



Thwarted belongingness as an explanatory link between insomnia symptoms and suicidal ideation: Findings from three samples of military service members and veterans

Melanie A. Hom^{a,*}, Carol Chu^a, Matthew E. Schneider^a, Ingrid C. Lim^b, Jameson K. Hirsch^c, Peter M. Gutierrez^{d,e}, Thomas E. Joiner^a

^a Department of Psychology, Florida State University, United States

^b Office of the Army Surgeon General, United States

^c Department of Psychology, East Tennessee State University, United States

^d Rocky Mountain Mental Illness Research, Education and Clinical Center, Denver Veterans Affairs Medical Center, United States

^e Department of Psychiatry, University of Colorado School of Medicine, United States

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ABSTRACT

Background: Although insomnia has been identified as a robust predictor of suicidal ideation and behaviors, little is known about the mechanisms by which sleep disturbances confer risk for suicide. We investigated thwarted belongingness as an explanatory link between insomnia symptoms and suicidal ideation across three military service member and veteran samples.

Methods: Data were collected among United States military service members and veterans ($N_1=937$, $N_2=3,386$, $N_3=417$) who completed self-report measures of insomnia symptoms, thwarted belongingness, suicidal ideation, and related psychiatric symptoms (e.g., anxiety, hopelessness). Bias-corrected bootstrap mediation analyses were utilized to examine the indirect effects of insomnia symptoms on suicidal ideation through thwarted belongingness, controlling for related psychiatric symptoms.

Results: Consistent with study hypotheses, thwarted belongingness significantly accounted for the relationship between insomnia and suicidal ideation across all three samples; however, insomnia symptoms did not significantly account for the relationship between thwarted belongingness and suicidal ideation, highlighting the specificity of our findings.

Limitations: This study utilized cross-sectional self-report data.

Conclusions: Insomnia may confer suicide risk for military service members and veterans, in part, through the pathway of thwarted belongingness. Additional prospective studies are warranted to further delineate this model of risk. Our results offer a potential therapeutic target for the prevention of suicide, via the promotion of belongingness, among service members and veterans experiencing insomnia symptoms.

1. Introduction

In the past decade, rates of suicide and suicide attempts have increased among United States military personnel (LeardMann et al., 2013; Ramchand et al., 2011) and veterans (Department of Veterans Affairs Office of Public and Intergovernmental Affairs, 2016; LeardMann et al., 2013). Currently, the prevalence of suicidal behaviors among service members exceeds rates found among matched civilian populations (Nock et al., 2014, 2015; Ursano et al., 2015a, 2015b). In response, there has been a call for increased suicide prevention efforts among both military personnel and veteran popula-

tions (Kuehn, 2009; Ramchand et al., 2011). To inform these efforts and illuminate potential points of intervention, there is a critical need to identify suicide risk factors and to understand the pathways by which these factors lead to suicidal thoughts and behaviors.

Among the most robust risk factors for suicide is insomnia (see Bernert et al. (2015) and Pigeon et al. (2012b) for review). For instance, insomnia has been repeatedly shown to predict future suicidal ideation (Wong and Brower, 2012; Wong et al., 2011) as well as death by suicide (Bernert et al., 2014; Goldstein et al., 2008; Kodaka et al., 2014). This association has also been demonstrated among military service members and veterans. For example, a study by Ribeiro et al.

* Corresponding author.

E-mail address: hom@psy.fsu.edu (M.A. Hom).

(2012) found that insomnia symptoms predicted suicidal ideation among a sample of military service members above and beyond other risk factors (e.g., hopelessness, depression, diagnosis of posttraumatic stress disorder [PTSD]). In another study, veteran suicide decedents who reported sleep disturbances at their last health care visit died within a shorter period of time after this visit than those without sleep disturbances (Pigeon et al., 2012a). These findings highlight insomnia as a critical warning sign for suicide among service members and veterans.

Given this well-established link, there is a strong rationale to better understand the pathways by which insomnia and sleep disturbances confer risk for suicide among military service members and veterans, especially since insomnia is highly prevalent in these populations (Capaldi et al., 2011; Kroenke et al., 1998; Lewis et al., 2009; Miller et al., 2011; Neylan et al., 1998; Peterson et al., 2008; Seelig et al., 2010). Since few studies to date have empirically tested the mechanisms underlying the association between insomnia and suicide risk, a theoretical approach may provide a useful framework for exploring this relationship.

The interpersonal theory of suicide (Joiner, 2005; Van Orden et al., 2010), which has amassed growing empirical support (e.g., Bryan et al., 2010; Christensen et al., 2013; Cukrowicz et al., 2013; Czyz et al., 2014; Joiner and Van Orden, 2008), may provide one possible explanation for the robust connection between insomnia and suicide risk. This theory proposes that lethal and near-lethal suicide attempts occur when an individual has both the desire and capability for suicidal behavior. Suicidal desire emerges when thwarted belongingness (i.e., the feeling that one does not belong) and perceived burdensomeness (i.e., the belief that one's death is worth more than one's life) co-occur. Capability for suicide is characterized by increased pain tolerance and fearlessness about death.

Using the interpersonal theory as a guide, insomnia may confer risk for suicide specifically by increasing feelings of thwarted belongingness. Since insomnia is defined by recurrent difficulties falling asleep, staying asleep, and/or waking up too early (American Psychiatric Association, 2013), those suffering from insomnia are likely to experience extended periods of wakefulness during hours when the majority of the population is asleep. This experience may itself be lonely. Clinically significant insomnia also leads to functional impairment, including minor irritations and interferences in one's social life and relationships (see Sateia et al. (2000) and Shochat et al. (2014) for review). For example, studies have found that poor sleep is associated with difficulties both establishing and maintaining relationships (Roberts and Duong, 2013; Roberts et al., 2001). This may then result in isolation and feelings of loneliness. Furthermore, inadequate sleep is related to impaired emotion regulation abilities (see Walker, 2009, for review). Indeed, studies have shown that individuals with poor sleep quality may have greater difficulties reappraising negative situations (Mauss et al., 2013) and chronic sleep restriction may impact the effective regulation of emotions (Baum et al., 2014). These difficulties may, in turn, increase individuals' vulnerability to maladaptive thoughts about their belongingness. Taken together, chronic insomnia may contribute to feelings of loneliness (cf. thwarted belongingness), resulting in elevated suicidal desire and, ultimately, greater suicide risk.

Findings from recent studies support this proposed pathway. Our research group has found both a cross-sectional and prospective relationship between insomnia symptoms and loneliness across six samples, including undergraduates, community-dwelling adults, and military personnel. Similarly, Chu et al. (2016) not only reported a significant association between insomnia symptoms and thwarted belongingness but also demonstrated that thwarted belongingness significantly accounted for the association between insomnia and suicidal ideation in a sample of South Korean university students. Chu et al. (in press) replicated these findings across four additional samples—U.S. undergraduates, adult mental health outpatients, fire-

fighters, and adult primary care patients—and demonstrated that this pattern of findings remained even after controlling for anxiety symptoms. Finally, Nadorff et al. (2014) examined the relationship between insomnia symptoms, interpersonal theory constructs, and suicide risk in two undergraduate samples. Interpersonal theory constructs did not significantly account for the relationship between insomnia symptoms and suicidal ideation in one of the samples. However, in the other sample, this relationship was no longer significant after controlling for interpersonal theory constructs. These findings suggest that interpersonal theory constructs, including thwarted belongingness, may serve as an explanatory link between insomnia and suicide risk. Consistent with this assertion, a study of older adults also revealed that insomnia symptoms were no longer related to suicide risk after controlling for interpersonal theory variables (Golding et al., 2015). However, these equivocal results emphasize the need for further investigation into the relationship between these symptom constellations.

1.1. The present investigation

In considering the (1) relatively high rates of suicidal thoughts and behaviors among military service members and veterans, (2) prevalence of sleep disturbances in these populations, and (3) vast body of evidence identifying insomnia as a potent suicide risk factor, empirical exploration of the mechanisms underlying the relationship between insomnia and suicide risk among service members and veterans is indicated. As such, we investigated whether thwarted belongingness may serve as an explanatory link between insomnia symptoms and suicidal ideation across three large samples of military service members and veterans. Based on prior research and propositions of the interpersonal theory of suicide, we hypothesized that (1) insomnia symptom severity would be associated with more severe suicidal ideation and greater thwarted belongingness, and (2) thwarted belongingness would significantly account for the relationship between insomnia symptoms and suicidal ideation, controlling for related psychiatric symptoms. To evaluate the specificity of effects, we conducted secondary analyses to examine whether insomnia symptoms may serve as an explanatory link in the association between thwarted belongingness and suicidal ideation.

Consistent with similar studies, we controlled for symptoms associated with both sleep problems and suicide risk. Specifically, where possible, we controlled for: (1) anxiety sensitivity and anxiety symptoms (Capron et al., 2012; Hendin et al., 2007; Johnson et al., 2006); (2) perceived burdensomeness (Christensen et al., 2013; Cukrowicz et al., 2013; Nadorff et al., 2014); and (3) general hopelessness (Beck et al., 1989, 1985; Woosley et al., 2014). We also controlled for depression symptoms where possible (Brown et al., 2000; Cavanagh et al., 2003); however, these analyses were exploratory in light of evidence for conceptual and empirical problems with controlling for depression in analyses predicting suicidal ideation (Rogers et al., 2016). Lastly, though less is known about perceived burdensomeness' role in the insomnia and suicidal ideation relationship, this construct is posited as necessary for the emergence of suicidal desire (Joiner, 2005; Van Orden et al., 2010). Thus, where possible, we conducted exploratory analyses examining: (1) thwarted belongingness and perceived burdensomeness as parallel explanatory factors and (2) whether perceived burdensomeness moderated thwarted belongingness' mediating effects. All participants provided informed consent prior to study participation, and relevant Institutional Review Boards approved procedures for each study.

2. Study 1

In Study 1, we tested the mediating role of thwarted belongingness in the relationship between insomnia symptoms and suicidal ideation, controlling for hopelessness and anxiety sensitivity, in a sample of military services members and veterans.

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