



SMARTPHONE ADDICTION: PREVALENCE AND ASSOCIATED FACTORS AMONG UNDERGRADUATE STUDENTS OF A MEDICAL COLLEGE IN TAMIL NADU, INDIA – A CROSS-SECTIONAL STUDY

Kecanduan Smartphone: Prevalensi Dan Faktor Terkait Pada Mahasiswa Di Fakultas Kedokteran Di Tamil Nadu, India – A Cross-Sectional Study

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ABSTRACT

Background: Smartphone proliferation has raised concerns over smartphone addiction among medical students under academic pressure. Excessive use has been linked to detrimental physical and psychological effects, impacting academic performance and well-being. **Purpose:** This study aims to determine smartphone addiction prevalence and associated factors in undergraduate medical students at a Tamil Nadu medical college. **Methods:** This cross-sectional study was conducted among undergraduate medical students using the Smartphone Addiction Scale – Short Version (SAS-SV). **Results:** Smartphone addiction was prevalent in 26.9% of the study population. About 86.1% of students use smartphones over 6 hours daily. Social networking and YouTube were the most used features. Multivariable analysis indicated that male gender with AOR 1.94 (1.19 – 3.18) and smartphone use over 6 hours per day with AOR 4.67 (2.48 – 8.78) were significantly associated with smartphone addiction. **Conclusion:** A study revealed 25% of medical students showed smartphone addiction symptoms. Male gender and prolonged daily use were key risk factors. The findings emphasize the need for behavioral interventions and school-based campaigns promoting responsible smartphone use and reducing addiction effects.

Keywords: addiction, medical students, smartphone

ABSTRAK

Latar Belakang: Penggunaan smartphone telah menyebar luas dengan meningkatnya kekhawatiran atas kecanduan smartphone, terutama di kalangan mahasiswa kedokteran yang berada di bawah tekanan akademik yang intens. Penggunaan smartphone yang berlebihan telah dikaitkan dengan efek fisik dan psikologis yang merugikan, yang berdampak pada kinerja akademik dan kesehatan psikologis. **Tujuan:** Studi ini bertujuan untuk memperkirakan prevalensi kecanduan smartphone dan faktor terkait pada mahasiswa kedokteran sarjana di sebuah perguruan tinggi kedokteran di Tamil Nadu. **Metode:** Studi cross-sectional ini dilakukan di kalangan mahasiswa kedokteran sarjana menggunakan Smartphone Addiction Scale – Short Version (SAS-SV). **Hasil:** Kecanduan smartphone lazim terjadi pada 26,9% dari populasi penelitian. Sekitar 86,1% siswa menggunakan smartphone selama lebih dari 6 jam per hari. Jejaring sosial dan YouTube adalah fitur yang paling sering digunakan. Analisis multivariabel menunjukkan bahwa jenis kelamin pria dengan AOR 1,94 (1,19 – 3,18) dan penggunaan smartphone selama lebih dari 6 jam per hari dengan AOR 4,67 (2,48 – 8,78) secara signifikan terkait dengan kecanduan smartphone. **Kesimpulan:** Seperempat mahasiswa kedokteran ditemukan kecanduan smartphone. Jenis kelamin pria dan penggunaan harian yang berkepanjangan diidentifikasi sebagai faktor risiko utama. Temuan ini menggarisbawahi perlunya intervensi perilaku dan kampanye pendidikan berbasis sekolah yang mempromosikan penggunaan ponsel cerdas yang sehat dan mengurangi efek buruk dari kecanduan.

Kata Kunci: kecanduan, mahasiswa kedokteran, smartphone

INTRODUCTION

In recent years, the phenomenon of smartphone addiction has emerged as a pressing global public health concern, with millions of individuals worldwide affected. The pervasive proliferation of smartphones has led to their extensive utilization across diverse demographic groups, particularly among young adults (Aljomaa *et al.*, 2016). Mobile phone overuse has been associated with a variety of deleterious consequences worldwide, including impaired cognitive function, sleep disturbances, and the development of psychological disorders such as depression and anxiety (Kim *et al.*, 2019; Elhai *et al.*, 2017). These adverse outcomes can lead to a decline in academic and occupational performance. The World Health Organization (WHO) has identified behavioral addictions, including those involving technology use, as pressing emerging problems that require immediate attention (WHO, 2018). Mobile phone addiction has been classified as a non-substance addiction (WHO., 2025).

According to research, the number of mobile subscribers in India in 2021 was 1.2 billion, with approximately 750 million of them using smartphones (Deloitte – The Hindu, 2025). The proliferation of smartphone use among adolescents is a matter of significant concern, as evidenced by the growing body of research highlighting smartphone addiction as a prevalent social health concern (Rathod *et al.*, 2022).

In addition to their use for entertainment and gaming, smartphones are also employed by students for academic purposes and to communicate with friends and family. Nevertheless, extant research suggests that smartphone addiction engenders deleterious health effects, including but not limited to musculoskeletal disorders, ocular manifestations, and an elevated risk of psychological disorders.

Moreover, these effects extend to social life, communication, and concentration (Sut *et al.*, 2016; Jonsson *et al.*, 2011; Lee *et al.*, 2014; Zheng *et al.*, 2014).

A body of research has identified a heightened propensity among medical students to develop such addictions, a phenomenon attributed, in part, to the pervasive stress associated with their arduous academic curriculum (Basu *et al.*, 2018). Consequently, there is a possibility that their academic performance may be adversely affected. A multicentric study conducted in Karnataka has demonstrated a substantial decline in academic performance among students who exhibit symptoms of mobile addiction (Zeera *et al.*, 2024). It has been demonstrated that prolonged use of smartphones will result in tolerance, compelling a gradual increase in smartphone use to attain the same level of satisfaction. In addition, the need to substitute operating devices with new models that have appeared on the market has been identified (Choliz *et al.*, 2010)

Despite the existence of extensive global research on the impacts of smartphone addiction, there is a paucity of such comprehensive studies in Tamil Nadu. However, there is a paucity of extant studies in this domain. The scant research that has been conducted is limited by smaller sample sizes or a focus on a limited number of psychosocial factors (Panicker & Sivaanusuya, 2020; J.i.1 *et al.*, 2020).

This study is novel in its application to this particular context, thereby addressing the extant knowledge gap by providing an updated prevalence estimate of smartphone addiction and its multidimensional predictors. By so doing, the study facilitates the strengthening of context-specific interventions and support systems in our institution and other medical colleges. The objective of this study is to estimate the

prevalence of smartphone addiction and its associated factors among undergraduate medical students at a medical college in Tamil Nadu.

METHOD

Study Design

This cross-sectional study was conducted among the undergraduate medical students of Government Thiruvarur Medical College from May to July of 2024.

Population and Sample

The sample size was calculated using the formula

$$N = Z^2 pq/d^2$$

For an expected prevalence (p) of smartphone addiction among medical students from previous studies (Ammati *et al.*, 2018) of 36.8% with Z value of 1.96 at 95% confidence level at 5% (Absolute precision), the sample size required was 360 study participants

$$q = 1-p = 63.2\%$$

$$1.96 \times 1.96 \times 36.8 \times 63.2$$

$$N = \frac{\text{-----}}{5 \times 5}$$

= 357. Sample size is therefore taken as 360.

Sampling Method

Stratified random sampling method has been used for the study. The undergraduate medical students of Government Thiruvarur Medical College were divided into five strata based on their academic year of study. From each stratum, 72 students were chosen by simple random sampling method to achieve the sample size of 360.

Inclusion Criteria

Undergraduate medical students of Government Thiruvarur Medical College

who used smartphone and has agreed to participate in the study.

Exclusion Criteria

- 1) Students who did not use smartphone
- 2) Students who did not consent to participate in the study

Data Collection

After obtaining permission from the Institutional Ethical Committee and from The Dean, Government Medical College and Hospital, the investigator has started collecting the data. The investigator has obtained consent verbally from the study participants and then administered a pretested semi-structured questionnaire to collect the data.

Study Variables

A pretested semi-structured questionnaire was administered which had 3 sections:

1. Section I – Details of the participants like name, Age, gender and residence.
2. Section II – Smart phone usage and the pattern of use like age of getting first smartphone, hours of smart phone usage in a day, Main application of smart phone other than calling, screen time monitoring and physical discomfort like neck pain, eye strain are collected using closed ended questions.
3. Section III - Smart phone Addiction Scale - Short version (SAS – SV) to assess the addiction where a cut off value of 31 for males and 33 for females is used from the pre-existing literature.

SAS – SV is a short version of the Kwon *et al.* scale that has concurrent validity and internal consistency. This is a six-point Likert scale self-report questionnaire consisting of ten items. The following areas are addressed by SAS-SV: overuse, tolerance, withdrawal, cyberspace-oriented relationships, and disruption of daily life. For

evaluating smartphone addiction, it has strong validity (Content validity index – 0.93) and reliability (Cronbach’s alpha – 0.85). According to (Kwon *et al.*, 2013) a cutoff value of 31 was used for males and 33 for females.

Statistical Analysis

The data was entered in MS Excel and analyzed using SPSS version 16.0

1. Prevalence of Smartphone addiction was given as a proportion with 95% CI.
2. Continuous variables were represented as mean with standard deviation and categorical variables were represented as proportions.

Table 1. Socio Demographic Factors of the Study Population

Variable	Frequency (n)	Percentage (%)
Gender		
Male	139	38.6%
Female	221	61.4%
Place of stay		
At College hostel	320	88.9%
At Home with parents	40	11.1%
Age of getting the first Smart phone		
< 10 years	2	0.6%
11 – 16 years	54	15%
17 – 21 years	299	83.1%
> 21 years	5	1.4%

Table 1 showed the socio demographic factors of the study population. Most of the study population were females (61.4%). 88.9% of the study population were residing in the College hostel. 83.1% of the

3. Multiple logistic regression was used to find the association between smart phone addiction and the factors influencing using backward elimination method.

Ethical Clearance

This research has passed the ethical clearance from the Institutional Ethical Committee, Government Thiruvapur Medical College with the letter number DHR Reg No. EC/NEW/INST/2023/TN/0296.

RESULT

Mean age of the study participants (SD) – 20.81 (1.44) years.

study population have obtained their first smartphone between 17 – 21 years. Only 1.4% of the study population have obtained their first smartphone after the age of 21 years.

Table 2. Smart Phone Usage Patterns in the Study Population

Variable	Frequency (n)	Percentage (%)
Smart phone use in a typical day (hrs)		
≤6 hours	310	86.1%
> 6 hours	50	13.9%
Use of screen time monitoring app		
Yes	144	40%
No	216	60%
Keeping the mobile phone bedside during sleep		
Yes	282	78.3%
No	78	21.7%
Checking the phone in between while sleeping		
Yes	128	35.6%
No	232	64.4%

Table 2 illustrated that 13.9% of the study population used mobile phones for more than 6 hours in a typical day. Only 40% of the study population has screen monitoring

applications to track their screen time. Around one third (35.6%) of the study population have the habit of checking their phones while sleeping.

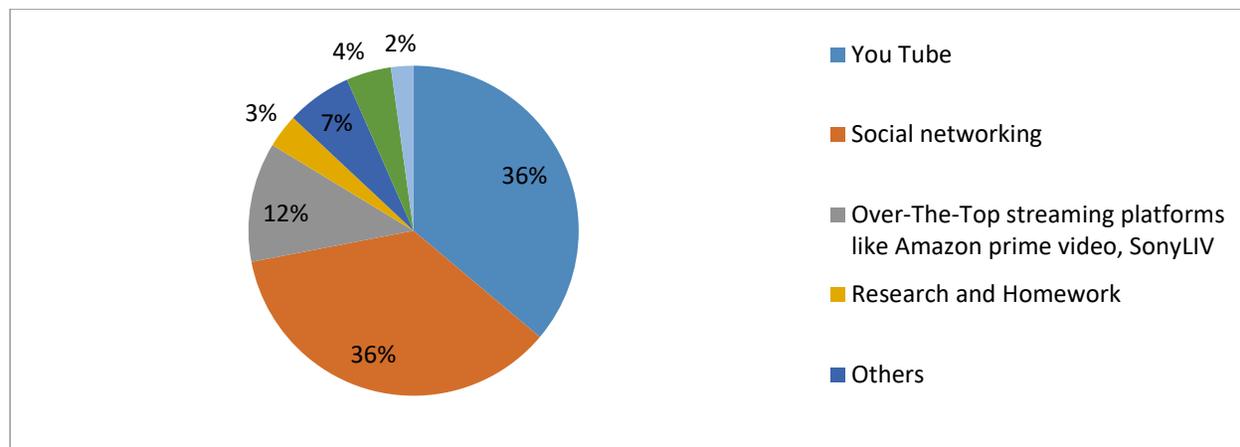


Figure 1. Main Activity for Which Smart Phone Is Predominantly Used by the Study Population

Figure 1 showed that around one third of the Study population used Smart phones predominantly for social networking. Another one third of the study population’s main activity was Youtube. Only 2% of the study population used the smart phone for watching/reading news which was the least preferred activity followed by educational

purposes like Homework and online classes (3% and 4%) respectively.

Smartphone addiction among the study population using SAS – SV: 26.9%
 Smartphone addiction among males: 36%
 Smartphone addiction among females: 21.3%

Table 3. Association between various independent variables and Smartphone addiction in the study population

Study Variable	Crude OR (95% CI)	P-Value	Adjusted OR (95% CI)	P-Value
Gender				
Male	2.08 (1.29 – 3.33)	0.002	1.94 (1.19 – 3.18)	0.008
Female	Reference		Reference	
Family arrangement				
At College Hostel	1.30 (0.59 – 2.85)	0.503		
At Home with Parents	Reference			
Age of onset of smart phone use				
< 10 years	0.50 (0.03 – 8.46)			
11 – 16 years	0.34 (0.02 – 5.61)	0.573		
17 – 21 years	0.25 (0.002 – 8.56)			
> 21 years	Reference			
Smart phone use in hours/day				
> 6 hours	4.91 (2.63 – 9.16)	< 0.001	4.67 (2.48 – 8.78)	< 0.001
≤ 6 hours	Reference		Reference	
Screen time monitoring app				
No	0.83 (0.51 – 1.33)	0.438		
Yes	Reference			

Table 3 showed that males and those who use smartphones for more than six hours on a typical day were at higher odds of

developing smartphones addiction. All variables with the significant association

were subjected to multivariate analysis, and the results were tabulated.

The multivariate analysis confirmed that the variables retained their significant association with smartphone addiction. Males had 1.94 times increased odds of developing smartphone addiction, and increased smart phone usage (> 6 hours) on a typical day was 4.67 times higher odds. Both findings were statistically significant.

DISCUSSION

A study conducted by Chatterjee *et al* (2021) among medical students in North India showed the prevalence of smartphone addiction among males as 46.15% and among females as 33.33%. This study employed the same SAS – SV scale as our study and the addiction rates were found to be higher in both males and females compared to our study. However, the prevalence of addiction was more in the males compared to females similar to our study. The prevalence of problematic smartphone use (PSU) among college students varied greatly, ranging from 36.5% to 67%, with a mean of 52%, according to a systematic review conducted in 2023 (Candussi *et al.*, 2023). Similarly, during the COVID-19 quarantine, 62.4% of Jordanians reported having a smartphone addiction, according to an online survey result (Saadeh *et al.*, 2022). Given the effect of the COVID-19 pandemic on smartphone use patterns, these discrepancies can be explained by differences in study populations, assessment instruments, cultural contexts, and data collection timing.

In this study, the usage pattern of smartphones showed that the predominant usage, approximately one third, was social network access. Furthermore, Youtube access contributed to another one third of the total use. This pattern was similar to a study conducted among the medical university students in Karnataka (Ammati *et al.*, 2018)

where the main use of smartphone was social networking contributing to about 46%. In the same study, 14% of the study population has used smart phones for more than six hours in a day. This was much similar to this study, in which 13.9% of the study population have used smartphones for more than six hours on a typical day.

This study showed a significant association of male gender with smartphone addiction with an increased odds of about two times (Adjusted OR – 1.94). This was similar to a study which showed a similar increase in odds (Adjusted OR – 2.42) of smartphone addiction among the males (Zeeraq *et al.*, 2024). The association in the current study of male gender with increased addiction risk could reflect gender-specific usage patterns which might be due to greater engagement in gaming or social networking.

It was proven from this study that smartphone addiction was significantly associated with increased hours of smartphone use (AOR – 4.67). It was similar to the study conducted in a medical college of Assam (Phukan *et al.*, 2022), which showed a similar association of smart phone addiction and the increasing hours of smart phone use. This correlation suggested that interventions aimed at reducing daily usage time could be effective in preventing addiction.

This study also identified concerning behavioral patterns, such as phone checking while sleeping (35.6%) and phone keeping by the bedside (78.3%), which have been linked to poor sleep quality and mental health problems (Esubalew *et al.*, 2024). These results highlighted the necessity of promoting healthy smartphone usage practices, particularly at night.

The cross-sectional design limited causal inference between smartphone use and addiction. Recalling bias was possible as the data was self – reported. Additionally, the

study population was limited to college students residing mostly in hostels, which was likely to affect the generalizability of the results to a wider population.

CONCLUSION AND SUGGESTION

Male gender and extended daily smartphone use were identified as significant risk factors for smartphone addiction, which affected more than 25% of the college population under study. These results emphasize the need for behavioral interventions and increased awareness to lessen the harmful effects of young adults' excessive smartphone use.

It is recommended that educational institutions should promote healthy digital habits, such as using screen time monitoring tools, and educating students about the dangers of excessive smartphone use. To better understand smartphone addiction, future studies should incorporate psychological factors and use longitudinal designs. Furthermore, programs for digital detoxification could be curated to enhance students' overall well-being.

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AUTHOR CONTRIBUTION

Jeevapriya Ravi has contributed in conceptualization of the idea, data analysis and review of the manuscript and Devika

Devendran has done collection of data and manuscript writing.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest with any party.

DECLARATION OF ARTIFICIAL INTELLIGENCE (AI)

The authors acknowledge the use of ChatGPT for language refinement in preparing this manuscript. All AI-generated content was rigorously reviewed, edited, and validated to ensure accuracy and originality. Full responsibility for the manuscript's final content rests with the authors.

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