

Effect of Mobile Usage and Compromise of Rem and Non Rem Sleep Among Medical Students

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ABSTRACT

Objective: The aim of current study is to determine the effect of late night mobile usage and compromise of rapid eye movement (REM) and non-REM among medical students.

Study Design: Cross-sectional study

Place and Duration: Sughra Shafi Medical Complex Narowal. Jun 2021-Dec 2021

Methods: There were 170 medical students of both genders had age 19-35 years were presented in this research. After obtaining written informed consent, participants' age, sex, BMI, and place of residence were recorded in detail. Participants filled out the Pittsburgh Sleep Quality Index (PSQI) and a validated semi-structured questionnaire that included demographic information and cellular phone data. Outcomes were assessed among patients with REM and non REM sleep. SPSS 22.0 was used to analyze all data.

Results: Among 170 presented students, majority was females 97 (57.1%) and rest of the patients was males 73 (42.9%). We found that 70 (41.2%) had age 19-25 years, 60 (35.3%) had age 26-30 years and 40 (13.5%) had age 31-35 years. 120 (70.6%) had BMI <25kg/m² and 50 (29.4%) had BMI >25kg/m². 94 (55.3%) cases had REM sleep and 76 (44.7%) were non REM sleep. Majority of the cases were had mobile usage >4hours found in 80 (47.1%) students. There was a statistically significant (P <0.05) increase in sleep latency, decrease in sleep length, increase in inefficiency during sleep, and increase in daytime sleep disruptions in REM patients. Sleep quality was negatively connected with unawareness of night shift mode and lying posture while using a phone before bed (P <0.05). We found higher number of fatigue, headache, temper and burning eyes among REM cases as compared to non REM.

Conclusion: We concluded in this study that mobile usage among patients with REM sleep resulted higher number of poor sleep quality, fatigue and headache as compared to non REM cases. The detrimental effects of late-night screen time on sleep and health should be highly publicized.

Keywords: REM, Medical Students, Mobile Usage, Sleep Quality

INTRODUCTION

To put it simply, sleep is a homeostatically regulated physiological state of unawareness. Sleep occupies nearly a third of our lives, [1] so it is an extremely important time. A good night's sleep is essential for proper brain and body functioning, the elimination of cellular toxins, the prevention of disease, and the healing of both. In the last 20-30 years, there has been a dramatic decrease in sleep duration, which has been linked to an increase in the prevalence of obesity, diabetes, and other chronic debilitating diseases [3-5]. For toddlers and teenagers, getting enough sleep is crucial [6]. Adolescent sleep loss has emerged as a major public health concern. [7] There are a number of factors that can impact sleep hygiene[8], but in recent years, researchers have paid a lot of attention to the role that cellphone use plays in producing sleep disorders in adolescents. [9] According to a recent research conducted by Sohn et al, 1 in 4 children and young adults experience problematic cell phone use (PSU), which has been connected to mental health issues such as sadness, anxiety, and insomnia. Recent meta-analysis by Carter et al. [10] demonstrated a positive correlation between media consumption before bed and lower quality sleep and increased drowsiness the following day. As well as improving communication and daily living, [11] cell phones are linked to a host of health issues. When used in moderation and with awareness, cell phones can be a great convenience, but they can have detrimental impacts on one's health and well-being if used excessively or without proper caution. Human health risks associated with both receiving and transmitting radio-frequency electromagnetic waves (EMF) have sparked public and scientific debate. Overusing a cell phone has been linked to a variety of negative health outcomes, including inability to focus, weakness, exhaustion, high blood pressure, headache, eye difficulties, and sleep disorders. [12]

Improved cognitive, emotional, and physiological functioning are among the outcomes of sufficient sleep. They'll have a better immune system, more stable hormones, faster metabolism, and clearer thinking thanks to this change. Students' cognitive ability

and learning capacity will suffer if they don't get enough sleep because all this "brain junk" will be stored there. College students, driven by their natural inquisitiveness, tend to set a high standard for themselves in terms of autonomy and the desire to set their own rules for everything from eating habits to bedtime rituals. Smartphones have had a profound effect on people's lives all over the globe ever since their introduction in 2009. The many useful features of smartphones are put to good use in the classroom, as they can be used to take notes, access information on any subject, keep in touch with others, and improve one's own knowledge and abilities in a variety of areas. While studies haven't consistently linked smartphone addiction to negative mental or behavioural outcomes, there is evidence that it can happen. On the other hand, excessive use is associated with psychopathological symptoms that negatively affect mental health and lead to things like depression, anxiety, poor health and sleep quality, and poor academic performance.[8,10]

Students with low academic or work performance, reduced social interference from peers, mental preoccupation, neglect of personal life, mood modifying experiences, and relationship disorders are more likely to display maladaptive behaviours. Indicators of student addiction. Adult men have their own schedules and are not forced to use their phones like they might be if they were still in high school. The increased use of smartphones by college students is supported by these data. In the twenty-first century, smartphones have become more portable and appealing, especially among adolescents, much like laptops due to their inclusion of web browsing, Wi-Fi, third-party apps, etc. Adolescents have a high level of curiosity and enjoyment when it comes to using their smartphones, which allows them to use a wide variety of music wallpapers, etc. to sustain their enjoyment and aid in their expression. It is therefore not surprising that this would primarily appeal to young college students, who would then become overly reliant on their smartphones. Contributing Factors We looked into whether or not late-night smartphone use disrupts sleep. Considering that excessive mobile use, which has no beginning or end due to continuous involvement in that pleasurable

aura of the phone, replaces other activities and even sleep. Sleep disruption is a major issue for today's youth, who grew up with computers and smartphones. College students, driven by their natural inquisitiveness, tend to set a high standard for themselves in terms of autonomy and the desire to set their own rules for everything from eating habits to bedtime rituals. There may be significant changes in the timing, duration, and quality of sleep as high school students make the leap to the more freewheeling college environment. Instead of giving up their highly connected social lives, most students would rather sacrifice sleep. Students face a difficult juggling act as they attempt to excel in school, participate in sports and extracurriculars, and possibly hold down a part-time job—all while keeping their GPAs in the A+ range. An already high cost of not getting enough sleep due to an unpredictable schedule is compounded when one also doesn't get the recommended amount of sleep. Lack of sleep, even if it's only a little less than the eight to nine hours recommended by sleep experts for optimal mental health, might not cause serious complications. Students who get less sleep than recommended may experience poor sleep quality, which can have negative consequences for their health, mood, and performance in class. [13,14]

People's reliance on their smartphones has grown to the point where they feel helpless whenever they're not near one, and constant use has led them to put off or completely ignore more pressing responsibilities. Overuse of smartphones has been linked to a variety of issues, such as addiction-like symptoms and a feeling of dependence, dangerous use, especially while driving, and even using them in libraries, classrooms, and public transportation. Use of smartphones in excess is linked to an increase in psychopathological symptoms like depression and anxiety, according to research. As a culture, we have become so reliant on our mobile devices that we often forget that our minds, in addition to our bodies, require periodic downtime. In a less stimulating environment, the brain can rest and regain some of its cognitive abilities, as postulated by the Attention Restoration Theory. The prefrontal cortex, which is responsible for making decisions and solving problems, is adversely affected by the high levels of stress that most of us experience in the modern world. To help our minds unwind and get in the zone, then, we need to schedule some quiet time. Smartphone addiction, defined by psychologists as an irrational overuse of smartphones, is predicted to be one of the most common types of addiction. Many people, especially younger students, have made smartphone use an integral part of their daily lives because they have grown up with them. [15]

This study aimed to investigate the extent to which people use their smartphones before bed (self-reported time; the time they decided to go to sleep) by categorising participants into three groups based on their smartphone habits, as well as to determine whether or not there is a correlation between REM and other cell phone variables and whether or not this affects the quality of sleep.

MATERIAL AND METHODS

This cross-sectional study was conducted at Sughra Shafi Medical Complex Narowal and comprised of 170 patients. After obtaining written informed consent, participants' age, sex, BMI, and place of residence were recorded in detail. Cases <19 years of age, severe medical illness, addicted to psychoactive substances were not included in this study.

Included cases had age 19-35 years. About 15% to 35% of people have sleep problems because they use their smartphones before bed. The sample size was determined using the following parameters: 5% alpha error, 80% power to detect a difference, and a significance level of 0.05 for the population proportion. Students in medical school who had been using smartphones for more than a year and were willing to participate were recruited. For this study, we aimed to extract from respondents the amount to which cellphones are used before night (self-reported time and usage). Manufacturer, mode used while sleeping, and daily smartphone

use time before bed were all taken into account. Students were polled on their knowledge of blue light emissions, night mode, and proper phone posture when using their devices late at night.

Research participants are evaluated based on their responses to a questionnaire designed to gauge Pittsburgh Sleep Quality Index (PSQI) scores within the previous month. The most common method of response is a four-point Likert scale. Subjective sleep quality, sleep latency, sleep length, habitual sleep efficiency, sleep disruptions, usage of sleep medicine, and daytime dysfunction are among the seven domains measured by this instrument. The maximum possible score is 21, with higher levels suggesting more severe sleep issues.

Microsoft Excel was used for both the data entering and coding processes. SPSS, in its most recent iteration (version 22), was used for both descriptive and inferential statistical analysis. Typically, descriptive statistics make use of the Mean, Standard Deviation, Proportion, and Frequency measures. Chi-square and Mann-Whitney U tests were used for inferential statistical analysis. We considered a result significant if it occurred at or below the 5% threshold (P<0.05).

RESULTS

Among 170 presented students, majority was females 97 (57.1%) and rest of the patients was males 73 (42.9%). We found that 70 (41.2%) had age 19-25 years, 60 (35.3%) had age 26-30 years and 40 (13.5%) had age 31-35 years. 120 (70.6%) had BMI <25kg/m² and 50 (29.4%) had BMI >25kg/m².(table 1)

Table-1: Demographics of the included patients

Variables	Frequency	Percentage
Gender		
Male	97	57.1
Female	73	42.9
Age (years)		
19-25	70	41.2
26-30	60	35.3
31-35	40	13.5
BMI		
<25kg/m ²	120	70.6
>25kg/m ²	50	29.4

We found that 94 (55.3%) cases had REM sleep and 76 (44.7%) patients had non REM sleep.(figure 1)

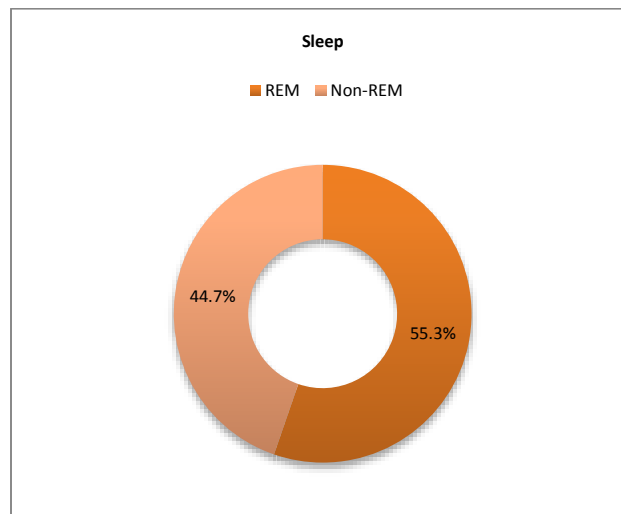


Figure-1: Frequency of REM and non REM sleep

Majority of the cases were had mobile usage >4hours found in 80 (47.1%) students, 42 (24.7%) cases had mobile usage 3hours, 35 (20.6%) cases had mobile usage 2hours and 13 (7.6%) cases had usage 1hours.(figure 2)

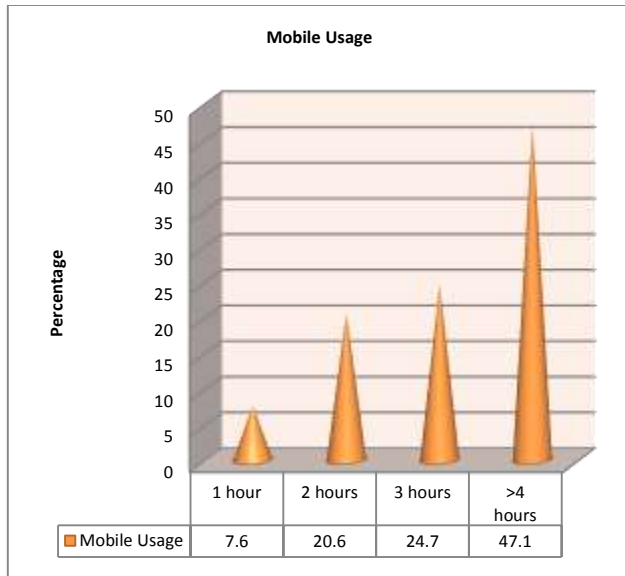


Figure-2: Mobile usage with respect to time among all cases

There was a statistically significant ($P < 0.05$) increase in sleep latency, decrease in sleep length, increase in inefficiency during sleep, and increase in daytime sleep disruptions in REM patients. Sleep quality was negatively connected with unawareness of night shift mode and lying posture while using a phone before bed ($P < 0.05$). (table 2)

Table-2: Quality of sleep among REM and non REM sleep with PSQI

Variables	REM (94)	Non-REM (76)
Increase in Sleep Latency	22 (23.4%)	10 (13.25)
Increase Inefficiency sleep	34 (36.2%)	8 (10.5%)
Daytime sleep disruptions	15 (15.95)	12 (15.8%)
Decrease in sleep length	23 (24.5%)	9 (11.8%)
Night Shift Mode Unawareness		
Yes	75 (79.8%)	54 (71.1%)
No	19 (20.2%)	22 (28.9%)

We found higher number of fatigue, headache, temper and burning eyes among REM cases as compared to non REM. (figure 3)

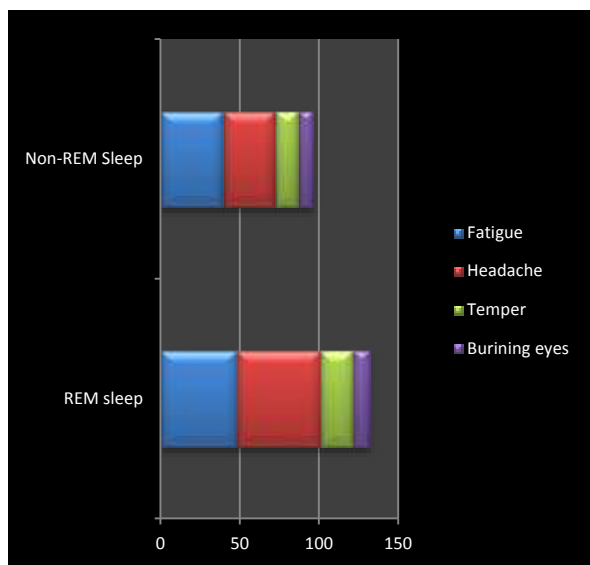


Figure-3: Association of complications with mobile usage at bedtime

DISCUSSION

The primary aim of this research was to evaluate the quality of sleep among smartphone users before bed and to identify the factors that are associated with sleep for mobile phone users. The vast majority of REM participants in our study (85%) reported an unsatisfactory global PSQI score. When used in bed, smartphones significantly altered sleep patterns, delaying the onset of sleep, shortening the time spent asleep, and decreasing the quality of sleep, all of which contributed to daytime sleepiness. Other factors related with poor sleep quality were using a smartphone in a lying position and not being aware that there is a "night mode."

According to the National Sleep Foundation, young adults (those between the ages of 18 and 25) need between 7 and 9 hours of sleep per night. [16] Seventy-plus percent of Indian college students surveyed in a recent study reported getting four to six hours of sleep each night. [17] The smartphone, with all of its many features, has gradually been ingrained in our daily routines. Boivin et al. observed in 1996 that exposure to dim light can alter circadian rhythm. [18] In the past decade, there has been a lot written about the relationship between electronic device use in the bedroom and the quality of sleep. As indicated by Munezawa et al. in their research on Japanese adolescents, smartphone use after lights out is linked to shorter sleep duration, lower sleep quality, and increased daytime drowsiness. [19]

In our study 170 medical students were presented. Majority was females 97 (57.1%) and rest of the patients was males 73 (42.9%). We found that 70 (41.2%) had age 19-25 years, 60 (35.3%) had age 26-30 years and 40 (13.5%) had age 31-35 years. 120 (70.6%) had BMI $< 25 \text{ kg/m}^2$ and 50 (29.4%) had BMI $> 25 \text{ kg/m}^2$. Findings of our study was comparable to the studies conducted in past. [20,21] We found that 94 (55.3%) cases had REM sleep and 76 (44.7%) patients had non REM sleep.

It has been suggested by recent research that the blue light from mobile devices is mostly to blame for the PSQ in late-night mobile users. Most mobile devices produce blue light with a wavelength of 400–495 nm; exposure to blue light in the 460–480 nm range has been shown to alter the circadian rhythm of humans by suppressing their melatonin production. [22] Reduced melatonin levels have been associated with sleep problems and later bedtimes. [23] Furthermore, PSQ is caused by the stimulation of cognitive activities after being exposed to blue light, which heightens awareness and alertness in the brain. [24] Supporting the aforementioned claims, we found that "using the mobile for at least 120 minutes after the lights have been turned off (without a blue light filter)" was significantly associated with lower sleep quality, more daytime sleepiness, more frequent sleep disturbances, and a later bedtime for participants. Additionally, a comparative study by Mortazavi et al. indicated that utilising an amber blue light filter in mobiles considerably enhances the quality of sleep, however the sample size was just 43 people. [25] Therefore, we suggest conducting additional case-control and experimental investigations with bigger samples to verify these results.

There was a statistically significant ($P < 0.05$) increase in sleep latency, decrease in sleep length, increase in inefficiency during sleep, and increase in daytime sleep disruptions in REM patients. Sleep quality was negatively connected with unawareness of night shift mode and lying posture while using a phone before bed ($P < 0.05$). We found higher number of fatigue, headache, temper and burning eyes among REM cases as compared to non REM.

Since learning at a professional level and developing clinical expertise are so important for doctors-in-training, medical students should never skimp on sleep quality. Low-quality sleep has been linked to negative effects on students' productivity, mental health, stability, physical health, and exercise levels. [26] Thus, it is crucial for all students, but especially those in the medical area, to learn to recognise poor sleep quality and any conditions that further diminish the quality of sleep. Neither our study's cross-sectional design nor the small number of participants were without flaws.

The present results may not be generalizable to other at-risk students because data was obtained solely from college medical students. Also, no research was conducted on the impact of psychological discomfort, which is likely to be significant among medical students, on the quality of sleep that they get.

CONCLUSION

We concluded in this study that mobile usage among patients with REM sleep resulted higher number of poor sleep quality, fatigue and headache as compared to non REM cases. The detrimental effects of late-night screen time on sleep and health should be highly publicized.

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