



MOBILE ADDICTION PATTERNS AMONG UNDERGRADUATE MEDICAL STUDENTS: A SOUTHERN INDIA PERSPECTIVE

Preventive & Social Medicine

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ABSTRACT

Background: The burgeoning use of mobile phones among undergraduate medical students has raised concerns about its adverse effects on their health. This study intends to assess the detrimental effects of excessive mobile phone usage among undergraduate medical students in a tertiary medical college in southern India and to evaluate the negative health consequences associated with excessive mobile phone use. **Materials and Methods:** A cross-sectional study was conducted from October 2020 to December 2020 among 626 undergraduate medical students in a tertiary medical college in southern India. Data were collected using a semi-structured, pretested questionnaire. The risk of smartphone addiction was evaluated using the Smartphone Addiction Scale-Short Version (SAS-SV). Fisher's exact test was used to test the associations in the data analysis, which was carried out using Microsoft Excel and SPSS software. **Results:** All respondents (100%) reported using mobile phones, with 83.2% using them for over 4 hours daily. Only 22% refrained from using their phones during classes, and 51.6% kept their phones near them while sleeping. A significant majority (84.3%) used social networking apps. Common symptoms included eye strain (67.9%), blurred vision (31.4%), and numbness/tingling in the palms (30.9%). According to the SAS-SV, 52.7% were at high risk of smartphone addiction. Screen time exceeding 4 hours daily was significantly associated with a high risk of addiction ($p < 0.0001$). High risk of addiction was also significantly linked with symptoms like eye strain ($p < 0.0001$), blurred vision ($p = 0.0115$), numbness/tingling in palms ($p < 0.001$), and heat/tingling in the auditory area ($p < 0.0001$). **Conclusion:** The study reveals a worrying prevalence of smartphone addiction risk among medical students, emphasizing the need for awareness and self-assessment of mobile phone usage habits. Further research is essential to develop standardized tools for early detection of mobile phone addiction and to explore effective interventions.

KEYWORDS

Smart phone, Screen time, Medical student.

INTRODUCTION

Mobile phones are wireless devices that facilitate communication over expansive networks without physical connections. They have become integral to modern life, providing easy access to the Internet for various activities, including social networking, banking, shopping, and education. India's mobile phone user base is projected to reach 0.820 billion by 2022, positioning it second globally after China [1, 2].

For medical students, mobile phones are vital for maintaining connections with peers and family, especially during long hospital hours. They also serve as essential educational tools, offering access to the dosage calculators, e-books, podcasts about medicine, and online lectures [3]. However, excessive mobile phone use is associated with negative health effects, such as headaches, impaired concentration, and fatigue [4]. Additionally, it may have an effect on biological systems, which may lead to stress, insomnia, and depression [5, 6]. The World Health Organization classifies mobile phone addiction as a non-substance addiction, marked by compulsive behaviour despite known adverse consequences [7].

New psychological conditions like nomophobia (fear of being without mobile phone connectivity) and ringxiety (hallucinating phone vibrations or rings) have emerged due to excessive mobile phone use [8, 9]. Mobile phone addiction has behavioural effects that are highlighted by terms like textxiety, textaphrenia, binge texting, and posttraumatic "text" disorder. [10]. Studies indicate a high prevalence of mobile phone addiction among Indian youth, particularly medical students, due to academic stress and burnout [8, 11]. Poor sleep quality associated with excessive mobile phone use exacerbates their risk of physical and mental health issues [6].

This study aims to explore mobile phone usage patterns among undergraduate medical students in a southern Indian tertiary medical college and assess the health implications of excessive mobile phone use.

MATERIALS AND METHODS

A cross-sectional observational study was conducted among undergraduate medical (MBBS) students in a tertiary medical college in southern India from October 2020 to December 2020. The anticipated prevalence of smartphone addiction was estimated at 50%, based on previous research [12]. A sample size of 0.384 was calculated with a 95% confidence interval and a 5% margin of error, with a final sample size of 500 to account for non-respondents. However, 626 responses were received and included in the analysis.

Data were collected using a semi-structured questionnaire administered via Google Forms, incorporating the Smartphone Addiction Scale-Short Version (SAS-SV) [13]. The SAS-SV, developed by Kwon et al., is a 10-item self-reported scale assessing smartphone addiction, with scores exceeding 34 indicating high risk. Data on health, sleep habits, physical fitness, and the COVID-19 pandemic's effect on mobile usage were all included, along with psychographic and demographic details. The questionnaire concluded with health education on the adverse effects of excessive mobile phone use and strategies to mitigate addictive behaviours. Data analysis was conducted using Microsoft Excel and SPSS software. Fisher's exact test was used to examine associations between variables, with statistical significance set at $p < 0.05$.

RESULTS

The study included 626 respondents with an average age of 20.14 ± 1.31 years, 69.3% of whom were female. All respondents owned mobile phones, with an average age of acquisition being 16.85 ± 1.94 years. Seventy percent of them accessed the Internet via both Wi-Fi and mobile data. Most respondents (83%) used their mobile phones for over 4 hours daily (Table 1). A majority (65%) did not use screen time monitoring apps, and approximately 70% were unfamiliar with terms like nomophobia, ringxiety, and textxiety (Table 2). Nearly two-thirds (63.1%) used headphones, though only 11% were aware of their potential to reduce radiation exposure.

Regarding mobile phone use during classes, 42% admitted to texting, while only 22% refrained from any mobile use. Popular applications included social networking (84%), YouTube (74%), OTT streaming platforms (60%), and online classes (48%). Ninety percent reported increased screen time since the onset of the COVID-19 pandemic.

Based on SAS-SV criteria, A high risk of mobile addiction was identified in 59.4% of the respondents. (Table 3). Screen time of ≥ 4 hours daily showed a significant association with high risk of mobile addiction ($p < 0.0001$).

Approximately 80% did not turn off their mobile phones before sleeping, and more than half kept their phones nearby. A quarter used their phones within an hour before sleeping, and a majority felt their sleep cycle was affected by mobile phone use.

A small percentage admitted to using mobile phones while driving. Forty-two percent felt that mobile use limited their daily physical activities, although half used physical fitness apps on their

phones. One-quarter avoided exercise due to increased mobile phone use.

Half of the respondents were aware of the potential health problems associated with electromagnetic radiation from mobile phones. The majority were aware of the detrimental effects on vision (92%) and hearing (25%). Reported side effects included eye strain (68%), heat/tingling in the auditory area (65%), blurred vision (31%), and numbness/tingling in the palms (31%). Significant associations were found between high risk of mobile addiction and symptoms such as eye strain ($p < 0.0001$), blurry vision ($p = 0.0115$), numbness/tingling in the palms ($p < 0.0001$), and heat/tingling in the auditory area ($p < 0.0001$) (Table 4).

DISCUSSION

India has witnessed a rapid expansion in its mobile user base, boasting 90 mobile connections per 100 people, making it the fastest growing in the world [14]. Our study aligns with these statistics, revealing that all respondents owned mobile phones, which is consistent with findings from similar studies among Indian medical students [15]. A significant concern emerging from our study is the high risk of mobile addiction, with 59.4% of participants identified as at risk according to the SAS-SV scale. This figure is comparable to findings by Dharmadikari et al. (46.15% among 195 medical students in Maharashtra) and Kumar et al. (44.7% among 150 medical interns in South India) [16, 17]. However, it is notably higher than the general Indian population's smartphone addiction rate, estimated at 39-44% by Davey and Davey [18]. This discrepancy could be attributed to the long hours medical students spend away from their social support networks, increasing their reliance on mobile phones.

A notable 81.1% of respondents reported more than four hours of screen time daily, surpassing the 60% reported by Ammati et al. and the 46% by Dasgupta et al. in 2017 among medical students from West Bengal [15, 19]. The COVID-19 pandemic has likely exacerbated this increase in screen time due to the shift from traditional classroom teaching to online virtual learning environments. The positive correlation between prolonged screen time and mobile phone addiction ($p < 0.0001$) is consistent with findings by Pavithra et al. among Bangalore medical students [20].

The use of mobile data to access the internet was reported by 93.8% of respondents, a figure similar to the 87% found by Basu et al. in a study of 388 medical students from New Delhi in 2017 [21]. The affordability of mobile data has significantly boosted consumption in India [22]. Social media applications were the most commonly used (84.4%), followed by gaming apps (31.2%). These patterns align with Tang et al.'s 2017 study, which found Asian students more inclined towards social networking compared to their American peers, who preferred gaming [23]. Ammati et al. also noted a higher use of mobiles for social networking (46%) than gaming (7.9%) among medical students [15].

In-class mobile phone usage was reported by 77.6% of respondents, primarily for text messaging (41.5%). This behavior parallels the 15% reported by Siddiqi et al. in their study of 129 medical students in Oman [24]. The prevalent use of mobile phones during class raises concerns about distractions and the potential misuse of electronic devices intended for educational purposes. Measures such as requiring students to switch off phones during classes might mitigate these distractions.

In comparison to the 83% reported by Siddiqi et al., 63.1% of respondents reported using headphones. [24]. Additionally, 43.7% were unaware that headphone use can reduce radiation exposure from mobile phones, compared to 90% awareness among Omani students [24]. There is a need to increase awareness about the benefits of using hands-free devices or speakerphone options to minimize health risks associated with radiofrequency radiation [25].

Regarding sleep habits, 80% of respondents did not switch off their phones before bed, and 92% kept them within five feet. This behavior is similar to that observed by Siddiqi et al., where 70% of students left their phones on during bedtime [24]. More than half (53.8%) of our respondents reported that their sleep quality was adversely affected by mobile phone use. Studies have shown that increased mobile use can reduce melatonin production and impair sleep quality [26, 27]. To mitigate these effects, it is advisable to turn off mobile data/Wi-Fi

before sleeping and to keep the phone at a distance. Another way to avoid using your phone near your bed is to use a traditional alarm clock.

Finally, 65.7% of respondents experienced difficulty concentrating due to mobile phone use, significantly higher than the 26.4% reported by Basu et al. in 2018 among New Delhi medical students [21]. Additionally, 62.9% indicated that their friends and family complained about their excessive mobile use, a sharp increase from the 20% reported by Aggarwal et al. in 2012 among North Indian postgraduate medical students [28]. This trend indicates a growing burden of issues related to mobile phone addiction over the years.

In conclusion, while 53% of respondents viewed mobile phones as essential for staying connected with family, this was lower than the 83% reported by Dixit et al. [29]. The strength of our study lies in its representative sample of medical students, a demographic particularly susceptible to mobile addiction. However, the results may not be generalizable to broader populations due to the specific characteristics of our sample group, which is relatively young and highly educated. Further research is needed to explore interventions and policies that can mitigate the negative impacts of mobile phone addiction among medical students.

CONCLUSION

Mobile addiction has emerged as a significant concern among medical students, with high prevalence and associated health risks. Regular monitoring, self-awareness, and educational interventions are crucial to mitigate the impact of mobile addiction. Future research should focus on standardized tools for early detection and effective strategies to reduce mobile addiction's negative effects on health and well-being.

Table 1: Mobile Screen Time Among The Participants

Mobile Screen Time	Percentage of Respondents
1-2 hours	2%
2-4 hours	15%
4-6 hours	36%
>6 hours	47%

Table 2: Awareness Of Terms Related To Mobile Addiction

Term	Percentage of Respondents
Nomophobia	16%
Ringxiety	18%
Textxiety	2%
None	64%

Table 3: Respondents With High Risk Of Mobile Addiction

Gender (cutoff)	N (%)
Male (≥ 31)	123 (64.10%)
Female (≥ 33)	249 (57.40%)
Total	372 (59.42%)

Table 4: Comparison Of Mobile Usage Patterns And Symptoms Of High Risk Of Mobile Addiction

Variables	Present (n = 372), N (%)	Absent (n = 352), N (%)	P value
Gender			
Male	123 (19.6%)	69 (11%)	0.1335
Female	249 (39.8%)	185 (29.5%)	
Screen time			
< 4 hours	33 (5.3%)	73 (11.7%)	<0.0001
≥ 4 hours	339 (54.1%)	181 (28.9%)	
Age			
≤ 20 years	251 (20.1%)	153 (24.4%)	0.07
> 20 years	121 (19.3%)	101 (26.1%)	
Age of first mobile			
≤ 20 years	123 (19.6%)	65 (10.4%)	0.0508
> 20 years	249 (39.8%)	189 (30.2%)	
Blurry vision			
Maybe	39 (6.2%)	19 (3%)	0.0115
Yes	129 (20.6%)	67 (10.7%)	
No	204 (32.6%)	168 (26.9%)	
Eye strain			
Maybe	45 (7.2%)	35 (5.6%)	<0.0001
Yes	281 (44.9%)	143 (22.8%)	
No	46 (7.3%)	176 (12.1%)	

Numbness/tingling in palm			
Maybe	45 (7.2%)	17 (2.8%)	<0.0001
Yes	135 (21.6%)	58 (9.3%)	
No	192 (30.7%)	179 (28.6%)	
Heat/tingling in the auditory area			
Maybe	42 (6.7%)	23 (3.7%)	<0.0001
Yes	117 (18.7%)	38 (6%)	
No	213 (34%)	193 (31%)	

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