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Associations Between Social Media and Well-Being and Sleep Quality in Medical and Health Professions.
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Abstract

This study was conducted to assess associations between social media use and overall well-being and sleep quality in medical and health professions graduate students. A cross-sectional survey was distributed to examine demographic information, social media use, and health behaviors and outcomes. Logistic regression analysis was conducted to examine the relationships between sleep quality and potential covariates and/or independent variables, while proportional odds regression was performed to analyze potential associations between emotional well-being and independent variables. Survey respondents were more likely to have a low or depressed mood if they used social media as a way to help them sleep [odds ratio=2.1, 95% confidence interval = (1.0, 4.2)]. Participants who used social media to help them sleep also had poorer sleep quality than those who did not use social media for that purpose [odds ratio=2.3, 95% confidence interval= (1.1, 4.7)]. In addition,

individuals who used social media to obtain health-related advice or information were 2.8 times [95% confidence interval= (1.4, 5.8)] more likely

to have poor sleep quality compared to those who did not use social media for health-related advice or information. These study results

expound upon the relationship between social media use and health outcomes in medical and graduate students.

Introduction

      For this generation, and likely for other generations after it, a significant portion of their social and emotional attachments will develop

over the Internet. The Internet and social networking sites can have a significant effect on many of the health concerns associated with young

people, such as aggressive behavior, substance abuse, and disordered eating (Sidani, Shensa, Hoffman, Hanmer, & Primack, 2016; Strasburger,

Jordan, & Donnerstein, 2010). A 2014 research study found that the average American college undergraduate student spends over four hours

per week on social media sites, with significant associations between social networking and body mass indexes and sleep (Melton, Bigham,

Bland, Bird, & Fairman, 2014). Current researchers believe that this amount of social media use is vastly underestimated. Regardless of the

amount, media use and its effects on sleep patterns have been shown to have important effects on health and well-being in several age groups

(Arora, Broglia, Thomas, & Taheri, 2014; Magee, Lee, & Vella, 2014).

      Social media use has also been shown to have effects on quality of life, of which emotional well-being is a major component. A previous

study reported that using the Internet for sociability is positively correlated with several dimensions of social support, but inversely correlated

with quality of life because online interactions are not as substantial or enduring as in-person communication (Leung & Lee, 2005). Labrague

(2014) found that time spent on social media websites, especially Facebook, increases a subject's scores on a depression and anxiety

questionnaire, indicating an increased likelihood of having these conditions. Steers, Wickham, and Acitelli (2014) also established an association between time spent on Facebook and depressive symptoms for both men and women. These authors suggested that social media use increases depression, especially when it triggers feelings of envy or inferiority (Steers et al., 2014). According to another study, when 'Facebook envy' is controlled or limited, Facebook use can reduce depression (Tandoc, Ferrucci, & Duffy, 2015).

Several elements are associated with social media use and are risk factors for poor well-being and sleep, including physical activity level, fruit and vegetable intake, smoking status, and alcohol consumption. Researchers postulated that media use and physical activity may have competing roles in the lives of adolescents and reported that boys and girls with high media usage were also in low physical activity groups. However, those who were highly physically active also had very high media use, especially for males (Spengler, Mess, & Woll, 2015). This indicates that social media use plays a large role in the lives of youth today and that there may be gender-based differences in the relationship between media use and physical activity. Moreover, a randomized controlled trial of individuals with insomnia demonstrated that increased physical activity-meeting the World Health Organization (WHO) recommended activity levels-significantly lowered insomnia, depression, and anxiety, while accounting for daily light exposure (Hartescu, Morgan, & Stevinson, 2015).

In addition to physical activity, nutrition has been linked to social media, well-being, and sleep. In recent years, researchers have discussed how restaurant chains and other industries utilize social media advertising to promote energy-dense, nutrient-poor (EDNP) food, drinks, and products to young adults (Freeman et al., 2014; Freeman, Kelly, Vandevijvere, & Baur, Epub 2015). This is troubling since research supports the belief that fruit and vegetable intake improves well-being and sleep (Mujcic & Oswald, 2016; Peuhkuri, Sihvola, & Korpela, 2012). Furthermore, tobacco companies have strategically designed and placed advertisements on social media to promote smoking, even at the risk of

being sanctioned by tobacco control agencies (Burton, Soboleva, & Khan, Epub 2014). Unfortunately, regulation of such content is poor, and the

dangers and exposure to smoking promotion has only increased as tobacco corporations expand their social media marketing strategies and

peers-intentionally or unintentionally-endorse pro-smoking messages and subsequent behaviors to their friends (Depue, Southwell, Betzner, &

Walsh, 2015; Yoo, Yang, & Cho, 2016). Smoking has been associated with reduced subjective well-being and poorer sleep quality and quantity

when compared to former and/or non-smokers (Barros, Kozasa, Formagini, Pereira, & Ronzani, 2015; Brook, Brook, & Zhang, 2014; Jaehne et al.,

2012; McNamara et al., 2014). The literature cites similar outcomes for the negative impact of social media on alcohol use and the effect of

alcohol on sleep and well-being (Boyle, LaBrie, Froidevaux, & Witkovic, 2016; Geoghegan, O'Donovan, & Lawlor, 2012; Hoffman, Pinkleton,

Austin, & Reyes-Velazquez, 2014; Moreno & Whitehill, 2014; Thakkar, Sharma, & Sahota, 2015). These findings may have implications for

graduate and medical students, since a recent study indicated that 93.4% (450/482) of medical students use social media, with 74.4% using

Facebook daily (Avci, Celikden, Eren, & Aydenizoz, 2015). More research is needed to validate and expand upon these claims for children, teens,

and adults. It is important to evaluate the current effects of social media use and influence on health indicators, as this knowledge will be helpful

in research and for the health and safety of future healthcare professionals and their patients.

Purpose

     This study was conducted to assess and understand associations between social media use and overall well-being and sleep quality in

medical and health professions graduate students at an academic health center. Potential covariates, such as physical activity level, fruit and

vegetable intake, smoking status, and alcohol consumption, were considered as well. The goals of this research include: 1) making medical and

health professions students and the community aware of health measures that are related to social media use and 2) providing recommendations, based upon the study results, that would maintain or improve health in those who provide healthcare services to others.

Materials and Methods

This cross-sectional survey was conducted during a period of 2 months (8 weeks) from the start date after Eastern Virginia Medical School Institutional Review Board approval (IRB # 15-12-XX-0237, approved on 8 January 2016). Participants were medical and graduate students at a medical school in Norfolk, Virginia who were between 20 and 54 years old and were enrolled at least part-time in a program at the medical school. Recruitment was conducted through a system-wide email announcement, including the link to the survey and the researchers' contact information.

Previously validated survey instruments were used to assess emotional well-being, sleep quality, and physical activity, while the research team created questions to evaluate nutrition and social media use and influence for the survey (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989; The IPAQ Group, 2005; WHO, n.d.). The questionnaire consisted of six domains: (1) Demographic information, (2) Emotional well-being, (3) Sleep quality, (4) Physical activity, (5) Nutrition, and (6) Social media use and influence. In the first domain, demographic data and general information were collected including age, gender, race, height, weight, and academic program. Race included the following choices: White, Black, Hispanic, Native American (including American Indian, Eskimo, and Aleut), Asian/Pacific Area [Pacific Area embraces Polynesian (including Hawaiian and Samoan), Micronesian (including Guamanian), and Melanesian], and other. Academic program determined if the participant was in the Medical Doctorate (MD), Master of Public Health (MPH), Art Therapy, Master's of Biomedical Sciences (Medical Master's), Biomedical

Sciences PhD (Biomedical PhD), Clinical Embryology, Physician Assistant, Surgical Assistant, Biomedical Science Research Master's (Biomedical MS), or other program.

The second domain was adapted from the WHO-5 Well-being Index and was used to measure students' emotional functioning (WHO, n.d.). The WHO-5 questions used a 6-point Likert scale, ranging from 0 (At no time) through 5 (All of the time). The raw score was calculated by summing the scores for each question. The final score was computed by multiplying the raw score by 4, so that the final score ranged from 0 (Depressed) to 100 (High mood). Well-being was operationalized into three categories, where a score of 0 to less than 29 indicated depression, a score from 29-50 signified low mood, and a score greater than 50 to 100 denoted a high mood. Poor well-being was synonymous with a score that indicated depression and, therefore, the health event of interest, while a high score (>50-100) denoted high mood and good well-being. The WHO-5 Well-being Index has high validity and reliability and has been a stable measure of well-being across several populations even when compared to other instruments, such as the Beck Depression Inventory II (Topp, Ostergaard, Sondergaard, & Bech, 2015). The third domain, which evaluated sleep quality, was adapted from the Pittsburgh Sleep Quality Index (PSQI) (Buysse et al., 1989). The possible score was between 0 (Better) and 21 (Worse), with a score above 5 indicating poor sleep quality. It should be noted that the question about not being able to breathe comfortably and the set of questions regarding a bed partner or roommate from the original version of the survey were excluded from this study.

Regarding the fourth domain, the International Physical Activity Questionnaire (IPAQ) - Short Form was utilized to determine the physical activity behaviors of the participants (The IPAQ Group, 2005). Physical activity was measured in time spent being physically active during the past seven days. The measurements in hours and minutes were converted into MET-minutes. The metabolic equivalent of task, or METs, are

a quantification of the amount of energy required for an individual to complete an activity and this figure is multiplied by the length of time spent performing the activity to derive the MET-minutes. The total possible MET-minutes ranged from 0 to 19,278 MET-minutes per week, with a higher number indicating more physical activity. After MET-minutes were calculated, physical activity was categorized into one of three levels: low, moderate, or high, according to the IPAQ scoring instructions (The IPAQ Group, 2005).

The fifth domain concerning nutrition included questions on daily fruit and vegetable intake, and smoking and drinking habits. According to the United States Department of Agriculture (USDA) and the Office of Disease Prevention and Health Promotion (ODPHP) of the United States Department of Health and Human Services (HHS), Americans should strive to consume a minimum of 5-9 servings of fruits and vegetables per day (ODPHP, 2017; USDA, 2015a; USDA, 2015b). Five servings is the recommended amount for the lowest caloric intake (1,000 calories per day) (USDA, 2015a; USDA, 2015b). Survey participants were categorized as eating the minimum recommended amount of 5 servings or eating less than the recommended amount (0-4 servings) per day. Participants were asked if they smoked at least part of a cigarette in the last seven days and if so, how many cigarettes had they smoked per day, on average. Since there were so few smokers and those smokers either smoked only one or two cigarettes per day, the variable was treated as categorical in analysis. Survey respondents were also asked how many days they had had at least one drink of an alcoholic beverage in the past 30 days and on those days how many drinks they consumed, on average.

The sixth and final domain assessed social media use and influence by gathering information on daily amount of time spent on social media, social media use in the hour before bed, social media use as a way to help individuals sleep, and social media use to obtain health-related advice or information. For the purposes of this study, social media included Facebook, MySpace, Twitter, Instagram, email, various messenger

services, online dating applications, and any other non-gaming platforms where the participants could engage with others, regardless of how they were connecting (e.g. mobile phone, tablet, desktop computer, and laptop).

The survey was administered using Qualtrics, an online survey software (Provo, Utah, USA). This study was conducted in accordance with the Declaration of Helsinki. All members of the research team completed training in the Health Insurance Portability and Accountability Act (HIPAA) and Collaborative Institutional Training Initiative (CITI). Participation in the survey was voluntary and participants could terminate their involvement at any time. All participants were informed about the purpose of the study, what was required of them, and that they could terminate their participation at any time. Participants were contacted via their school emails, requesting their voluntary and anonymous participation. The emails were only sent to addresses with the institutional email domain and included a link to the survey. The email instructed the participants to take the survey only once, even though they may receive multiple reminder emails. In addition, participants were instructed not to share the link with other individuals. The survey was available for 8 weeks, with a reminder email sent on the 4-week deadline.

All data were reported in aggregate and confidentiality was protected. The main outcomes were emotional well-being and sleep quality. The independent variables included social media usage amounts in minutes per day, social media use before bed, social media use to aid sleep, and social media use to obtain health advice or information. The potential covariates that were examined were age, gender, race, body mass index (kg/m^2) as computed from the height and weight variables, academic program, physical activity, and nutrition as measured by fruit and vegetable intake, cigarette smoking, and alcohol consumption. Descriptive and summary statistics were calculated for all survey items. Means and standard deviations were calculated for normally distributed, continuous outcomes, medians and ranges were described for non-normally distributed outcomes, and frequencies and proportions were reported for categorical outcomes. Logistic regression analysis was conducted to

examine the relationships between sleep quality and potential covariates and/or independent variables, with poor sleep quality as the event.

Proportional odds regression was performed to examine potential associations between emotional well-being and continuous variables or categorical independent variables. Probabilities modeled were cumulated over the lowered ordered values of well-being (1=Depressed, 2=Low mood, 3=High mood). A response of "No" was the reference group for the categorical independent variables pertaining to social media use. Potential associations between categorical covariates and the primary outcomes were assessed using Chi-squared analyses. All data analyses were executed using SAS 9.4 (Cary, North Carolina, USA.) with alpha equal to 0.05.

Results

Table 1 presents the sample characteristics. The survey response rate was 14.8% (165/1,118), with one survey being excluded as an extreme outlier, resulting in a total of 164 analyzed responses. Significantly more females than males participated in the survey, most respondents were White and the majority of them were students in the MD program. The "Other" category responses for race included "Bi-racial", "Mixed race", "Mixed White/Asian", and "Multiracial White/Asian", and the "Other" category responses for academic program included Laboratory Animal Science (LAS) and Medical and Health Professions Education (MHPE). None of the respondents identified themselves as Native American and there were no Biomedical Science Research Master's program students who completed the survey. The average age was approximately 28 years old and the average BMI was just below 25, which is the lower limit for the overweight category, according to the National Heart, Lung, and Blood Institute (NHLBI, NIH, n.d.). In addition, more than 60% of the participants had a low or moderate level of physical activity. No one reported eating nine or more servings of fruits and vegetables per day, but approximately 17% (24/139) of participants

did consume at least five fruits and vegetables per day. Less than 3% (4/140) of survey respondents smoked a cigarette in the last seven days

and the median number of days alcohol was consumed in the past 30 days equaled four (see Table 1).

Table 1

Demographic Information of the 164 Survey Participants

Continuous variables	Mean (SD)
Age in years (n=161)	28.1 (6.0)
Weight in kilograms (n=161)	72.8 (17.6)
Height in meters (n=159)	1.7 (0.1)
BMI in kilograms/meter squared (n=159)	24.9 (5.2)
Non-normally distributed variables	Median (Range)
Number of Days Alcohol Consumed in Past 30 Days (n=138)	4.0 (0.0-28.0)
Number of Alcoholic Beverages Consumed Per Day (n=133)	2.0 (0.0-5.0)
Categorical variables	Frequency (%)
Gender (n=162)	
Female	105 (64.8)
Male	57 (35.2)
Race/Ethnicity (n=162)	
White	107 (66.0)
Black	14 (8.6)
Hispanic	9 (5.6)
Asian/Pacific Area	26 (16.0)
Other	6 (3.7)
Academic Program (n=162)	
MD	74 (45.7)
MPH	22 (13.6)

Art Therapy	3 (1.9)
Medical Master's	12 (7.4)
Biomedical PhD	5 (3.1)
Clinical Embryology	2 (1.2)
Physician Assistant	32 (19.8)
Surgical Assistant	8 (4.9)
Other	4 (2.5)
Physical Activity (n=164)[a]	
Low Activity	55 (33.5)
Moderate Activity	49 (29.9)
High Activity	60 (36.6)
Servings of Fruits & Vegetables Per Day (n=139)	
0-4 Servings	115 (82.7)
5 or More Servings	24 (17.3)
Smoked Cigarette(s) in Last Seven Days (n=140)	
Yes	4 (2.9)
No	136 (97.1)
Number of Cigarettes Smoked Per Day (n=4)	
One	1 (25.0)
Two	3 (75.0)

Note. [a]Adapted from "The International Physical Activity Questionnaire" by The IPAQ Group, 2005, Short Last 7 Days Self-Administered Format.

Retrieved from http://www.ipaq.ki.se

Summary statistics for the main variables of interest are shown in Table 2. With regard to emotional well-being, most medical and

graduate students reported being in a good mood in general, based on the WHO-5 outcomes. However, approximately half of the students

indicated that they had poor sleep quality. With concern to social media use, survey respondents reported an average of about 58 minutes per

day on social media, with a minimum of zero and a maximum of 200 minutes on social media per day. Significantly more individuals used social

media in the hour before going to bed, and less participants used social media to help them sleep and for health advice or information compared

to those who did not (see Table 2).

Table 2

Independent and Dependent Variable Descriptive Statistics

Continuous outcomes	Mean (SD)
Social Media Use in Min Per Day (n=141)	57.7 (43.8)
Categorical outcomes	**Frequency (%)**
Well-being (n=157)[a]	
Depressed	11 (7.0)
Low Mood	46 (29.3)
Good Mood	100 (63.7)
Sleep Quality (n=145)[b]	
Poor Sleep Quality	73 (50.3)
Good Sleep Quality	72 (49.7)
Social Media Use in Hour Before Going to Bed (n=141)	
Yes	104 (73.8)
No	37 (26.2)
Social Media Use As A Way to Help You Sleep (n=141)	
Yes	47 (33.3)
No	94 (66.7)
Social Media Use to Obtain Health Advice or Information (n=141)	
Yes	53 (37.6)
No	88 (62.4)

Note. [a]Adapted from "WHO (Five) Well-being Index," by WHO, retrieved from http://www.WHO-5.org/. [b]Adapted from "The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research," by D. J. Buysse, C. F. Reynolds, III, T. H. Monk, S. R. Berman, and D. J. Kupfer, 1989, Psychiatry Research, 28(2), p. 209-210. Copyright 1989 by the University of Pittsburgh.

Analysis of potential associations between the aforementioned independent and dependent variables demonstrated that social media use to help one sleep was associated with well-being and sleep quality while social media use to obtain health advice or information was only related to sleep quality (see Table 3). Survey participants who used social media as a way to help them sleep were more likely to have a poor mood than those who did not use social media as a way to help them sleep [OR=2.1, 95% CI=(1.0, 4.2)]. Similarly, individuals who utilized social media as a way to help them sleep were 2.3 times [95% CI= (1.1, 4.7)] more likely to have poor sleep quality compared to those who did not use social media as a way to help them sleep. Additionally, participants who used social media to obtain health advice or information were 2.8 times [95% CI= (1.4, 5.8)] more likely to have poor sleep quality versus those who did not use social media to find health advice or information. However, social media use to obtain health advice or information was not significantly associated with well-being, and the number of minutes on social media per day and social media use in the hour before bed were not significantly related to self-reported well-being or sleep quality (see Table 3). Since no covariates were associated with sleep quality or well-being, there were no multivariate analyses required.

Table 3

Regression Results for Primary Outcomes and Independent Variables

Independent variable	Well-being (n=141)[a]	Sleep quality (n=138)[b]
Social Media Use in Minutes Per Day	1.0 [1.0, 1.0]	1.0 [1.0, 1.0]
Social Media Use in Hour Before Going to Bed (Reference: No)	1.2 [0.5, 2.5]	1.0 [0.5, 2.2]
Social Media Use As A Way to Help You Sleep (Reference: No)	2.1 [1.0, 4.2]*	2.3 [1.1, 4.7]*
Social Media Use to Obtain Health Advice or Information (Reference: No)	0.9 [0.5, 1.9]	2.8 [1.4, 5.8]*

Note. Data are presented as odds ratio [95% confidence interval]. Proportional odds regression was performed to analyze potential associations with emotional well-being, while logistic regression analysis was conducted to examine potential relationships with sleep quality. Probabilities modeled are cumulated over the lower ordered values, where 1=Depressed, 2=Low Mood, and 3=Good Mood for well-being. The event modeled for sleep quality is Poor Sleep Quality. [a]Adapted from "WHO (Five) Well-being Index," by WHO, retrieved from http://www.WHO-5.org/. [b]Adapted from "The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research," by D. J. Buysse, C. F. Reynolds, III, T. H. Monk, S. R. Berman, and D. J. Kupfer, 1989, Psychiatry Research, 28(2), p. 209-210. Copyright 1989 by the University of Pittsburgh. * $p < 0.05$.

Discussion

This study included survey respondents from a population of young to middle-aged adult medical and graduate students at an academic health center. Although previous studies have examined social media use in children and teenagers, it appears that young and middle-aged adults have been affected by the rapid technological advances and uses as well, as demonstrated by this study (Gradisar et al., 2013; Levenson, Shensa, Sidani, Colditz, & Primack, 2016; Melton et al., 2014; O'Keeffe, Clarke-Pearson, & Council on Communications and Media, 2011; Strasburger et al., 2010). Our study evaluated multiple aspects of health to analyze what effect, if any, social media had on those factors. The key

findings were (1) participants were more likely to have low emotional well-being if they used social media as a way to help them sleep, (2) participants' sleep quality was negatively associated with using social media to help one sleep, and (3) participants were more likely to have poor sleep quality if they used social media to obtain health advice or information.

Regarding the demographic characteristics of the sample, racial, gender, and academic program data were consistent with national medical, physician assistant, and art therapy applicant and matriculant data (Association of American Medical Colleges [AAMC], 2016; Deloitte, Macro Connections, & Datawheel, 2017; McHugo, 2016; Robohm-Leavitt, 2015). This does not necessarily coincide with the United States Census Bureau data for the region due to the well-documented dearth of Black and Hispanic individuals in medical and health professions. These groups are considered underrepresented populations in medical schools unlike Asian students who are a minority population for the country and region but not in health professions (AAMC, 2015; Goldsmith, Tran, & Tran, 2014; Saha, Taggart, Komaromy, & Bindman, 2000; U.S. Census Bureau, n.d.[c]; U.S. Census Bureau, n.d.[d]). Over time, female students have come to constitute the majority of health professions in general, which is reflected in this sample. Additionally, the medical school class size is larger than any of the health professions class sizes at the institution, which is emphasized by the percentage of medical students who completed the survey. Although socioeconomic status was not collected for this sample, census data indicates that residents of Norfolk, Virginia have a median household income of $44,480 and Virginia residents have a median income of $65,015 (U.S. Census Bureau, n.d.[a]; U.S. Census Bureau, n.d.[b]).

The majority of survey respondents reported being in a good emotional state. Yet, study results revealed that the individuals who utilized social media as an aid to help them sleep were more likely to have a depressed or low mood. Although our study did not explore the potential effect of negative emotions after social comparison (i.e. 'Facebook envy'), our results are in agreement with previous studies in at least

one respect, that is, social media use was negatively associated with emotional well-being (Labrague, 2014; Steers et al., 2014). Similarly, the outcomes of our study also suggest that medical and graduate students who engage on social media to help them sleep have poorer sleep outcomes. These results are consistent with a recent, nationally representative study of young adults' social media use and sleep, in which the authors found significant associations between social media use, measured by volume and frequency, and sleep disturbance (Levenson et al., 2016).

Being highly influenced by social media may also have a detrimental effect on sleep time and quality. The findings of this study indicate that sleep is negatively associated with social media use, even when the purpose for its use may be positive (i.e. seeking health advice). This result may be due to a hypochondriacal state known as cyberchondriasis, where individuals develop health anxiety from searching for health information on the internet (Muse, McManus, Leung, Meghreblian, & Williams, 2012). It is reasonable to hypothesize that this health anxiety could lead to poor sleep outcomes. Alternatively, individuals may spend time on social media instead of sleeping because of an emotional investment or attachment to social media (Woods & Scott, 2016). Regardless of the mechanism, sleep deprivation and poor sleep quality can substantially affect work performance and daily activities, with dire consequences when pertaining to medical professions (Institute of Medicine ([U.S.] Committee on Sleep Medicine and Research, 2006; Landrigan et al., 2004; Lockley et al., 2004). Therefore, it is essential that adults, especially medical and graduate students, remain cognizant of the amount of time that they spend on social media and how it may affect their sleep, overall health, and livelihood.

There were some limitations to this study. First, potential demographic features, such as socioeconomic status and relationship status, were not included in the data collection. Though the survey response rate was low, this response rate assumes that all recipients of the email

campus-wide actually opened the survey link, which might not be the case. Still, self-selection bias could have occurred due to the nature of the

survey sampling method used, and this bias should be considered when attempting to extrapolate said results to the population of interest. The

cross-sectional nature of the study did not allow us to definitively establish causality or examine whether changes in the dependent variables

occurred over time. Therefore, potential improvements in sleep quality or well-being could lead to reduced social media use as well. Finally,

inclusion of the two excluded questions from the PSQI questionnaire may have allowed for deeper understanding of how sleep is related to

social media use. Sleep is of particular importance, especially during the rigorous training that occurs at medical institutions. Since several

studies suggest that social media use negatively affects sleep time and quality, it would be appropriate to research the mechanisms and ways in

which social media disrupts or prevents proper sleep in more depth (Arora et al., 2014; Gradisar et al., 2013; Hysing et al., 2015; Levenson et al.,

2016; Magee et al., 2014). For example, future studies could examine whether the type of electronic device used or the purpose for social media

engagement (e.g. relaxation, work-related use) are significant covariates in the association between sleep and social media use in medical and

health professions graduate students.

In contrast with other studies, our analyses did not reveal any associations between demographic characteristics, physical activity level,

or nutritional factors and well-being or sleep quality (Barros et al., 2015; Hartescu et al., 2015; Mack et al., 2012). However, this finding might be

subjected to the small sample size or self-reporting bias. During survey creation and administration, measures were taken to reduce self-

reporting bias. Previously validated instruments were utilized, where possible, and items related to social media use were stated clearly and in

commonly used language to reduce ambiguity and confusion. Survey respondents were also notified that their responses would be anonymous

and that no personal identifiers would be collected. Despite these precautions, demographic characteristics and the other potential covariates

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were not significantly correlated with the outcomes. However, they may be important covariates in other populations. Other indices of health and academic and/or work performance could be examined to determine how social media use relates to them. Furthermore, additional measures of well-being or quality of life could be analyzed to confirm and further explore the psychological, emotional, and physical implications of social media use as a method to aid sleep. While previous studies have examined adolescents or undergraduate students, this study provided insight into social media use among graduate students of several health professions (Strasburger et al., 2010; Yoo et al., 2016). In addition, the definition of social media was more inclusive (i.e. the focus on more than one website or application) in this study than in previous research (Jha et al., 2016). Hence, graduate school faculty at our institution and similar institutions can use the results of this survey to promote the safe and effective use of social media and potentially improve associated health outcomes for forthcoming health professionals.

Conclusions

        This survey allowed our research team to evaluate the relationships between social media use and influence and health-related measures in medical and graduate students at an academic health center. Results indicated that social media use as a way to help one sleep is a risk factor for poor emotional well-being and sleep quality, and social media use to obtain health information is negatively associated with sleep quality. High-quality sleep is important for future health professionals, especially since they have limited time and an extensive list of requirements to fulfill. Medical and health professions students should take precautions to minimize social media use and influence in order to attain better emotional well-being and sleep quality, perform to their highest standards, and be responsible medical professionals.

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