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The impact of excessive mobile phone use on students' sleep quality and behavioral patterns

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A B S T R A C T

Introduction: In recent years, the ubiquitous use of smartphones has become an essential aspect of daily life. This study aims to explore the relation between excessive mobile phone use and the sleep quality of college students in the field of Medical Sciences.

Material and Methods: This descriptive cross-sectional study involved a sample of 53 students, comprising 41 girls and 12 boys, selected through convenience sampling. Data was collected using the Cell-Phone Over-Use Scale (COS) and the Pittsburgh Sleep Quality Index (PSQI). The gathered data were analyzed using SPSS version 22 and statistical tests including Mann-Whitney and chi-square.

Results: The average Cell-Phone Over-Use Scale score among students was (38.48 ± 88.13), while the average sleep quality score was (11 ± 27.7). Findings revealed that the most prevalent sleep issue among students was the inability to fall asleep (71.69%). Conversely, breathing problems, coughing, and snoring during sleep had the lowest prevalence (18.86%) among students. Additionally, it was observed that female students exhibited higher mobile phone usage and lower sleep quality. Furthermore, a direct significant relationship was established between excessive mobile phone use and students' ability to fall asleep (p-value<0.05).

Conclusion: Therefore, controlling this factor can contribute to an improvement in students' quality of life and mental well-being.

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INTRODUCTION

In recent years, the integration of mobile phones and information technologies has become pervasive, shaping an essential component of modern lifestyles [1-3]. While these advancements have expedited work processes and minimized geographical distances, they also present potential threats to users, impacting their overall well-being [4-11].

In educational settings, students' widespread access to mobile phones and information tools has the potential to significantly influence their sleep patterns, potentially leading to sleep quality issues, delayed sleep, and subsequent impacts on their educational and professional performance [1, 12, 13].

Sleep quality, a vital element in individuals' lives, encompasses subjective indicators related to sleep experience, satisfaction, and post-sleep feelings [14]. Stress and anxiety can significantly contribute to sleep problems, affecting both the quantity and quality of students' sleep [15-17].

Despite sleep problems being widely acknowledged as a public health concern, research on this topic, particularly pertaining to students, remains limited [18]. The prevalence of insomnia among students is reported to be approximately 18.5% [19], with various unorganized activities such as TV watching, internet usage, gaming, and mobile phone use being cited as contributing factors to sleep disturbances [20]. Excessive use of mobile phones, leading to

mental preoccupation, physical symptoms of sleep deprivation, and disruption of sleep patterns, presents a significant concern in educational environments [17, 21, 22].

Hence, this study aims to identify potential links between excessive mobile phone use and sleep problems among students and to provide essential interventions to enhance students' sleep quality and overall well-being.

MATERIAL AND METHODS

In this applied descriptive-cross-sectional study, the target population consisted of college students specializing in Health Information Technology (HIT). Data was collected in December 2021 through an online questionnaire designed using the Porsline website. A total of 53 college students participated, utilizing an available sampling method. Inclusion criteria necessitated possession of a mobile phone, active usage during the study, and willingness to complete the questionnaires. Exclusion criteria involved non-participation in student groups on Telegram (because the group was formed in Telegram). Data collection involved the utilization of two questionnaires: The Cell-Phone Over-Use Scale (COS) and the Pittsburgh Sleep Quality Index (PSQI) (www.sleep.pitt.edu/psqi) [23].

The Cell-Phone Over-Use Scale (COS) questionnaire, developed by Gennaro, Flores, Gomez et al. in 2007, demonstrated a reliability of 0.85 among male and female Spanish students using the internal consistency method [24]. This questionnaire comprises 21 items based on 10 psychological indicators from the diagnostic guide and classification of mental disorders. The questionnaire employs a five-choice Likert scale answer format (1-very little, 2-little, 3-somewhat, 4-a lot, 5-very much). Higher scores indicate excessive mobile phone usage, with scores above 75 categorizing subjects as heavy users and scores below 25 categorizing them as low users.

RESULTS

In this study, the average age of the students was 21.09 years (±3), with 41 (77.4%) being female students and 12 (22.6%) being male students. The average score for excessive use of mobile phones among students was 48.38 (±88.13), while the average score for sleep quality was 11.23 (±7.27).

Table 1 presents the prevalence of various sleep problems among students. The findings indicate that 71.69% of students experienced difficulty falling asleep for more than 30 minutes, while 60.37% reported sleep disturbances due to waking up in the middle of the night or early in the morning. Confusion caused by forced awakening during sleep was reported by 41.50% of students, and 18.86% experienced breathing problems, coughing, and snoring during sleep. Additionally, 23% and 29% of students reported confusion caused by feeling extreme cold and disturbance due to feeling heat, respectively. Nightmares affected 69.81% of students, while 47.16% experienced pain during sleep. Furthermore, 22.64% reported using sleeping pills, 41.50% had difficulty staying awake during daily activities, and 66.03% experienced an inability to continue desired activities due to sleep problems.

Comparing the prevalence of sleep problems, it is evident that the most common issue among students is the inability to fall asleep (71.69%), while the lowest prevalence was related to breathing problems, coughing, and snoring during sleep (18.86%).

According to results, three students (5.7%) exhibited minimal mobile phone use, while 50 students (94.3%) used mobile phones moderately, and none used them extensively.

The sleep quality questionnaire scores ranged from 0 to 21, with 44 students (83%) experiencing poor sleep quality (PSQI > 5) and 9 students (17%) having good sleep quality (PSQI < 5). Girls had an average sleep quality score of 508.6 ± 73.11, and boys had 507.9 ± 5.9, indicating lower sleep quality in girls. However, no significant relationship between sleep quality and gender was found (p-value > 0.05).

Results revealed that boys' average mobile phone use was 491.15 ± 17.39, and girls was 311.12 ± 51.07, indicating higher use among girls. A significant difference was found in mobile phone use between boys and girls (p-value < 0.05).

In Table 2, 38 students (71.69%) struggled to fall asleep, while 46 students (86.79%) experienced various sleep disorders. 37 students (69.81%) had difficulty staying awake during daily activities, and 12 students (22.64%) used sleeping pills. A significant positive relationship was found between sleep delay, sleep disorders, and gender (p-value < 0.05).

Table 1: Frequency Distribution of Student Sleep Problems and Prevalence

Sleep problems	Prevalence rate	More than 3 times during the week	1-2 times a week	Less than once a week	Lack of problem
Inability to fall asleep for more than 30 minutes	38	18	16	4	15
Sleep disturbances caused by waking up in the middle of the night or early in the morning	32	14	6	12	21
Obsessive-compulsive sleep disturbance due to the need for the toilet	22	5	8	9	30
Sleep disturbance caused by breathing problems	10	2	3	5	42
Sleep disturbance caused by coughing or loud snoring	10	1	3	6	42
Sleep disturbance caused by extreme cold	23	3	6	14	29
Sleep disturbances caused by extreme heat	29	5	9	15	23
Sleep disturbance caused by bad dreams	37	9	9	19	15
Pain-induced sleep disturbance	25	3	7	15	27
Use of sleeping pills	12	4	2	6	39
Inability to stay awake during daily activities	22	3	7	12	30
Inability to sustain enthusiasm for doing things	35	11	9	15	17

Table 2: Relationship between the variables of the sleep quality questionnaire according to gender

Variables	Male		Female		p-value
	Without problems*	With problems*	Without problems*	With problems*	
Variable delay in falling asleep	7 (58.3)	5 (41.66)	8 (19.51)	33 (80.48)	0.01
Variable sleep disorders	0 (0)	10 (83.33)	4 (9.75)	36 (87.80)	0.016
Variable of daily functioning disorders	4 (33.33)	5 (41.66)	9 (21.95)	32 (78.04)	0.302
Variable use of sleeping pills	6 (50)	4 (33.33)	32 (78.048)	8 (19.51)	0.174
Subjective sleep quality variable	10 (83.33)	1 (8.3)	30 (73.17)	11 (26.82)	0.33

* The numbers outside the parentheses indicate the frequency and the numbers inside the parentheses indicate the percentage of participants.

DISCUSSION

The study findings suggest that girls exhibit lower sleep quality than boys and tend to use mobile phones more than boys, with a significant difference in mobile phone usage between the genders (p-value<0.05). This implies that girls' lower sleep quality may be due to increased mobile phone use. A study conducted at the University of Medical Sciences in 2016 revealed similar gender discrepancies in mobile phone usage [23].

In the current study, 3 students (5.7%) demonstrated minimal mobile phone usage, while 50 students (94.3%) used mobile phones at an average level. Notably, no students reported extensive use. This data mirrors a study conducted at Mohaghegh Ardabili University from 2011-2018, where 13% of students exhibited minimal mobile phone usage, 5.5% reported extensive use, and 81.5% used mobile phones at an average level [24].

Regarding sleep quality, scores higher than 5 (PSQI < 5) indicated poor sleep quality, aligning with studies conducted among Chinese college students [25].

The present study found a significant direct relationship between excessive mobile phone use and students' struggle to fall asleep, indicating that increased mobile phone usage is linked to difficulties in falling asleep. This aligns with a study in China in

2020, which demonstrated the effectiveness of limiting mobile phone use before sleep [21].

Onur Sapci and et al, measure the impact of smartphone use on academic success among college students and compare the academic performance but this article refers to the Behavioral Patterns [26].

The limitation of this study was the lack of cooperation in completing the questionnaires, which led to a smaller sample size being selected. Overall, these results underscore the critical impact of mobile phone usage on sleep quality, emphasizing the need for further research and potential interventions to address these concerns. It is recommended that in future studies, students from computer-related fields also participate in this survey.

CONCLUSION

Excessive mobile phone use has been linked to dependency, exhibiting behavioral patterns similar to addiction seen in substance abuse, alcoholism, and other compulsive behaviors. In severe cases, this dependency can significantly disrupt users' daily lives. Additionally, prolonged exposure to electromagnetic fields, particularly due to close proximity to mobile devices, may trigger stress protein responses, affecting brain activity, the nervous system, and overall consciousness. These physiological effects can, in turn, negatively impact sleep quality. Furthermore, excessive internet and social media engagement via smartphones has been associated with disrupted sleep patterns, highlighting the broader consequences of prolonged mobile phone use.

AUTHOR'S CONTRIBUTION

All authors contributed to the literature review, design, data collection, drafting the manuscript, read and approved the final manuscript.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest regarding the publication of this study.

ETHICAL APPROVAL

The Ethics Committee of Mashhad University of Medical Sciences approved this research (code: IR.MUMS.REC.1400.098)

FINANCIAL DISCLOSURE

No financial interests related to the material of this manuscript have been declared.

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