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Original Article

Smartphone Usage and Addiction among Undergraduate Dental Students in South India: A Cross-sectional Study

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Abstract

Background: Mobile phones have become a vital part of modern life, generating concerns about addiction among students. The present study aimed to assess smartphone usage and addiction among undergraduate dental students in Eluru, Andhra Pradesh.

Methods: A cross-sectional study was conducted among 304 dental students using a pre-designed questionnaire based on the Smartphone Addiction Scale Short Version (SAS-SV). Data was analyzed using descriptive and inferential statistics.

Findings: Out of 304 participants, most spent 3–4 hours on smartphones. Females showed slightly lower addiction scores than males. Addiction tendencies differed across different academic years, with second-year students scoring the highest.

Conclusion: The study's findings suggested that most dental students were addicted to smartphones. The study also revealed that having a smartphone was a crucial asset in their daily lives, and they preferred smartphones with advanced features.

Keywords: Addiction, Behavior, Dental, Smartphone use, Students

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Introduction

Beyond being a mere communication device, the smartphone has evolved into an indispensable social accessory, seamlessly woven into every aspect of society.[1,2] This device has changed from a technological to a social tool and is now fully integrated into the daily lives of people from all walks of life. Smartphones can enhance educational activities in both undergraduate and postgraduate medical training.[3] As smartphones become more prevalent in higher education, it is imperative to investigate their usage and assess their implications on learning outcomes.[4]

Despite their undeniable benefits, smartphones also present drawbacks.[5] When students are unable to access their smartphones due to factors like network issues or drained batteries, it can disrupt their sense of ease and connection. This loss of contact with their mobile devices can decrease concentration levels, causing discomfort, anxiety, or distress.[6]

The term "addiction" is defined in dictionaries as (1) a physiological abnormality resulting from exposure to food or pharmaceutical toxins; (2) a pathological condition where continuous consumption of alcohol or drugs is required to avoid withdrawal symptoms; and (3) a state where rational judgment is impaired due to specific ideas or objects. Addiction is typically addressed by neuropsychiatric departments and involves tolerance, withdrawal symptoms, dependence, and social challenges.[7,8] Smartphone addiction typically results in cognitive and behavioral signs, such as escalating loss of control, tolerance, and withdrawal symptoms that are similar to those seen in substance addiction.[9] Mobile addiction has substantial risks and consequences for physical and mental health.[10] Over-dependence on smartphones causes stress and may lead to compulsive smartphone use, which may cause further stress to an individual, initiating a vicious cycle.[11]

Understanding the concept of addiction requires awareness of both risk and protective factors. Without proper intervention, smartphone addiction could evolve into a significant public health issue, not only in India but globally. Considering the limited research on smartphone addiction, there is a need for comprehensive studies, particularly among specific demographics like dental students in South India. Addressing this issue through research and awareness could help mitigate its negative impacts and promote healthier smartphone usage habits. Within this context, the present study aimed to assess the usage of and addiction to smartphones among dental undergraduate students in Eluru.

Materials and Methods

Study design

A cross-sectional study was conducted among dental students at St. Joseph Dental College in Eluru. Prior to the study, approval was obtained from the Institutional Ethical Committee (SJDC/CEC/01/2023). All participants in the study received comprehensive information about its purpose without specific disclosure of the focus and objectives. Consent was obtained from each participant before their participation, ensuring the participation was voluntary. Anonymity was maintained throughout the data collection process, with participants receiving a link to an online survey via WhatsApp in September 2023.

Participants

Four hundred seventy-four undergraduate students were chosen for the survey via convenience sampling; 123 individuals provided incomplete responses, and 47 participants had phones with advanced features. The total number of participants was 304.

Inclusion criteria

The study included undergraduate students who were present at the university on the day of the survey and who reported using smartphones.

Exclusion criteria

Participants who provided unfinished responses, subjects who were unwilling to participate, and those who had featured mobile phones were excluded.

Questionnaire design

A self-administered questionnaire based on the Smartphone Addiction Scale Short Version (SAS-SV) was utilized in this study. The SAS-SV, developed by Kwon et al,[12] comprises 33 questions divided into six domains: Impact on daily life, Positive Anticipation, Withdrawal, Cyberspace-Oriented Relationships, Overuse, and Tolerance. This scale aims to capture various aspects related to excessive smartphone use. Participants are required to rate their symptoms of addiction on a 6-point Likert scale provided for each question. The scale has demonstrated good reliability and validity, making it a valuable tool for understanding and addressing smartphone addiction among individuals, particularly adolescents and college students.

Statistical analysis

Statistical analysis was carried out using SPSS version 23.0. Descriptive and inferential statistics were obtained. The results of SAS-SV are presented as mean scores for the individual domains and total scores, where higher scores represent greater smartphone addiction. An independent *t* test was used to compare smartphone addiction between genders. One-way analysis of variance (ANOVA) was used to compare between domains and academic years. $P \leq 0.05$ was considered statistically significant.

Results

A total of 304 students participated in the study, of whom 255 (83.8%) were female and 49 (16.2%) were male. The majority of the participants were interns ($n = 70$, 23.0%), followed by third-year Bachelor of Dental Surgery (BDS) students ($n = 66$, 21.7%), first-year BDS students ($n = 59$, 19.4%), fourth-year BDS students ($n = 58$, 19.1%) and second-year BDS students ($n = 51$, 16.8%). Table 1 depicts that the mean scores for the individual domains of the SAS scale were high, representing greater smartphone addiction, with 50.90% of males and 46.20% of females spending 3–4 hours on smartphones (Figure 1). Figure 2 shows that females purchase more smartphones in higher price ranges than males, with 32% of females buying phones priced over 20 000 INR (239.95 USD), compared to only 23% of males.

Females and males had different mean scores in the domains of daily life disturbance, positive anticipation, withdrawal, cyberspace-oriented relationships, overuse, and tolerance. There were significant differences ($P < 0.05$) in the domains of Positive Anticipation, Withdrawal, Cyberspace-Oriented Relationships, and Overuse, indicating that smartphone addiction tendencies varied by gender among participants (Table 2).

Table 3 compares smartphone addiction across different academic years among the participants. A significant difference ($P < 0.05$) was observed in the domains of positive anticipation and withdrawal, suggesting varying levels of smartphone addiction tendencies across different academic years. However, no significant difference was found in the domains of daily life disturbance, cyberspace-oriented relationships, overuse, and tolerance among the different years of study.

Discussion

Smartphones have become vital for daily tasks and have made important contributions to educational progress, particularly during the COVID-19 pandemic. However, they have been identified as possible origins of behavioral addiction. There is limited research on smartphone addiction among dental students, particularly in different

Table 1. Mean and standard deviation of the six domains of smartphone addiction scale ($n = 304$)

Domains	Mean ± SD
Daily life disturbance	11.91 ± 4.12
Positive anticipation	22.79 ± 6.26
Withdrawal	12.75 ± 5.11
Cyberspace-oriented relationships	16.72 ± 6.03
Overuse	11.06 ± 3.47
Tolerance	8.56 ± 2.90

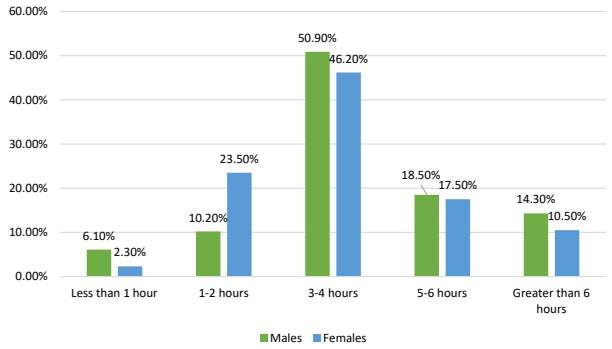

Figure 1. No. of hours spent on smartphones with gender

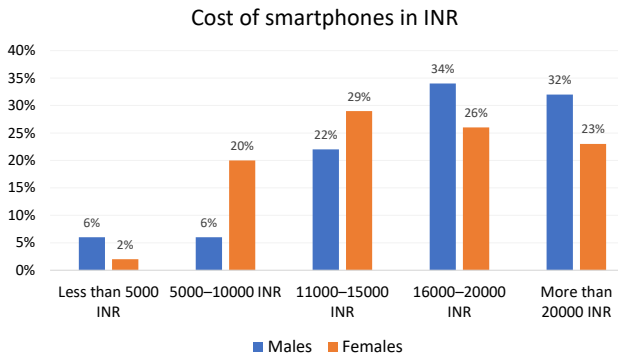

Figure 2. Cost of smartphone

locations in Andhra Pradesh. The current study assesses the usage and dependence of mobile phone use among dental undergraduate students in Eluru city.

Number of hours spent with smartphone

The present study shows that 50.90% of males and 46.20% of females used smartphones for at least 3 to 4 hours daily. A study done by Haug et al[13] reported that 31.1% of the participants used smartphones 3–4 hours a day, while another study conducted by Bavlı et al[14] reported that the majority of participants (36.3%) used smartphones for 4–6 hours daily. Pandya et al[9] found that 36% of the participants used smartphones for 3–4 hours daily. These findings were in line with those of the present study. This might be because of the exponential growth in technology development, which has increased the duration and daily usage of smartphones.[14]

Smartphone addiction scale

The current study indicated a moderate level of smartphone addiction among students, as reflected by the mean scores across various domains. Students reported experiencing relatively low levels of disturbance in their daily lives due to smartphone usage, with a mean score of 11.91 ± 4.12 in the domain of daily life disturbance. However, there was notable positive anticipation towards smartphone usage, with students scoring an average of 22.79 ± 6.26 in this domain. Additionally, moderate withdrawal symptoms were observed, indicated by a mean score of 12.75 ± 5.11. Furthermore, students were actively engaged in cyberspace-oriented relationships, as reflected by a mean score of 16.72 ± 6.03 in this domain. The study also identified signs of overuse, with students scoring an average of 11.06 ± 3.47 and a moderate level of tolerance towards smartphone use, with a mean score of 8.56 ± 2.90. A study by Arora et al[15] found that the highest mean score belonged to "withdrawal" with a mean score of 30.97 ± 9.94, which is not in line with the current study's findings.

Association between gender and smartphone addiction

In terms of gender differences, most aspects of smartphone addiction show slight variance. However, females (11.75) tend to experience slightly less disruption in their daily lives due to smartphone use than males (12.75). The overall effect of the smartphone is greater among males (86.78 ± 33.38) compared to females (83.23 ± 25.97), and the difference observed is highly statistically significant, which is in line with studies by Lei et al,[4] Chen et al,[16] Baghianimoghadam et al,[17] and Arora et al.[15]

Table 2. The association between gender and smartphone addiction (n = 304)

Domains	Mean ± SD		Mean difference (95% CI)	*P* value
	Female	Male		
Daily life disturbance	11.75 ± 3.82	12.75 ± 5.37	-1.0022	0.00**
Positive anticipation	22.81 ± 6.04	22.71 ± 7.40	0.1014	0.022*
Withdrawal	12.51 ± 4.90	14.04 ± 5.97	-1.5310	0.025*
Cyberspace-oriented relationships	16.55 ± 5.08	17.61 ± 7.08	-1.0593	0.041*
Overuse	11.08 ± 3.31	10.98 ± 4.24	0.1028	0.015*
Tolerance	8.53 ± 2.82	8.69 ± 3.32	-0.164	0.119

Independent t test; * Statistically significant.

A study by Bavlı et al[14] found no substantial difference when comparing mobile phone dependence according to gender. However, they found that females had higher addiction scores (29.1 ± 10.4) compared to males (26.9 ± 10.9). Another study by Sut et al[18] reported that females had higher scores in cellphone dependence than males. Similarly, Rao et al[19] observed that high smartphone usage was prevalent among female art students (77.78%) compared to males. These findings contrast with those of the present study, which indicate that females exhibit lower addiction to smartphones compared to males. Research findings indicate that men utilize smartphones for various activities such as gaming, gambling, and accessing illicit content. Studies have also examined the addictive potential of smartphones and popular social networking apps such as Twitter, WhatsApp, and Facebook.

Association between year of study and effect of mobile phone

Second-year BDS students showed the highest scores

Table 3. The association between the year of study and smartphone addiction (n = 304)

Domains	Mean ± SD					
	Year 1	Year 2	Year 3	Year 4	Year 5	*P* value
Daily life disturbance	11.05 ± 4.16	12.84 ± 4.55	11.83 ± 3.56	12.39 ± 4.36	11.65 ± 3.97	0.187
Positive anticipation	22.83 ± 5.64	24.94 ± 6.20	21.56 ± 6.06	23.41 ± 7.04	21.87 ± 6.00	0.030*
Withdrawal	11.55 ± 4.34	13.33 ± 5.56	12.13 ± 4.45	14.17 ± 5.50	12.75 ± 5.39	0.053*
Cyberspace-oriented relationships	15.13 ± 5.13	17.98 ± 6.71	16.45 ± 5.79	17.86 ± 5.39	16.45 ± 6.67	0.070
Overuse	10.25 ± 3.06	11.68 ± 3.70	10.87 ± 3.49	10.93 ± 3.05	11.58 ± 3.85	0.153
Tolerance	8.44 ± 2.743	9.14 ± 2.92	8.41 ± 2.78	8.31 ± 2.79	8.57 ± 3.22	0.608

in all the domains of the SAS-SV scale; this result is in contrast with those of studies by Arora et al,[15] and Payne et al.[20] This might be because of more free time in the second year. As students progress from Year 1 (22.83) to Year 2 (24.94) of their studies, their positive anticipation regarding smartphone usage significantly increases. This suggests an increase in inclination towards smartphone use as they advance academically. When smartphone addiction is compared across different academic years, between the first and second year, there is a significant increase in positive anticipation (P = 0.030). In contrast, other domains of smartphone addiction do not show significant differences across study years.

The focus on specific demographic variables was made based on several factors, including the scope of the study, available resources, and the need for targeted investigation into factors most directly relevant to our research objectives.

There are certain limitations to the study that should be taken into account when evaluating the results. The study relied on self-reported data, which may result in recollection and social desirability biases, which could alter the accuracy of the reported smartphone usage and addiction levels. Furthermore, the cross-sectional approach only captures a snapshot of smartphone addiction at a specific point in time, limiting the ability to detect longitudinal patterns. Finally, the study only included undergraduate dental students, limiting its application to different groups and contexts.

Recommendations

Future research might explore how smartphones affect dental students' academic performance. Institutions should enforce policies that discourage mobile phone use during lectures, preclinical sessions, and clinical settings. It is crucial to guide dental students in reassessing their priorities, with input from both educational institutions and parents/guardians. Additionally, students should be encouraged to allocate their mobile phone usage predominantly to academic and research activities, minimizing the distractions of social networking and instant messaging.

Conclusion

The present study offers insights into smartphone addiction among undergraduate dental students in Eluru, indicating moderate levels of addiction with differences across different domains. While daily life disturbance due to smartphone usage remains relatively low, positive anticipation, withdrawal symptoms, and engagement in cyberspace-oriented relationships are noticeable. Gender differences were observed, with males showing slightly higher addiction scores. Additionally, addiction tendencies varied across academic years. Despite its limitations, this study emphasizes the importance of targeted interventions to promote healthier smartphone usage habits among dental students and mitigate the negative impacts of addiction on academic performance and well-being.

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Authors' Contribution

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Competing Interests

None declared.

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