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Dependence of mobile phone usage among medical students of private medical college in Puducherry: A cross-sectional analytical study

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Abstract

Background: Smartphones have made modern life more convenient and secure, but excessive use has adversely affected the health and academic performance of young adults. As smartphone addiction becomes more widespread, it is essential to understand its prevalence and the contributing factors. *Aim and Objectives*: To assess the prevalence of smartphone addiction and examine the usage patterns and influencing factors among medical students in a private college in Puducherry. *Material and Methods:* A cross-sectional study was conducted among 395 students using a validated questionnaire, incorporating the SAS-SV, PSQI, PSS, MSPSS, and WHO-5. Descriptive statistics and chi-square tests were performed, and logistic regression was applied to identify key predictors. *Results* : Smartphone addiction was identified in 40.5% of students, with males demonstrating significantly higher rates. Addicted students were more likely to report poor academic outcomes, disturbed sleep, elevated stress, and diminished well-being. Stress (AOR = 31.55) and poor sleep quality (AOR = 2.46) emerged as the most significant predictors.*Conclusion:* The study reveals a high prevalence of smartphone addiction among medical students, with clear academic and psychological consequences. These results highlight the need for timely identification and structured interventions to mitigate its harmful effects.

Keywords: Smartphone, Addiction, Mobile

Introduction

Smartphone use is now deeply integrated into daily life across all age groups, especially among youth and young adults, significantly influencing routine activities [1]. While these devices provide convenience and connectivity, their overuse has been linked to adverse health outcomes including stress, fatigue, and reduced concentration, all of which can affect academic performance [2]. Smartphones have evolved into multifunctional tools with advanced features such as large displays, storage capacity, and computing power [2].

Medical students, in particular, are vulnerable due to low physical activity and elevated stress levels [3]. A majority of mobile users are aged between 21 and 30 years, a group highly affected by smartphone dependence [4]. Studies suggest that many adolescents never turn off their devices, sometimes using them for an average of 10 hours per day [4]. Excessive smartphone use has been strongly associated with symptoms such as musculoskeletal pain, visual disturbances, and poor sleep [5]. It also correlates with mental health concerns like anxiety, depression, impulsivity, and social disconnection [5]. Often, students are unaware of their dependence, underscoring the

need for further research into the causes and impacts of smartphone addiction [6].

Material and Methods

A cross-sectional study was carried out among undergraduate and postgraduate students at a private medical college in Puducherry from January to June 2024. A total of 395 participants were selected using stratified random sampling, ensuring representation across MBBS and postgraduate levels. Participants aged 17 years and above who regularly used smartphones and provided informed consent were included. The calculated sample size was 377; 395 were finally enrolled.

Ethical clearance: The study received ethical clearance from the Institutional Ethics Committee of Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry, with number: No.IEC/C-P/19/2023, dated 15/10/2024. Written informed assent was obtained from the participant, and written informed consent was additionally obtained from their parent/guardian, as per the Institutional Ethics Committee's approved protocol prior to data collection

A validated structured questionnaire was used, divided into three sections: 1. Socio-demographic profile (age, gender, year of study, consent); 2. Smartphone Addiction Scale – Short Version (SAS-SV) to measure smartphone addiction; 3. Usage patterns across domains: social media, entertainment, academics, shopping, finance, news, music, health, and official communication

Operational definitions

Pittsburgh Sleep Quality Index (PSQI) was used to measure sleep quality with scores >5 indicating poor sleep [8].

Perceived Stress Scale (PSS), a 10-item scale measuring stress over the past month [9] was used to measure perceived stress.

Multidimensional Scale of Perceived Social Support (MSPSS), a 12-item scale was used to assess perceived social support [10].

SAS-SV, a 10-item scale rated on a 6-point Likert scale with cut-offs defined differently for men and women [7], was used to measure smartphone addiction.

WHO-Five (WHO-5) Well-being Index was used to evaluate emotional well-being with scores < 50% indicating poor mental health [11].

Additionally whether the mobile use was restricted for institutional/professional purposes was also recorded [12].

Statistical analysis: Data were collected using Google forms and maintained confidentially. Analysis was done using the Statistical Package for the Social Sciences software version 21. Descriptive and inferential statistics (Chi-square, logistic regression) were used with significance set at $p < 0.05$.

Results

The study included a total of 395 participants, with the majority (32.41%) aged 20–22 years. Female participants made up 60.76% of the sample population. The primary reasons for smartphone use were entertainment (97.47%) and with minimal use reported for financial purposes (0.5%). Smartphone addiction was observed in 40.51% of participants, with a higher prevalence among males (64.5%) compared to females (25.0 %, $p < 0.001$). Symptoms associated with addiction included disruptions to planned activities, difficulty concentrating on academic or work tasks, and physical discomfort such as wrist or neck pain. Additionally, 13.48% of participants admitted to using smartphones longer than

intended, while 18.14% reported receiving frequent remarks from peers about excessive usage. A significant association was identified between smartphone addiction and various academic, psychosocial, and demographic factors. Addicted participants demonstrated poorer academic performance, with 34.4% reporting poor grades, compared to 17.0% among non-addicted participants (p = 0.002). Poor sleep quality was significantly more common among addicted participants (71.9% vs. 25.5%, p = 0.001), as were high stress levels (80.0% vs. 25.5%, p = 0.002). Furthermore, low social engagement (68.8% vs. 43.0%, p = 0.003) and poor mental well-being (75.0% vs. 42.6%, p = 0.004) were markedly more prevalent among those with smartphone addiction. The logistic regression model revealed that high stress levels had the strongest association with smartphone addiction (AOR = 31.55, 95% CI = 11.71–85.02, p < 0.001), followed by poor sleep quality (AOR = 2.46, 95% CI = 1.28–4.72, p = 0.007). Low social engagement did not show a statistically significant association (AOR = 1.23, 95% CI = 0.39–3.83, p = 0.724).

Figure 1 shows pattern of smart phone usage among participants. Among 395 students percentage categorical division of students using smart phone for social networking was 95.44%, entertainment was 97.47%, mobile gaming was 45.82%, education was 62.53%, shopping was 48.10%, finances was 45.82%, news and magazine was 83.54%, music and audio was 92.41%, health and fitness was 34,44%, official communication was 68.61. Thus, it was found that smartphone usage for entertainment ranked highest among other categories of usage, and health and fitness was the least used category.

The most frequently reported reason was social networking (34.7%), followed by academic use (25.6%), entertainment (21.8%), and communication (17.9%). These findings reflect a shift in mobile phone utility, with social media platforms playing a dominant role in daily usage patterns, potentially overshadowing their educational use.

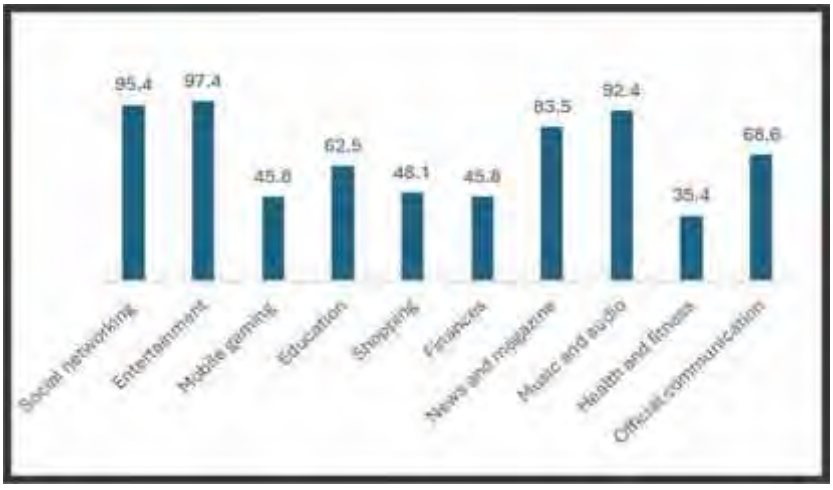

Figure 1: Number of students with various categories of smart phone usage (N=395)

Table 1: Socio-demographic characteristics of participants (N = 395)

Variable		Frequency (Percentage)
Age (in years)	17-19	68 (17.22%)
	20-22	128 (32.41%)
	23-25	98 (24.81%)
	26-30	62 (15.7%)
	>30	39 (9.87%)
Gender	Male	155 (39.24%)
	Female	240 (60.76%)
Smartphone Addiction	Present	160 (40.51%)
	Absent	235 (59.49%)

Table 2: Smartphone addiction indicators among participants (N = 395)

Indicators	Strongly disagree Number (Percentage)	Disagree Number (Percentage)	Weakly disagree Number (Percentage)	Weakly agree Number (Percentage)	Agree Number (Percentage)	Strongly agree Number (Percentage)
Missing planned work due to smart phone use?	53 (6.11%)	123 (8.24%)	38 (9.74%)	49 (10.23%)	108 (18.30%)	24 (20%)
Having a hard time concentrating in class, while doing assignments, or while working due to smartphone use?	72 (8.29%)	132 (8.85%)	42 (10.47%)	66 (13.77%)	71 (12.03%)	12 (10%)
Feeling pain in the wrists or at the back of the neck while using a smartphone?	75 (8.64%)	160 (10.72%)	37 (9.23%)	48 (10.02%)	63 (10.67%)	12 (10%)

Continued...

Won't be able to stand not having a smartphone?	78 (8.98%)	148 (9.92%)	41 (10.22%)	39 (8.14%)	68 (11.52%)	21 (17.5%)
Feeling impatient and fretful when I am not holding my smartphone?	98 (11.29%)	177 (11.86%)	45 (11.22%)	43 (8.97%)	25 (4.23%)	7 (5.833%)
Having my smartphone in my mind even when I am not using it?	111 (12.78%)	176 (11.79%)	39 (9.72%)	35 (7.31%)	31 (5.25%)	3 (2.5%)
I will never give up using my smartphone even when my daily life is already greatly affected by it.	106 (12.21%)	151 (10.12%)	55 (13.71%)	36 (7.52%)	41 (6.94%)	6 (5%)
Constantly check my smartphone so as not to miss conversations between other people on Twitter or Facebook.	108 (12.4%)	163 (10.92%)	35 (8.72%)	42 (8.77%)	42 (7.11%)	5 (4.16%)
Using my smartphone longer than I had intended?	117 (13.48%)	168 (11.26%)	38 (9.47%)	33 (6.89%)	34 (5.76%)	5 (4.16%)
The people around me tell me that I use my smartphone too much.	50 (5.76%)	94 (6.30%)	31 (7.73%)	88 (18.37)	107 (18.14%)	25 (20.83%)

Table 3: Association between smartphone addiction and academic, psychosocial, and demographic factors (N = 395)

	Variable	Addicted (n=160)	Not-addicted (n=235)	*p*
Gender	**Male**	100 (64.5%)	55 (23.4%)	<0.001
	Female	60 (25.0%)	180 (76.6%)	
Academic performance	**Excellent**	10 (6.3%)	75 (31.9%)	0.002
	Good	35 (21.9%)	85 (36.2%)	
	Average	60 (37.5%)	35 (14.9%)	
	Poor	55 (34.4%)	40 (17.0%)	
Sleep quality	**Poor sleep quality**	115 (71.9%)	60 (25.5%)	0.001
	Good sleep quality	45 (28.1%)	175 (74.5%)	
Stress levels	**High stress levels**	128 (80.0%)	60 (25.5%)	0.002
	Low stress levels	32 (20.0%)	175 (74.5%)	
Social engagement	**Low social engagement**	110 (68.8%)	101 (43.0%)	0.003
	Good social engagement	50 (31.3%)	134 (57.0%)	
Mental well-being	**Poor mental well-being**	120 (75.0%)	100 (42.6%)	0.004
	Good mental well-being	40 (25.0%)	135 (57.4%)	

Table 4: Logistic regression model (N = 395)

Variable	AOR (95% CI)	*p*	Reference category
Constant	0.25 (0.17 – 0.38)	< 0.001	—
Poor sleep quality	2.46 (1.28 – 4.72)	0.007	Good Sleep Quality
High stress levels	31.55 (11.71 – 85.02)	< 0.001	Low Stress Levels
Low social engagement	1.23 (0.39 – 3.83)	0.724	Good Social Engagement

Discussion

The current research shows a high rate of smartphone addiction among university students, with 40.51% of the participants qualifying for addiction. This rate is significantly higher than the 29.8% that the study by Alhassan *et al*. found in a comparable population, indicating a possible increasing trend or regional difference in smartphone dependency among young populations [13]. The greater rate of addiction among males (64.5%) as compared to females (25.0%) in our group is contrary to the studies by Sohn and Hawi *et al*. [14-15], where higher addiction rates have been observed in females, perhaps indicating differences in the use patterns of smartphones like entertainment vs. social communication.

Smartphone addiction had a strong effect on academic performance, with 34.4% of addicted students having poor grades compared to just 17.0 % of non-addicted students ($p = 0.002$). This result supports the findings of study by Hawi *et al*. [15], who found that there was a negative correlation between excessive smartphone usage and academic performance, attributed to greater distractions and poor concentration.

Psychosocial characteristics were also significantly linked to smartphone addiction with 71.9% of addicted participants compared to 25.5% of non-addicted participants reporting poor sleep quality ($p = 0.001$), as supported by Panova *et al*., thereby showing that excessive screen use interfered with sleep quality and patterns [16]. High levels of stress occurred in 80.0% of addicts as compared to 25.5% of non-addicts ($p = 0.002$), validating Panova *et al*.'s assertion that stress is both a predictor and result of problematic smartphone use [16]. Logistic regression analysis further attested to the association, with high stress having a strong link with addiction (AOR = 31.55, 95% CI = 11.71–85.02, $p < 0.001$). Additionally, poor mental health was also higher in addicted students (75.0% vs. 42.6%, $p = 0.004$), a finding that parallels the results of Elhai *et al*. to connect smartphone addiction with depression and anxiety [17].

Interestingly, although low social engagement was more prevalent among addicted students (68.8% vs. 43.0%, $p = 0.003$), it was not significant in the regression model (AOR = 1.23, 95% CI = 0.39 –3.83, $p = 0.724$), indicating that the association between smartphone use and social engagement is perhaps more intricate or mediated by other psychosocial variables. Contrary to Twenge and Campbell's postulation that heightened screen time displaces social interaction directly [18].

The most common reasons for smartphone use in this study were entertainment (97.47%) and communication (42%), which could account for the high levels of addiction and the gender disparities found, since the studies by Sohn and Hawi *et al*. [14-15] have indicated that entertainment-based use is more closely linked with addictive behaviours.

The cross-sectional design of the study restricts causal inference, and use of self-reported data may lead to recall bias. Longitudinal designs and objective use tracking should be used in future research to elucidate directionality and mechanisms of these associations better [19]. Finally, the results emphasize the multi-determinant aspects of smartphone addiction in university students where academic, psychosocial, and demographic determinants all contributed significantly.

These findings call for institutional policy actions within medical colleges, such as incorporating mandatory digital wellness modules into the

curriculum, implementing campus-wide guidelines on responsible smartphone use during academic and clinical hours, and establishing regular screening programs for stress and sleep disorders. Additionally, structured mental health support services, sleep hygiene workshops, and monitored "tech-free" zones in hostels or libraries could promote healthier technology habits. Future longitudinal research is essential to examine causality and assess the effectiveness of such targeted institutional interventions in reducing smartphone addiction and its adverse academic and psychosocial impacts.

Conclusion

This study reveals a high prevalence of smartphone addiction among medical students, with over 40% affected—particularly males. Addiction was significantly associated with impaired academic performance, elevated stress levels, and poor sleep quality, with stress and sleep emerging as key predictors in multivariate analysis. While low social engagement and poor mental well-being were more common among addicted students, they were not statistically significant predictors.

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