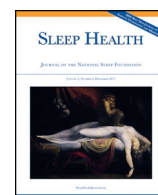




Contents lists available at ScienceDirect

## Sleep Health

Journal of the National Sleep Foundation

journal homepage: [sleephealthjournal.org](http://sleephealthjournal.org)

## Sleep in a large, multi-university sample of college students: sleep problem prevalence, sex differences, and mental health correlates

Stephen P. Becker, PhD<sup>a,b,\*</sup>, Matthew A. Jarrett, PhD<sup>c</sup>, Aaron M. Luebbe, PhD<sup>d</sup>, Annie A. Garner, PhD<sup>e</sup>, G. Leonard Burns, PhD<sup>f</sup>, Michael J. Kofler, PhD<sup>g</sup>

<sup>a</sup> Division of Behavioral Medicine and Clinical Psychology, Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio, USA

<sup>b</sup> Department of Pediatrics, University of Cincinnati College of Medicine, Cincinnati, Ohio, USA

<sup>c</sup> Department of Psychology, University of Alabama, Tuscaloosa, Alabama, USA

<sup>d</sup> Department of Psychology, Miami University, Oxford, Ohio, USA

<sup>e</sup> Department of Psychology, Saint Louis University, St. Louis, Missouri, USA

<sup>f</sup> Department of Psychology, Washington State University, Pullman, Washington, USA

<sup>g</sup> Department of Psychology, Florida State University, Tallahassee, Florida, USA

### ARTICLE INFO

#### Article history:

Received 4 September 2017

Received in revised form 29 December 2017

Accepted 5 January 2018

Available online xxxx

#### Keywords:

ADHD

Anxiety

Depression

Daytime sleepiness

PSQI

Sex differences

University students

### ABSTRACT

**Objectives:** To (1) describe sleep problems in a large, multi-university sample of college students; (2) evaluate sex differences; and (3) examine the unique associations of mental health symptoms (i.e., anxiety, depression, attention-deficit/hyperactivity disorder inattention [ADHD-IN], ADHD hyperactivity-impulsivity [ADHD-HI]) in relation to sleep problems.

**Methods:** 7,626 students (70% female; 81% White) ages 18–29 years ( $M=19.14$ ,  $SD=1.42$ ) from six universities completed measures assessing mental health symptoms and the Pittsburgh Sleep Quality Index (PSQI).

**Results:** A substantial minority of students endorsed sleep problems across specific sleep components. Specifically, 27% described their sleep quality as poor, 36% reported obtaining less than 7 hours of sleep per night, and 43% reported that it takes >30 minutes to fall asleep at least once per week. 62% of participants met cut-off criteria for poor sleep, though rates differed between females (64%) and males (57%). In structural regression models, both anxiety and depression symptoms were uniquely associated with disruptions in most PSQI sleep component domains. However, anxiety (but not depression) symptoms were uniquely associated with more sleep disturbances and sleep medication use, whereas depression (but not anxiety) symptoms were uniquely associated with increased daytime dysfunction. ADHD-IN symptoms were uniquely associated with poorer sleep quality and increased daytime dysfunction, whereas ADHD-HI symptoms were uniquely associated with more sleep disturbances and less daytime dysfunction. Lastly, ADHD-IN, anxiety, and depression symptoms were each independently associated with poor sleep status.

**Conclusions:** This study documents a high prevalence of poor sleep among college students, some sex differences, and distinct patterns of mental health symptoms in relation to sleep problems.

© 2018 National Sleep Foundation. Published by Elsevier Inc. All rights reserved.

### Introduction

College students frequently have poor sleep.<sup>1–3</sup> Using the *Pittsburgh Sleep Quality Index* (PSQI),<sup>4</sup> a commonly used measure of sleep in adults, between 40 and 65% of college students in the United States meet cut-off criteria for poor sleep.<sup>2,5–7</sup> Fewer studies have examined rates of specific sleep components, though it appears

clear that many (if not most) college students obtain insufficient sleep, have an extended sleep onset latency, and experience generally poor sleep quality.<sup>2,3,5</sup> Additional studies are needed to describe rates of sleep problems in college students, particularly as a number of studies have only examined total sleep and not specific sleep components.<sup>3,8–12</sup> Further, most studies that have examined sleep in college students included participants from a single university and often had modest sample sizes.<sup>2,3,5–9,11,13</sup> In the present study, we describe sleep in a sample of 7,626 college students recruited from six universities, making it one of the largest studies to date to describe the sleep patterns and problems in college students in the United States.

\* Corresponding author at: 3333 Burnet Ave., MLC 10006, Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio 45229, USA. Tel.: +1 513 803 2066; fax: +1 513 803 0084.

E-mail address: [stephen.becker@cchmc.org](mailto:stephen.becker@cchmc.org) (S.P. Becker).

Studies using the PSQI report mixed findings regarding possible sex differences in sleep problems among college students. Some studies found no differences in sleep problems between male and female college students,<sup>9,11,14,15</sup> whereas other studies found female college students to have more sleep problems than male college students.<sup>3,7,10,12</sup> The conflicting findings may be due to some studies examining only total sleep,<sup>3,9–12</sup> even though males and females may differ on some domains of sleep but not others. Some studies indicate that females may have poorer sleep than males in the specific domains of sleep quality, sleep duration, sleep disturbances, and daytime dysfunction, though conflicting findings have been reported both across and within extant studies depending on the sleep variables examined.<sup>7,14–16</sup>

It is clear that mental health symptoms are related to poor sleep. What is less clear, however, is whether certain mental health symptoms are more clearly associated with college students' total sleep and/or specific sleep components. In the present study, we focus on anxiety, depression, and attention-deficit/hyperactivity disorder (ADHD) symptoms, as these are three of the most prevalent mental health problems among college students.<sup>17,18</sup> Given the high co-occurrence between anxiety and depression,<sup>19</sup> as well as the high co-occurrence of these internalizing symptoms (anxiety/depression) with ADHD,<sup>20</sup> it is important to examine these mental health domains simultaneously. However, studies examining mental health symptoms in relation to college students' sleep have examined internalizing symptoms (anxiety, depression)<sup>3,10,11,21</sup> or ADHD symptom dimensions (i.e., inattention [IN], hyperactivity-impulsivity [HI]).<sup>5,22</sup> Still other studies have only examined anxiety symptoms<sup>15</sup> or depressive<sup>14,23</sup> symptoms. We are unaware of any study that has simultaneously examined the unique associations of anxiety, depression, and ADHD symptoms in college students.

Depressive symptoms have been examined most frequently in relation to college student sleep, with studies showing depression to be associated with most aspects of sleep. For example, one study found that students with depressive symptoms reported poorer sleep quality, longer sleep onset latency, more night wakings, and greater daytime sleepiness than students without depressive symptoms,<sup>23</sup> and depressive symptoms are also related to college students' insomnia specifically.<sup>14</sup> Studies of university students that considered both anxiety and depressive symptoms have generally found both of these internalizing mental health domains to be associated with poorer sleep quality.<sup>2,10</sup> For instance, in a sample of over 85,000 United States college students, those with co-occurring anxiety and depression (either diagnosed or symptomatic) had the highest occurrence of self-reported sleep problems, and depression/anxiety status was also associated with students more frequently reporting that sleep problems had a negative impact on their academic performance.<sup>24</sup> Conversely, in a recent study of college students that examined both anxiety and depressive symptoms, anxiety symptoms were more clearly associated than depressive symptoms with poorer overall sleep quality, though this study did not examine separate components of sleep.<sup>25</sup> Thus, although there are some mixed findings in the extant literature, the findings are generally such that both anxiety and depressive symptoms are independently associated with poorer sleep in college students.

Fewer studies have examined ADHD symptoms in relation to college students' sleep. One study of college students diagnosed with ADHD did not find ADHD symptom severity to be prospectively correlated with either daytime sleepiness or sleep duration, though separate ADHD symptom dimensions were not examined.<sup>26</sup> Two other studies found ADHD-IN and ADHD-HI symptoms to have differential associations with sleep components. In a sample of 288 college students, Becker et al.<sup>5</sup> found ADHD-IN symptoms to be uniquely related with increased daytime sleepiness, whereas hyperactivity was uniquely associated with poorer sleep quality, longer sleep onset

latency, shorter sleep duration, and greater use of sleep medication. Similarly, Gau et al.<sup>22</sup> found ADHD-IN symptoms to relate to increased daytime sleepiness whereas ADHD-HI symptoms were related to shorter sleep duration in a large sample of college students in Taiwan. It thus appears that ADHD-IN symptoms may be more clearly associated with daytime dysfunction/sleepiness whereas ADHD-HI symptoms may be more clearly associated with nighttime sleep problems. However, neither of these ADHD studies included measures of anxiety or depression in their analyses. Thus, additional studies are needed to examine separate ADHD symptom dimensions in relation to college students' sleep, as well as to simultaneously consider internalizing symptoms.

The present study had three objectives. First, we described rates of PSQI total sleep problems and component sleep problems in a large, multi-university sample of college students, including rates of college students meeting established cut-off criteria for "poor sleep." We expected approximately half of the sample would be classified with poor sleep on the PSQI.<sup>2,5–7</sup> Second, we examined sex differences in sleep, and we hypothesized that females would generally demonstrate poorer sleep than males, particularly in the PSQI domains of sleep quality, sleep duration, sleep disturbances, and daytime dysfunction.<sup>3,7,10,12</sup> Third, we examined the unique associations of anxiety, depression, ADHD-IN, and ADHD-HI symptoms in relation to the PSQI total sleep score and specific PSQI sleep components. We hypothesized that both depression and anxiety symptoms would be uniquely associated with poorer sleep, though we did not make predictions regarding specific sleep components given the absence of literature to guide more specific hypotheses.<sup>2,10,14,23</sup> We also hypothesized that ADHD-IN symptoms would be uniquely associated with increased daytime dysfunction, whereas ADHD-HI symptoms would be uniquely associated with longer sleep onset, more sleep disturbances, and shorter sleep duration.<sup>5,22</sup>

## Methods

### Participants

Participants were 7,626 college students enrolled in six universities in the United States (between 961 and 1,704 students participated at each university). Five of the six universities are public universities, and the universities are located in the Midwest, South, and West regions of the United States. Participants ranged in age from 18 to 29 years ( $M=19.14$ ,  $SD=1.42$ ). As summarized in Table 1, the majority of participants self-identified as female (70%), White (81%), and non-Hispanic (91%). Most participants (59%) were in their first year of college.

### Procedures

This study was approved by the local Institutional Review Board at each university, with the individual study protocols specifying that data would be merged across sites for analysis and dissemination. Students were informed about the study and could choose to participate if they were  $\geq 18$  years old. The survey was offered during both the fall and spring semesters of the 2015–2016 and 2016–2017 academic years, and the survey was open to participants throughout the semester but not during finals week. Participants at each institution completed the survey in Qualtrics and received course credit for participation.

### Measures

#### Sleep

The *Pittsburgh Sleep Quality Index* (PSQI)<sup>4</sup> has 9 items (including one multi-part item with 10 subitems) that assess seven well-

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات