



The indirect effects of sleep hygiene and environmental factors on depressive symptoms in college students



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ARTICLE INFO

Article history:

Received 11 December 2015

Received in revised form 25 January 2016

Accepted 28 January 2016

Keywords:

College

Sleep

Sleep hygiene

Depressive symptoms

ABSTRACT

Objective: Because of the interrelation of sleep disturbance and depression in college students, sleeping environments and sleep hygiene practices have emerged as potential avenues for intervention. To understand associations between predictors of sleep (environmental noise disturbances, pre-bedtime media use, sleep hygiene), poor sleep quality, and depressive symptoms, this study examined poor sleep quality as a potential mediator between these predictors and depressive symptoms.

Design: Cross-sectional.

Setting: Residential colleges/universities.

Participants: The sample was collected during the spring of 2015 and was comprised of 335 college students (mean age = 19.9 years, SD = 1.9), including both students living with roommates and students living alone.

Measurement: A multiple-group path analysis was conducted based on self-report and online questionnaires.

Results: Environmental noise disturbances and emotionally-related sleep hygiene practices were indirectly associated with higher depressive symptoms across students living either with or without roommates. Furthermore, students living alone evidenced an indirect association between cognitively-related sleep hygiene practices and depressive symptoms, whereas students living with roommates evidenced indirect associations between both physiologically and environmentally-related sleep hygiene practices and depressive symptoms.

Conclusions: Sleep hygiene and environmental factors may be potential avenues for preventing depressive symptoms in college students.

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Among the many challenges that college students face, mental health concerns and sleep are intricately interrelated. With prevalence rates estimated to be approximately 30%, depressive disorders are one of the most common mental health issues for college students.^{1,2} The negative effects of depressive disorders in students include increased risk for substance abuse and suicide.^{3,4} Research also supports a strong link between poor sleep quality and depressive symptomatology, which is most likely bidirectional in nature.^{5–7} In addition to the high rates of depressive symptoms in this population, approximately 60% of college students report sleep problems,^{8,9} and some of the most extensively documented consequences of such problems include academic and alcohol-related problems.^{10,11}

The current study sought to examine these associated problems facing college students by exploring their links to a number of predictors in the context of a mediational model. Specifically, this study focused on sleep hygiene and environmental disturbances to sleep as predictors of both sleep disturbance and depressive symptoms.

Because of the relative paucity of studies that have examined these constructs (for exceptions, see Brown et al¹² and Gellis et al¹³), understanding both environmental and sleep hygiene-related influences on college students' poor sleep quality remains an important avenue toward preventing and treating mental health issues in this population. Accordingly, the current study examined college students' sleep disturbance as a potential mechanism of the indirect associations between environmental and sleep hygiene-related factors and depressive symptoms.

Predictors of sleep problems

Sleep environment

Fundamental to college students' sleep are both their sleep environment and their sleep hygiene practices. The sleep environment is typically defined by the physical space and related aspects of the context in which sleep occurs (eg, noise, temperature). One aspect of the sleep environment that is often overlooked is the presence of a roommate. According to the American Council on Education, approximately 20% of college students live in residence halls, and

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research suggests that students living in 2-bed residence hall rooms (ie, living with a roommate) most commonly endorse sleep environment disturbances that include noise within residence halls.¹⁴ Specific to living with a roommate, common complaints include lights left on in the dormitory room and noises associated with electronic media (eg, cell phones). Given the propensity for roommates to perturb the sleep environment above and beyond living in a dormitory, their inclusion in research on college sleep remains underused, especially because such environmental factors have been linked to higher levels of sleep disturbance.^{13,14}

Sleep hygiene

In addition to environmental disturbances, students' sleep hygiene (ie, behaviors that influence and support sleep) potentially plays an integral role in their sleep quality.^{12,13,15} Specifically, college students tend to have little understanding of sleep hygiene practices,¹⁵ and this lack of knowledge often results in poor sleep quality.^{12,13} Poor sleep hygiene practices typically include excessive physical or cognitive activity before bedtime, daytime naps, being emotionally unsettled or upset around bedtime, or trying to sleep in noisy or bright rooms. Research suggests that such practices negatively impact sleep quality and are associated with clinically significant insomnia.^{13,16}

One aspect of sleep hygiene that has received increasing attention is the use of pre-bedtime media (eg, computers, iPhones, tablets). According to a 2011 survey conducted by the National Sleep Foundation,¹⁷ young adults regularly use mobile phones or other handheld devices (89%) or watch television (50%) in the hour before bedtime. Sleep hygiene practices suggest abstaining from pre-bedtime media use due to the alerting characteristics of screen light.¹⁸ Previous research suggests that screen light can have a negative influence on sleep architecture^{19,20}; however, contrary findings have also emerged. In a cross-lagged study assessing bidirectional effects between sleep disturbance and pre-bedtime media use, researchers found that sleep duration was not associated with media use and instead suggested that college students used electronic media to cope with their sleep problems.²¹ The current study sought to build on this literature by measuring pre-bedtime electronic media use in the hour before bedtime, allowing us to model that factor alongside other environmental and sleep hygiene predictors.

Sleep problems and depressive symptoms

Extensive research supports clear associations between poor sleep quality and depressive symptoms in college-aged students.^{6,22} For example, decreased sleep has been found to be associated with increased depressive symptoms.²³ In addition, students who reported both high levels of sleep disturbance and depressive symptoms endorsed higher levels of anxiety and poorer cognitive and physical functioning.⁶ Students with elevated depressive symptoms have also reported greater levels of fatigue during class and more difficulty with academics.²² Although relatively few studies have examined the directionality of the association between poor sleep quality and depressive symptoms (for an exception, see Brooks et al²³), more recent evidence suggests that the associations are bidirectional.⁷ Given these strong links, however, understanding the predictors of both sleep disturbance and depressive symptoms could provide researchers, clinicians, and university staff avenues of intervention to address both issues. Specifically, understanding the unique links between environmental factors, sleep hygiene practices, and our outcomes (ie, sleep problems and depressive symptoms) could help to identify specific skills or environmental factors that could be targeted to most effectively reduce both sleep disturbance and depressive symptoms on college campuses.

The current study

The current study sought to examine the associations between predictors of poor sleep quality (ie, sleep environment, sleep hygiene practices, pre-bedtime media use), sleep quality, and depressive symptoms in a sample of 335 college students. We posited that poor sleep quality might serve as a more general mechanism to explain associations between an array of environmental factors (ie, environmental noise, screen time) and sleep hygiene behaviors and their predictive links to depressive symptoms. **Hypothesis 1:** We hypothesized that environmental noise disturbances and poor sleep hygiene, including pre-bedtime media use, would be associated with higher levels of sleep disturbance. **Hypothesis 2:** We further hypothesized that higher levels of sleep disturbance would be associated with higher levels of depressive symptoms. **Hypothesis 3:** We hypothesized that sleep hygiene and environmental disturbances would be significantly and indirectly linked to current depressive symptoms through their associations with current sleep disturbance. Given recent findings suggesting that the presence of roommates might impact models of sleep,²⁴ we tested the above hypotheses in a multigroup model that was allowed to freely vary across individuals with and without roommates.

Method

Participants

The mean age of the current sample ($n = 335$, 77% female) was 19.9 years ($SD = 1.9$), and the majority of participants were white (66%), with 20% Asian or Pacific Islander, 6% multiracial, 5% Latino, 2% African American, and 1% Native American. Participants were predominately first- and second-year students, 34% and 30%, respectively, with 21% reporting as juniors, 14% seniors, and 1% in their fifth year or beyond. Finally, 23% of participants reported living off-campus, and 50% reported having at least 1 roommate.

Procedure

The study was approved by an Institutional Review Board, and informed consent was obtained before participation. Participants were recruited from psychology classes from small (<2500 students) and mid-sized (<6000 students) colleges/universities in Upstate New York (75%) and from psychological research Web sites (25%; eg, <http://psych.hanover.edu/research/>). The online survey took roughly 20–25 minutes to complete. As incentives to participate, all respondents were given a chance to win a \$100 cash prize, and eligible participants received course credit for completing the survey.

Measures

Depressive symptoms

Depressive symptoms were assessed with 7 of the 9 items of the Patient Health Questionnaire.²⁵ After removing the items measuring sleep disturbance and fatigue, the remaining 7 items corresponded to the criteria for major depressive disorder in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition—Revised*,²⁶ specifically pertaining to anhedonia, depressed mood, change in appetite, guilt or worthlessness, trouble concentrating, feeling slowed down or restless, and suicidal thoughts. Respondents indicated for each of the 8 depressive symptoms whether, during the previous 2 weeks, the symptom had bothered them: 0 = “not at all” to 3 = “nearly every day.” The continuous variable was the sum of scores of the 7 items ($\alpha = .87$), which ranged from 0 to 21, with higher scores indicating more depressive symptoms.

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