



Insomnia symptoms and suicidality in the National Comorbidity Survey – Adolescent Supplement



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ABSTRACT

Objective: In this paper, we examined the relationship between insomnia symptoms and suicidality in a national sample of US adolescents, while controlling for several psychiatric disorders that are known to be associated with suicidality. Additionally, we examined whether insomnia symptoms interact to affect any suicidality variables.

Methods: Study participants were 10,123 adolescents between the ages of 13–18 from the National Comorbidity Survey – Adolescent Supplement (NCS-A).

Results: In bivariate analyses, all insomnia symptoms (i.e., difficulty falling asleep, difficulty staying asleep, and early morning awakening) were associated with suicide ideation, plan and attempts. In multivariate analyses, controlling for substance use, mood and anxiety disorders, as well as important covariates, difficulties falling and staying asleep had a significant relationship with 12-month and lifetime suicide variables while early morning awakening did not.

Conclusions: Two of the three insomnia symptoms had a significant association with suicide thoughts and plan even after controlling for psychiatric disorders that were known to affect suicidality. Having trouble falling sleeping or staying asleep had both direct and indirect relationships (via substance use, mood and anxiety disorders) on suicidal behavior. Assessment and treatment of sleep disturbances may reduce the risk for suicidality in adolescents.

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1. Introduction

According to Center for Disease Control and Prevention, suicide is the third leading cause of death for youth between the ages of 10–24 (Center for Disease Control and Prevention, 2015). Current research demonstrates that sleep problems are concurrently associated with, and longitudinally predict, suicidality¹ in both adolescents and adults (Bernert et al., 2015; Pigeon et al., 2012). Yet no adolescent study examined the relationship between sleep problems and suicidality while controlling for the presence of psychiatric disorders.

Sleep difficulties and insufficient sleep are common among our nation's youth. The National Sleep Foundation found that approximately 60% of 6th to 8th graders did not sleep the recommended

9 h per night on school nights (National Sleep Foundation, 2006). Less than 10% of 9th to 12th graders reported getting this recommended amount in the same study. This is likely due to a combination of biopsychosocial and contextual factors (Becker et al., 2015).

Both sleep homeostasis and circadian timing show marked changes in adolescence (Carskadon and Tarokh, 2013). Compared to younger children, the pressure to fall asleep after a period of wakefulness builds up more slowly in adolescents (Jenni et al., 2005; Taylor et al., 2005). Moreover, the circadian system appears to move to a delayed position (Carskadon et al., 1993, 2004). These changes result in a preference for eveningness and later bedtimes, even though the need to sleep does not change. 24/7 access to information via phone and computers leads to late-night arousal and prolonged light exposure (National Sleep Foundation, 2011). Increased academic demands and early school start time also decrease the amount of sleep time on school nights and increase the need to catch up on weekend (Becker et al., 2015; Carskadon and Tarokh, 2013). Insufficient and irregular sleep may have serious consequences on adolescent health. The brain undergoes

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¹ In this paper, suicidality refers to suicidal thoughts, plans, and attempts.

considerable growth and development in adolescence (Becker et al., 2015; Dahl and Lewin, 2002). Insufficient sleep and sleep difficulties may affect this development, potentially put the adolescents at risk for a trajectory of physical, emotional and mental health problems (Colrain and Baker, 2011; Hasler et al., 2015; Shochat et al., 2014).

A significant relationship between sleep problems and suicidality has been observed in adolescents. Sleep problems were associated with suicidal thoughts (Bailly et al., 2004; Barbe et al., 2005), attempts (Bailly et al., 2004; Nrugham et al., 2008), and suicide (Goldstein et al., 2008). Nightmares have been linked to both suicidal thoughts (Choquet and Menke, 1990; Liu, 2004) and suicide attempts (Koyawala et al., 2015; Liu, 2004). These relationships have been found in clinical samples (Barbe et al., 2005) as well as population and community samples (Liu, 2004; Nrugham et al., 2008).

Several prospective studies have found that sleep problems predicted subsequent suicidal behaviors in community samples. In a study of Norwegian adolescents ($N = 265$; Nrugham et al., 2008), sleep problems at age 15 predicted suicide attempts between ages 15–20. However, the relationship became non-significant after controlling for baseline suicidal thoughts and depressive symptoms. Another study reported a longitudinal relationship between sleep difficulties and suicidality in a community sample of 392 children of alcoholics and controls (Wong et al., 2011). Controlling for gender, parental alcoholism, parental suicidal thoughts, child's depressive symptoms, nightmares, aggressive behaviors, substance-related problems, as well as suicidal thoughts and self-harm behaviors at ages 12–14, having trouble sleeping at ages 12–14 significantly predicted suicidal thoughts and self-harm behaviors at ages 15–17. Two additional studies used data from the National Longitudinal Study of Adolescent Health to examine the relationship between sleep problems and suicidality. In this nationally representative sample, sleep problems longitudinally predicted a new incidence of suicide thoughts of attempts among subjects with no frequent depressive symptoms ($N = 4494$) (Roane and Taylor, 2008). Additionally, sleep problems predicted subsequent suicidal thoughts and attempts in all subjects ($N = 6504$), even after controlling for alcohol-related problems, illicit drug use, depressive symptoms, chronic physical problems and demographic variables including gender, age, race, education and poverty status (Wong and Brower, 2012).

Sleep problems are symptoms of many psychiatric disorders (e.g., mood, anxiety disorders and substance use disorders (SUD)) (American Psychiatric Association, 2013). These disorders are correlated with suicide thoughts and attempts in adolescence (Pena et al., 2012; Wolitzky-Taylor et al., 2010). Thus an important question is whether sleep problems are associated with suicidality after these psychiatric disorders are controlling for. If the relationship between sleep and suicidality is non-significant once psychiatric disorders are taken into account, then relationship is likely due to the presence of these disorders. However, if the relationship between sleep problems and suicidality remains significant even after controlling for these psychiatric disorders, then sleep problems are an independent risk factor of suicidality. To our knowledge, only one adult study had examined the relationship between sleep difficulties and suicidality while controlling for the

presence of psychiatric disorders (Wojnar et al., 2009). No adolescent studies has focused on this issue.

The present study analyzed data from the National Comorbidity Study - Adolescent Supplement (NCS-A), examining whether sleep problems (i.e., problems falling or maintaining asleep, and early morning awakening) have a significant relationship with suicidal thoughts, plans and attempts while controlling for mood, anxiety and SUD.² Chronic physical conditions and important demographic variables such as gender, age, ethnicity, education and poverty were also controlled for in the analyses. While similar work has been conducted among adults (Wojnar et al., 2009), no such work has been done in nationally representative samples of adolescents. Additionally, we examined whether different symptoms of insomnia have an additive or a multiplicative effect on suicidal behavior (Kessler et al., 1999; Pena et al., 2012).

Even though data from NCS-A are cross-sectional, they offer a unique opportunity to examine the relationship between sleep problems and suicidality while controlling for psychiatric disorders that are known to be associated with both variables. We hypothesized that insomnia symptoms and suicidality would be significantly correlated after controlling for known correlates.

2. Methods

2.1. Participants

Study participants were 10,123 adolescents from the National Comorbidity Survey Replication Adolescent Supplement (NCS-A). NCS-A is a nationally representative epidemiological face-to-face survey of U.S. adolescents between the ages of 13–18 (Kessler et al., 2009a, b; Merikangas et al., 2009). The survey was conducted between February 2001 and January 2004. It used a dual-frame sampling design – 904 adolescent residents from the households that participated in the National Comorbidity Study Replication (NCS-R) and 9244 adolescent students from a representative sample of 320 schools in the same nationally representative sample of counties as the NCS-R (Kessler et al., 2009b). NCS-A was designed to provide estimates of lifetime and current prevalence, age-of-onset, course, comorbidity, risk and protective factors, as well as services utilization patterns for DSM-IV mental disorders. The survey used a modified version of the World Health Organization Composite International Diagnostic Interview (CIDI). Details regarding the background, measures and study design of NCS-A have been described in other publications (Kessler et al., 2009a, b; Merikangas et al., 2009).

2.2. Measures

This study analyzed data on sleep problems (i.e., difficulty initiating sleep, difficulty maintaining sleep and early morning awakening) and suicidal behavior (i.e., suicide ideation, plans and attempts). Important covariates (i.e., SUD, mood and anxiety disorders, serious physical problems that may affect sleep) and demographics characteristics of participants (e.g., age, gender) were controlled for in all analyses.

2.2.1. Sleep problems

Participants were asked whether they had any one of the three problems with their sleep that lasted two weeks or longer in the past 12 months: (1) Problem falling asleep (PFA) – “Problems getting to sleep, when nearly every night it took you a long time to fall asleep?”; (2) Problem staying asleep (PSA) – “Problems staying asleep, when you woke up nearly every night and took a long time to get back to sleep?”; (3) Early morning awakening (EMA) – “Problems waking too early, when you woke up nearly every

² Attention deficit hyperactivity disorder (ADHD) is associated with both sleep problems (Konofal et al., 2010) and suicidality (Hurtig et al., 2012; Impey and Heun, 2012). In analyses not shown here, we controlled for the effects of both 12-month and lifetime ADHD on suicide thoughts, plan and attempts. However, we did not find any significant relationship between ADHD and suicide variables. We therefore decided not to include ADHD in the analyses presented in the paper.

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