



The association between social media use and sleep disturbance among young adults



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ABSTRACT

Introduction. Many factors contribute to sleep disturbance among young adults. Social media (SM) use is increasing rapidly, and little is known regarding its association with sleep disturbance.

Methods. In 2014 we assessed a nationally representative sample of 1788 U.S. young adults ages 19–32. SM volume and frequency were assessed by self-reported minutes per day spent on SM (volume) and visits per week (frequency) using items adapted from the Pew Internet Research Questionnaire. We assessed sleep disturbance using the brief Patient-Reported Outcomes Measurement Information System (PROMIS®) sleep disturbance measure. Analyses performed in Pittsburgh utilized chi-square tests and ordered logistic regression using sample weights in order to estimate effects for the total U.S. population.

Results. In models that adjusted for all sociodemographic covariates, participants with higher SM use volume and frequency had significantly greater odds of having sleep disturbance. For example, compared with those in the lowest quartile of SM use per day, those in the highest quartile had an AOR of 1.95 (95% CI = 1.37–2.79) for sleep disturbance. Similarly, compared with those in the lowest quartile of SM use frequency per week, those in the highest quartile had an AOR of 2.92 (95% CI = 1.97–4.32) for sleep disturbance. All associations demonstrated a significant linear trend.

Discussion. The strong association between SM use and sleep disturbance has important clinical implications for the health and well-being of young adults. Future work should aim to assess directionality and to better understand the influence of contextual factors associated with SM use.

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Introduction

Sleep and circadian functioning are essential to promoting good health (Buysse, 2014). While it is recommended that young and midlife adults obtain 7–9 h of sleep per night (Hirshkowitz et al., 2015), 40% of American adults report getting less than 7 h of sleep per night on weeknights (National sleep foundation, 2005). Moreover, 38% wake up feeling unrefreshed and 21% have difficulty falling asleep at least a few nights per week. Among young adults ages 19–29, 67% report not getting enough sleep to function properly (Gradisar et al., 2013).

Sleep disturbance and insufficient sleep duration are associated with daytime sleepiness (Jiang et al., 2011; Liu et al., 2000) and a range of poor health outcomes. For example, insufficient sleep negatively affects cognitive performance, mood, immune function, cardiovascular risk, weight, and metabolism (Banks and Dinges, 2007; Grandner et al., 2010a; Van et al., 2008). Additionally, a large multiethnic sample of U.S. adults showed that those with sleep duration shorter or longer

than 7 h were more likely to report fair or poor self-rated health (Shankar et al., 2011), and a worldwide survey of over 16,000 students (ages 17–30) showed a dose–response association between fewer hours of sleep and reporting poor health (Stepptoe et al., 2006).

A range of biological, psychosocial, and environmental factors contribute to insufficient sleep and sleep disturbance among adolescents and young adults. This includes biological changes in the accumulation of homeostatic sleep pressure (the likelihood of falling asleep), increasing academic and vocational demands, and use of substances such as alcohol and caffeine (Moore and Meltzer, 2008; Hershner and Chervin, 2014; Owens, 2014; Millman, 2005). However, less is known about associations between use of social media (SM) and sleep quality and quantity. SM has been defined as “a collection of software that enables individuals and communities to gather, communicate, share, and in some cases collaborate or play” (Microsoft Research Tech Fest, 2009) and a “group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content.” (Kaplan and Haenlein, 2010) The rapidly growing rate of SM use in recent years (Duggan et al., 2015) raises concern that SM use may adversely affect sleep quality and may displace total amount of sleep (Zimmerman, 2008).

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Prior work that has examined SM use and sleep has yielded inconsistent results. Two recent reviews in this area demonstrated an inverse association between electronic media use and sleep parameters such as longer time to fall asleep, delayed bedtime, and reduced total sleep time (Cain and Gradisar, 2010; Hale and Guan, 2015). However, another study among 11–13 year olds in the Midlands region of the United Kingdom demonstrated that, compared with SM, use of other technologies such as television, music, and video games was more substantially associated with sleep problems (Arora et al., 2014). Still, frequent use of social networking sites had the strongest impact on reduced weekday sleep duration among this sample. Other studies have suggested associations between SM use and sleep disturbance in countries such as Australia and China (An et al., 2014; Vernon et al., 2015), but there is a need to explore these findings among large, nationally-representative populations in the U.S.

It will also be valuable to examine associations such as these among young adults. While nearly all research in this area has focused on children and adolescents, 96% of young adults in the 18–30 year-old range use some type of technology—such as cell phones (67%), computers (60%), and electronic music devices (43%)—before bed (Gradisar et al., 2013). Given this high prevalence of devices which could be used for SM, and the deleterious health consequences of disturbed and insufficient sleep among young adults, studies are needed to explicitly focus on the association of SM and sleep disturbance in young adults.

Thus, we conducted a large, nationally-representative study to assess SM use and sleep among U.S. young adults. Our specific aims were to 1) describe the extent of self-reported SM use in this sample; 2) describe the level of self-reported sleep disturbance among this sample; and 3) determine the association between SM use and sleep disturbance. This will help us to better understand the impact of SM use as these individuals emerge into adulthood, before most chronic illnesses are established. Moreover, we have the unique opportunity to examine the association between SM use and sleep among a group of young adults who are, arguably, the first generation to grow up with social media.

Methods

Participants

We assessed a nationally-representative sample of U.S. young adults ages 19–32 who were participating in a longitudinal survey assessing multiple health behaviors. Our sample was drawn from a large-scale web-based research panel, which was developed and maintained by Growth from Knowledge (GfK), a survey research company. The research panel, known as the KnowledgePanel®, has been shown to be a statistically valid method for surveying and analyzing health indicators from a nationally-representative sample (Baker et al., 2010; Wagner et al., 2004). Participants were recruited via random digit dialing and address-based sampling, which reaches a sampling frame of over 97% of the U.S. population and provides access to people who use a home phone (also known as a “land line”) as well as those who use cell phone only (KnowledgePanel design summary, 2012; GfK KnowledgePanel, 2015).

Procedures

From March 2013 to April 2013 (baseline), 3254 GfK panel members completed an Internet-based survey. They were ages 18–30 when they completed the baseline assessment. From October 2014 to November 2014, a follow-up survey was sent via email to those who had completed the baseline survey, who were then ages 19–32. The data used for this study were collected as part of this 18-month follow-up, during which SM use items were included as part of the survey. Responses were received from 1796 participants (55.2%), of which 1788 participants (54.9%) had complete sleep data and were included in the analysis. The median time for survey completion was 15 min and participants received \$15 for their participation. This study was approved by the Institutional Review Board of the University of Pittsburgh and was granted a Certificate of Confidentiality from the National Institutes of Health.

Measures

Participants completed online survey items assessing SM use (independent variable), sleep disturbance (dependent variable), and covariates.

Social Media Use

SM use was assessed with multiple items that were used to create two SM use variables. The first variable reflects *volume* of SM use, as measured by the number of total minutes that participants use SM per day on average for personal, non-work related use. Participants were asked to estimate using text fields for hours and minutes per day. For analysis, this variable was represented in quartiles: Q1 = 0–30 min; Q2 = 31–60 min; Q3 = 61–120 min; Q4 = 121 min or more. The second variable reflects *frequency* of SM use, as measured by the number of visits to SM platforms per week. The frequency variable was adopted from a Pew Internet Research survey asking participants to indicate how frequently they visit or use each of the 11 most popular SM platforms: Facebook, YouTube, Twitter, Google Plus, Instagram, Snapchat, Reddit, Tumblr, Pinterest, Vine, and LinkedIn (Pew Research Center, 2014; Nielsen, 2015). Response choices included: “I don’t use this platform,” “Less than once a week,” “1–2 days a week,” “3–6 days a week,” “About once a day,” “2–4 times a day,” and “5 or more times a day.” Summed weighted responses on this scale were used to estimate total site visits per week. We also collapsed these data into quartiles for analyses (Q1 = 0–8; Q2 = 9–30; Q3 = 31–57; Q4 = 58+).

Sleep Disturbance

We assessed sleep disturbance using four items from the Patient-Reported Outcomes Measurement Information System (PROMIS®) Sleep Disturbance measure (Buysse et al., 2010; Yu et al., 2012), which assessed problems with sleep, difficulty falling asleep, whether sleep was refreshing, and sleep quality over the past 7 days. PROMIS measures have the advantage of being highly reliable and precise measures of patient-reported health, utilizing short forms of its measures to lessen participant burden while maintaining precision across a range of domains (NIH, 2015a; NIH, 2015b). The PROMIS Sleep Disturbance assessment, in particular, reflects a global measure of sleep, rather than focusing on a particular disorder. Previous work has described the development and psychometric testing of the PROMIS sleep disturbance measure among individuals age 18 and older. (Buysse et al., 2010; Yu et al., 2012) The four items included here were rated on a Likert scale, ranging from not at all (1) to very much (5). Items pertaining to sleep quality and the refreshing nature of sleep were reverse-coded. Because there were four items each on a 1–5 scale, raw scores ranged from 4 to 20. Due to the non-normal distribution of our data, we collapsed the sleep measure into tertiles based upon the raw score distribution, rather than converting to T-scores and treating the score variable as continuous. Low sleep disturbance corresponded to raw scores of 4–8, medium corresponded to raw scores of 9–11, and high corresponded to raw scores of 12–20.

Covariates

We examined associations between our dependent variable and each of the following demographic variables: age, sex, race/ethnicity, relationship status (single vs. committed relationship), living situation, household income, and education level. We divided participants into three age groups (19–23 years; 24–26 years; 27–32 years) and four mutually exclusive groups based on race/ethnicity (White, non-Hispanic; Black, non-Hispanic; Hispanic; or Other non-Hispanic). Categories for living situation, household income, and education level are depicted in Table 1.

Analysis

We included all participants who completed the sleep and SM use items in our analyses. We conducted all primary analyses using survey weights, which were calculated by GfK and applied using a post-stratification adjustment based on socio-demographic benchmark distributions. We used descriptive statistics to characterize the demographic features of the weighted sample and to determine the level of sleep disturbance and SM use frequency and volume reported by our participants. We used chi-square tests to determine whether participants in each sleep disturbance group (low, medium, high) differed significantly on level of SM use (volume and frequency) and covariates.

We used ordered logistic regression to examine associations among each SM use variable and sleep disturbance, with the lowest level of each social media variable (Q1 for each variable) serving as the reference group. We first conducted this analysis without covariates, and then we conducted

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