drinking Veterans reporting symptoms of depression or PTSD.

1. Introduction

Excessive alcohol consumption is one of largest barriers to physical and mental health in the nation, costing the United States (US) approximately $223 billion per year (CDC, 2016). It is especially concerning among military personnel, 20% of whom report consumption of five or more drinks in one occasion every week in the last month (Bray, 2013; Brown et al., 2010). Heavy-drinking service members (defined as 7/14 + drinks per week in the past year for women/men) report higher levels of general stress (63.4%), anxiety (32.9%), depression (20.8%), posttraumatic stress (PTSD; 13.2%), and suicidal ideation (10.5%) than their lower-drinking counterparts; yet few (< 1%) report interest in alcohol treatment in the next six months (Barlas et al., 2013). Such high

rates of mental health disorders in comparison to civilian samples (Rudd et al., 2011; Widome et al., 2011), combined with the perceived stigma of mental health treatment (Britt et al., 2008; Vogt et al., 2014), place heavy-drinking service members and Veterans at increased risk for negative health outcomes.

A range of co-occurring mental health symptoms contribute to the burden of alcohol use on the US healthcare system. Symptoms of depression and PTSD, for example, have been associated with relapse to problematic drinking among service members and Veterans who had remitted naturally over time (Williams et al., 2015). They have also been associated with a greater number of drinking-related symptoms among Veterans with alcohol use disorders (Fuehrlein et al., 2014). Moreover, drinking to cope with negative affect has been associated

with an increase in alcohol-related consequences among service members and Veterans, both in college (Whiteman and Barry, 2011) and in hospital settings (McDevitt-Murphy et al., 2015). Studies at the daily level are also consistent with self-medication models (Khantzian, 2003), in that elevations in PTSD symptoms during the day are associated with increases in alcohol use and related problems that evening (Gaher et al., 2014; Langdon et al., 2016). Collectively, these findings suggest that symptoms of depression and PTSD significantly increase risk for heavy drinking and alcohol-related consequences among military service members and Veterans.

One symptom that is shared across multiple mental health disorders – and, therefore, may play a transdiagnostic role in alcohol use outcomes – is difficulty falling or staying asleep. Depression and PTSD have both been linked to symptoms of insomnia in military and Veteran populations (Jenkins et al., 2015; Seelig et al., 2010). In turn, symptoms of insomnia have been linked to heavy drinking and alcohol-related consequences among military samples. For example, poor sleep quality is a concurrent predictor of heavy alcohol consumption (Swinkels et al., 2013), and short sleep duration (< 6 h) predicts heavy and unintentional drinking in returning Veterans (Luxton et al., 2011). Insomnia severity has also been associated cross-sectionally with alcohol-related consequences among those exposed to combat (Wright et al., 2011). In longitudinal studies, decreased pre-deployment sleep has been associated with higher risk of post-deployment depression and PTSD (Seelig et al., 2010), and difficulty falling/staying asleep has been found to predict relapse to problem drinking up to three years later among military personnel and Veterans who had naturally remitted (Williams et al., 2015).

The longitudinal associations between insomnia and mental health – and their respective and combined effects on alcohol use among military samples – are complex and not well understood. This is likely due in part to the fact that these symptoms are often difficult to tease apart. For example, there is some evidence that insomnia moderates the impact of combat exposure on PTSD and alcohol use, such that combat exposure is associated with PTSD symptoms and hazardous drinking only among those reporting high levels of insomnia (Wright et al., 2011). This suggests that insomnia compounds the negative impact of certain military experiences (i.e., combat) on health-related outcomes. However, it is also possible that insomnia helps explain the association between health-related outcomes (e.g., PTSD, depression) and subsequent alcohol use. Specifically, the racing and/or intrusive thoughts associated with depression and PTSD may compound problems falling asleep at night, both at bedtime and during nighttime awakenings. Such disturbed sleep may increase use of alcohol as a sedative as well as risk for alcohol-related problems (Swinkels et al., 2013; Williams et al., 2015). Indeed, there is cross-sectional evidence that mental health symptoms (defined as a combination of depression, anxiety, and stress) may impact alcohol use and related consequences indirectly through poor sleep quality in civilian samples (Kenney et al., 2013). Thus, symptoms of PTSD and depression may lead to sleep problems that then exacerbate heavy drinking and alcohol-related consequences.

The current study tested three hypotheses. First, given previous research linking mental health to alcohol use outcomes (Fuehrlein et al., 2014; Williams et al., 2015), we hypothesized that baseline symptoms of depression and PTSD would predict alcohol use and related consequences one month later. Second, we expected symptoms of depression and PTSD to predict greater insomnia severity at one month (Jenkins et al., 2015; Seelig et al., 2010). Finally, we hypothesized that insomnia severity at one month would mediate the association between baseline symptoms of both depression and PTSD and alcohol use and consequences reported one month later.

2. Method

2.1. Participants and procedure

Veterans aged 18–34 years were recruited using targeted Facebook ads as part of a larger randomized controlled trial examining the efficacy of a personalized normative feedback alcohol intervention for Veterans at one-month follow-up (Pedersen et al., in press; National Institutes of Health Clinical Trial NCT02187887). Participants were eligible for the study if they (a) were a U.S. Veteran currently separated from active duty, (b) were between the ages of 18 and 34 years, and (c) scored 3/4+ (for women/men) on the Alcohol Use Disorders Identification Test (Saunders et al., 1993). A total of 1177 individuals responded to the ads and provided informed consent. Of those, 784 participants with reliable demographic information completed the baseline assessment and were randomized to receive either the intervention ($n = 388$) or an attention control ($n = 396$). One month later, 622 participants (79%) completed the online follow-up survey. All surveys were completed online from remote locations, and all procedures were approved by the institutional review board.

2.2. Measures

2.2.1. Demographic information

Participants provided information regarding age, gender, race, ethnicity, and branch of service. Combat exposure and severity were assessed using an 11-item scale used in prior work with service members and veterans (Hoge et al., 2004; Schell and Marshall, 2008). After indicating (*yes/no*) if they had been exposed to combat during deployment, participants indicated (*yes/no*) if they had been exposed each of 11 potential combat experiences (e.g., "being responsible for the death of a civilian"). Affirmative responses were summed to calculate combat severity. This measure has been used in previous studies documenting the association between combat severity and mental health problems among returning service members (Schell and Marshall, 2008) and had adequate reliability in this sample ($\alpha = 0.78$).

2.2.2. Alcohol use

Participants completed the Daily Drinking Questionnaire, a reliable measure of drinking quantity and frequency that has demonstrated criterion-related validity in young adult samples (Collins et al., 1985; Sobell and Sobell, 2003), at baseline and one-month follow-up. Using a seven-day grid, participants indicated the number of drinks they had consumed on each day of a typical week in the past month. Values were summed to create the drinks per week variable.

2.2.3. Alcohol-related consequences

Participants completed the 24-item Brief Young Adult Alcohol Consequences Questionnaire (Kahler et al., 2008; Kahler et al., 2005) at baseline and one-month follow-up. Each participant indicated (*yes/no*) if they had experienced each consequence (e.g., "felt sick to my stomach or thrown up") after drinking in the past month. Affirmative responses were summed to create the alcohol-related consequences variable. This instrument has demonstrated strong psychometric properties in young adult samples (Kahler et al., 2005), and reliability in this sample was high ($\alpha = 0.94$).

2.2.4. Symptoms of depression

Symptoms of depression were assessed at baseline using the Patient Health Questionnaire-8 (PHQ-8; Kroenke et al., 2009). Participants indicated the frequency with which they had been bothered by eight depressive symptoms (e.g., "little interest or pleasure in doing things") in the past two weeks. Response options ranged from 0 (*not at all*) to 3 (*nearly every day*) and were summed to create the total symptom severity score used in statistical analyses. Internal consistency was high in this sample ($\alpha = 0.93$). For descriptive purposes, a cut-off score ≥ 10