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RESEARCH ARTICLE

Effect of smartphone usage on quality of sleep in medical students

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ABSTRACT

Background: Like every other important invention of the technological revolution, smartphones have brought with themselves both comforts and problems. An irrational overuse of smartphones has been described as smartphone addiction. Medical students are highly vulnerable to sleep deprivation, smartphone addiction might further aggravate this problem. **Aims and Objectives:** The aim of this study was to find out the effect of smartphone addiction on sleep quality among medical students of SKIMS Medical College, Srinagar. **Materials and Methods:** This cross-sectional study was conducted on 236 medical students from October 2017 to December 2017 using a self-administered questionnaire consisting of three parts sociodemographic characteristics, smartphone addiction scale (SAS-SV), and Pittsburgh sleep quality index (PSQI). Pearson correlation coefficient was used to correlate SAS scores and PQSI scores. **Results**: The prevalence of smartphone addiction in this study was found out to be 34.4%. 62.7% were poor sleepers as assessed by PQSI scores. There was a positive correlation between overall PQSI scores and SAS scores. In the subgroups, the correlation was significant for males and those residing in the hostel. Correlations were highly significant for younger age group (17–19) and 1st year of study. **Conclusion:** Excessive use of smartphones is prevalent among medical students and is related to poor sleep quality. This study further brings out the importance of the availability of counseling services to medical students, so that those already addicted can be helped and provided with remedial measures.

KEY WORDS: Smartphone Addiction; Sleep Quality; Medical Students

INTRODUCTION

A smartphone is a popular device that works like a portable computer providing easy access to information, social connectivity, workplace applications, convenience, mobility, size, and so forth, making it an essential part of our daily lives.[1] Like every other important invention of the technological revolution, smartphones have brought with themselves both comforts and problems.[2] Nowadays, smartphone users are particular about owning the latest versions, apps, and upgrade for which they are ready to spend large sums of money. Users have become so dependent on this device that they feel inadequate and useless without it, and this preoccupancy with the smartphone makes them ignore other important work.[3]

According to the latest version of the diagnostic and statistical manual of mental disorders (DSM-5) gambling addiction (a well-known behavioral addiction) has been categorized within "substance-related and addictive disorders.[4,5]" It has been demonstrated that smartphone addiction has several similar aspects to DSM-5 substance-related disorders including the following four main factors: Compulsive behavior, functional impairment, withdrawal, and tolerance.[6] Thus, an irrational overuse of smartphones has been described as smartphone addiction by psychologists and is likely to be among the most prevalent forms of addictions.[3] Young people, undergraduates, in particular, are

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digital natives who have grown up in this smartphone age and have integrated this appliance into their lifestyle.[7] This makes them more prone to the development of smartphone addiction as compared to the older generation.[8]

This smartphone addiction can have several ill effects on the health and safety of an individual as it can cause physical (neck and wrist pain and accidents) as well as behavioral problems (depression).[9] This addiction can also interfere with school or work performance, reduce social interactions, cause negligence in personal life and forms an important environmental factor disturbing quality sleep.[10-12] Sleep restoration has shown a strong relationship with better physical, cognitive, and psychological well-being in adults, adolescents, as well as in children.[13] This makes good quality sleep an extremely essential part of student life with poor sleep quality further increasing the risk of physical and mental disorders.[12]

Unfortunately, medical students are exposed to high levels of stress right from the beginning of the course, and this makes them highly vulnerable to sleep deprivation. Smartphone addiction if present in these students might aggravate this problem and further, reduce the quality of sleep. Limited research has been conducted among medical students with respect to smartphone addiction and its possible physical and mental consequences. Thus, this study was conducted with an aim to find out the effect of smartphone addiction on sleep quality in medical students of SKIMS Medical College, Srinagar.

MATERIALS AND METHODS

A cross-sectional study was conducted among the undergraduate students of SKIMS Medical College, Srinagar, Jammu and Kashmir from October 2017 to December 2017. Students having a pre-existent psychological illness and those facing an upcoming exam during the study period (prefinal and final year) were excluded from the study. Students who did not give consent or those not possessing a smartphone were also excluded from the study. After taking proper consent from the students, a questionnaires consisting of three sections were distributed to a sample of 236 students (1st and 2nd year) in person, during a lecture schedule. The present research work is exempt from formal review of the Institutional Ethics Committee.

The first section was a questionnaire for sociodemographic characteristics such as age, gender, present address, and year of study. The second was the short version of the Smartphone Addiction Scale (SAS-SV). The SAS-SV is a validated scale originally constructed in South Korea but published in English. This 10-item self-report instrument addresses the following 5 content areas: (1) "Daily-life disturbance," (2) "withdrawal," (3) "cyberspace-oriented relationship," (4) "overuse," and (5) "tolerance." For each item, participants expressed their opinion on a 6-point scale ranging from 1 (strongly disagree) to 6 (strongly agree). It identifies the different range for males and females. Males are addicted to scores higher than 31 and females are addicted to scores higher than 33. The original SAS-SV showed content and concurrent validity and internal consistency (Cronbach's alpha: 0.91).[14,15] This section also assessed the duration of smartphone use and most commonly used apps.

The third section consisted of the Pittsburgh sleep quality index (PQSI) to assess the sleep quality and quantity in students. 19 individual items generate seven "component" scores including subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The sum of scores for these seven components yields one global score as sleep quality score. In each component, the scores varied from 0 to 3 and the total score of questionnaire varied from 0–21 and higher scores indicating the worse sleep quality. Subjects who got Pittsburgh sleep quality inventory (PSQI) global score of 5 or less were classified as "good sleepers," and those who got more than 5 as "poor sleepers." The PSQI has internal consistency and reliability coefficient (Cronbach's alpha) of 0.83.[16]

Data were analyzed using Statistical Package for the Social Sciences version 20. Categorical data were summarized as a percentage and numerical data as a mean and standard deviation. Pearson's correlation coefficient was used for assessing the relation between SAS score and PQSI score. $P < 0.05$ was considered significant.

RESULTS

Of the 236 students who participated in the study only 212 returned the completely filled questionnaire. The mean age of students was 19.76 years. There were 106 (50%) males and 106 (50%) females students, 73 (34.4%) lived at home with their families and 139 (65.5%) resided in the hostel, and 92 (43.3%) students were in 1st year and 120 (56.6%) were in 2nd year [Table 1].

In this study, the mean SAS score was 27.16, and the mean PQSI score was 6.12. More than half (56.1%) students had been using a smartphone for more than 2 years and social networking (50.9%) was the most commonly used app [Table 2].

The prevalence of smartphone addiction in this study was found out to be 34.4% as their scores fell in the group of high users as assessed by SAS scores. Low users formed 65.5% of the total sample. Based on PQSI scores 62.7% were poor sleepers, and 37.2% were good sleepers [Table 3].

Table 1: General characteristics of the study group

Variables	Groups	*n* (%)
Age (years)	17–19	104 (49.05)
	20–22	108 (50.95)
	Total	212 (100)
Gender	Male	106 (50)
	Female	106 (50)
	Total	212 (100)
Year of study	1st	92 (43.3)
	2nd	120 (56.6)
	Total	212 (100)
Present address	Home	73 (34.4)
	Hostel	139 (65.5)
	Total	212 (100)

Table 2: Smartphone usage variables

Variables	Groups	*n* (%)
Duration of smartphone use (in years)	1–2	93 (43.3)
	>2	119 (56.1)
	Total	212 (100)
Most commonly used app	Social networking	108 (50.9)
	Academic	36 (16.9)
	Games	46 (21.6)
	Current affairs	11 (5.1)
	Others	10 (4.7)
	Total	212 (100)

Table 3: Smartphone use characteristics and sleep quality among subjects

Variables	Groups	*n* (%)
SAS core	Low user	139 (65.5)
	High user	73 (34.4)
	Total	212 (100)
PSQI score	Poor	133 (62.7)
	Good	79 (37.2)
	Total	212 (100)

The mean PQSI scores were higher among high users (6.48) as compared to low users (5.19), which is higher than the 5 point cutoff. Hence, they were categorized as poor sleepers. Similarly, the mean SAS scores (28.86) were higher among poor sleepers as compared to good sleepers (22.13) [Tables 4 and 5].

A positive correlation was observed between overall PSQI scores and SAS scores which is statistically significant. In the subgroups, the correlation was significant for males and those residing in the hostel. Correlations were highly significant for younger age group (17–19) and 1st year of study [Table 6].

Table 4: Global PSQI score in smartphone among users

Groups	Mean PQSI scores±SD
Low users	5.19±1.84
High users	6.48±1.67

Table 5: SAS scores among good and poor sleepers

Groups	Mean SAS scores±SD
Good sleepers	22.13±8.12
Poor sleepers	28.86±8.41

Table 6: Correlation between SAS and PSQI scores

Variables	Groups	N	R	*P* value
Age (years)	17–19	104	0.386**	<0.001
	20–22	108	0.129	0.184
Gender	Male	106	0.194*	0.047
	Female	106	0.202*	0.038
Present address	Home	73	0.13	0.272
	Hostel	139	0.188*	0.027
Year of study	1st	92	0.536**	<0.001
	2nd	120	0.122	0.186
Overall		212	0.168*	0.014

*Correlation is significant at the 0.05 level (two-tailed).
**Correlation is significant at the 0.01 level (two-tailed)

DISCUSSION

In our study, the prevalence of smartphone addiction was found out to be 34.4%, and 62.7% were identified as poor sleepers. The mean PQSI scores were higher among high users (6.48) and mean SAS scores (28.86) were higher among poor sleepers. A positive correlation was observed between overall PSQI scores and SAS scores which is statistically significant.

A study conducted among Indian adolescents observed a prevalence of smartphone addiction (33.3%) which is similar to our study.[17] A slightly lower prevalence of smartphone addiction (29.8%) was found among medical students in South Korea.[18] In our study, 62.7% were having poor sleep quality according to PSQI scale. Similar results were obtained in a study performed on a group of Pakistani medical students (77%) and in a study conducted among non-medical college students (60%).[19,20] Positive and significant correlation was found between overall SAS scores and global PSQI scores. Correlation analysis showed the positive significant correlation among subgroups of variables such as gender (both male and female) and hostel residing students. The correlation was highly significant for younger age group and 1st year students. Our study is in accordance with a study conducted in a south Indian medical college which obtained similar results.[21] Previously conducted studies have provided us with evidence that smartphone

overuse is associated with sleep disturbances. Various mechanisms have been proposed to explain this relationship. Most electronic media devices essentially expose a person to bright light,[22] which can delay the circadian rhythm when it takes place after dark thus interfering with sleep.[23] It has been reported that electromagnetic field exposure in the evening has instantaneous physiological and behavioral consequences,[24,25] by influencing pineal gland it effects physiological factors such as sleep quality and the melatonin rhythm, and can also cause altered cerebral blood flow and brain electrical activity.[26] In addition, extended use can cause physical discomfort and headaches, which can further diminish sleep.[27]

Good quality of sleep is a must for medical students as acquiring professional-level learning as well as clinical skill is crucial for them. In students, poor quality of sleep can have its impact on various areas such as efficacy, mental health, stability, physical health, and activity.[28] Thus identification of poor sleep quality and any factors that further reduce the quality of sleep is essential for all students especially those belonging to the medical field. Our study was not devoid of limitations which included its cross-sectional design and limited sample size. Data was collected only from medical students of the college, and this may limit the generalization of the present results to other vulnerable students. Furthermore, the effect of psychological distress, which is expected to be high among medical students, on sleep quality was not studied.

CONCLUSION

Smartphone addiction is a rising public health issue among young students that cannot be ignored. Excessive use of smartphones is prevalent among medical students and is related to poor sleep quality. Medical students who are future physicians should use this double-edged sword judiciously and to their advantage rather than becoming slaves of this modern invention. This study further brings out the importance of the availability of counseling services to medical students, so that those already addicted can be helped and provided with remedial measures.

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