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Edited by Ruby Singh

E-mail: bioinformationruby@gmail.com

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Mobile phone dependency and nomophobia among dental students: Academic performance and psychological well-being

Dharamveer Singh Chouhan*, Sachin Chand, Mohsin Khan, Manju Panwar, Shanaz Nissar & Rahul Sharma

Department of Public Health Dentistry, Vyas Dental College and Hospital, Jodhpur, Rajasthan, India; *Corresponding author

Affiliation URL:

<https://vyasdentalcollege.com/>

Author contact:

Dharamveer Singh Chouhan - E-mail: dvchouhan1997@gmail.com

Mohsin Khan - E-mail: drmohsin.khan22@gmail.com

Sachin Chand - E-mail: drsachinchand83@gmail.com

Manju Panwar - E-mail: mpanwar2604@gmail.com

Shanaz Nissar - E-mail: shahnaz.nissar@gmail.com

Rahul Sharma - E-mail: sharmar14083@gmail.com

Abstract:

Excessive mobile phone use and nomophobia are emerging concerns that may impair academic performance and psychological well-being among dental students. Therefore, it is of interest to assess the mobile phone dependency, nomophobia and their academic impact among 350 dental students at Vyas Dental College and Hospital, Jodhpur, using a structured five-point Likert scale questionnaire. Hence, 39.5% of students reported poor academic performance related to excessive mobile phone use, while 53.8% experienced sleep loss due to night-time usage. Nomophobia was present in 24.12% of students and 40.97% were at risk, with significant differences across academic groups ($p < 0.05$). Thus, data shows the preclinical students as the most vulnerable group, providing evidence for targeted interventions to reduce mobile phone dependency and improve academic and psychological outcomes.

Keywords: Mobile phone dependency; nomophobia; academic performance; dental students; smartphone addiction; mobile phone usage anxiety; cross-sectional study; sleep disturbance; educational performance

Background:

Mobile phones have become an indispensable part of everyday life; students use them to communicate, access the internet and social media and engage with academic resources. Smartphones are more deeply embedded among university students now than at any prior time, raising serious concerns about their potential to impair academic performance, mental health and cognitive functioning through patterns of behavioural addiction [1]. Excessive reliance on mobile devices has been linked to addiction, study disruption, reduced concentration and lower examination scores. Nomophobia is defined as the fear or anxiety experienced when one is without a mobile phone - has emerged as a significant behavioural and psychological phenomenon among young adults, particularly among healthcare students facing elevated academic stress and prolonged periods of intensive study [2]. Dental students represent a high-risk subgroup owing to the dual burden of didactic coursework and clinical training, both of which demand sustained concentration while simultaneously increasing reliance on digital communication. Previous studies have consistently reported high prevalences of smartphone addiction and nomophobia among medical and dental students, with associated deterioration in sleep quality, concentration and academic productivity [3]. Although mobile phones are increasingly used as legitimate educational tools to access lecture materials, digital learning platforms and peer communication networks [4], inappropriate or excessive use undermines classroom attention and erodes academic outcomes. Recent investigations highlight the relationship between problematic smartphone use and adverse psychosocial outcomes including emotional distress, anxiety, social isolation and behavioural dependency [5, 6]. Therefore, it is of interest to assess the mobile phone dependence and attitudes towards mobile phone use in relation to academic performance and to determine the frequency and severity of nomophobia across different academic levels of dental undergraduates.

Methodology:

Study design and setting:

This cross-sectional study was conducted among dental students at Vyas Dental College and Hospital, Jodhpur, Rajasthan, India. Three hundred and fifty mobile phone-using dental undergraduates, interns and postgraduate students were enrolled. Written informed consent was obtained from all participants and ethical approval for data collection was obtained from the Ethics Committee of Vyas Dental College and Hospital. Participation was voluntary and the study was anonymous. Data were collected from 01 May 2024 to 31 May 2024.

Sample size:

Sample size was determined based on a prior power analysis using the formula $n = (Z\alpha/2 + Z\beta)^2/d^2$ for a normal population. A pilot study comprising 110 participants (20% of the target sample) was conducted to assess instrument reliability and validity. The pilot study yielded test-retest reliability of $\kappa = 0.84$, weighted $\kappa = 0.90$ and Cronbach's $\alpha = 0.82$ for internal consistency.

Data collection instrument:

A self-administered structured questionnaire containing 19 items was designed to collect demographic and psychographic data. Demographic variables included age, gender and academic year. Psychographic variables encompassed mobile phone dependency (MPD), attitude toward mobile phone use (ATMPU), anxiety and nomophobia. The questionnaire assessed frequency of mobile phone use, anxiety arising from absence of the mobile phone, battery depletion or network loss, inability to access social networking sites, consumption of addictive content and restrictions on verbal communication. Responses were measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Nomophobia classification:

Nomophobia was diagnosed in participants with a total questionnaire score of ≥ 40 ; those who scored 34–39 were classified as at risk for nomophobia; and those who scored < 34 were classified as normal.

Statistical analysis:

Data were coded and analysed using SPSS version 21.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics (mean and standard deviation) were computed for all variables. The Kruskal–Wallis test was applied to compare students' attitudes towards mobile phone use across academic groups. Statistical significance was set at $p < 0.05$.

Results:

The study comprised 350 dental students with a mean age of 22.18 ± 3.01 years. Among participants, 183 (52.28%) were male and 167 (47.72%) were female (**Table 1**). By academic level, 113 (32.28%) were preclinical (BDS first and second year), 93 (26.58%) were clinical (BDS third and fourth year), 67 (19.14%) were interns and 77 (22.00%) were postgraduate students (**Table 2**). With respect to mobile phone dependency and academic impact, 39.5% of students strongly agreed that mobile phone use was hindering their academic performance. A majority (53.8%) reported sleep loss due to night-time mobile phone use. During classes or clinical work, 24.7% frequently engaged in social networking or messaging. In examinations, 46.8% reported being distracted by mobile phone use. A total of 41% became anxious when acquaintances did not respond promptly, while 47.5%

reported stress when their battery was low or network signal was lost. Approximately 43.1% felt that mobile phones had increased the likelihood of examination dishonesty. While 65.7% found it distressing to be unable to use their phone, 47.1% reported using their mobile in public places to alleviate loneliness. A total of 44.8% experienced panic when their data limit was nearly exhausted and 62.8% reported stress at the prospect of going without a mobile phone for one week. Mean scores with significance levels across all items are presented in **Table 3**. With respect to nomophobia, preclinical students had the highest prevalence of nomophobia (score ≥ 40) at 52.6%, followed by clinical students (41.8%), interns (37.3%) and postgraduate students (32.2%). Risk of nomophobia (score 34–39) was highest among preclinical students (32.6%). Overall, 24.12% of respondents were classified as nomophobic and 40.97% were at risk for nomophobia. The association between academic level and nomophobia classification was statistically significant ($p < 0.05$) (**Table 4**).

Table 1: Distribution of study subjects according to gender

Characteristics	N = 350 (%)	Mean Age (years)
Males	183 (52.28)	22.18 ± 3.01
Females	167 (47.72)	-

Table 2: Distribution of study subjects according to academic level

Academic Level	N = 350 (%)
Preclinical (BDS 1st and 2nd year)	113 (32.28)
Clinical (BDS 3rd and 4th year)	93 (26.58)
Interns	67 (19.14)
Postgraduates	77 (22.00)

Table 3: Mean score of various questionnaire items among different academic groups (Kruskal–Wallis test)

Question	Total (Mean $\pm$ SD)	Preclinical	Clinical	Interns	Postgraduates
Score low marks in exams due to mobile phone use*	3.16 ± 1.27	2.72 ± 1.18	3.31 ± 1.22	3.47 ± 1.24	3.41 ± 1.39
Sleep loss due to night-time mobile use**	3.74 ± 1.10	3.76 ± 1.06	3.71 ± 1.15	3.79 ± 1.07	3.70 ± 1.11
Take calls while studying or doing clinical work*	3.04 ± 1.27	3.02 ± 1.29	3.04 ± 1.26	2.88 ± 1.24	3.22 ± 1.30
SMS/social networking while studying or clinical work*	2.43 ± 1.15	2.16 ± 1.02	2.37 ± 1.05	2.83 ± 1.23	2.72 ± 1.36
Cell phone as a study or clinical work aide**	3.63 ± 1.15	3.61 ± 1.15	3.60 ± 1.16	3.80 ± 1.10	3.57 ± 1.16
Scarcely using phone for educational purposes*	2.91 ± 1.36	3.16 ± 1.36	3.06 ± 1.30	2.60 ± 1.24	2.33 ± 1.42
Distracted by mobile during examination**	3.42 ± 1.14	-	-	-	-
Stress when battery low or signal lost*	3.29 ± 1.30	-	-	-	-
Exam fraud more rampant due to mobiles*	3.71 ± 1.11	-	-	-	-
Uncomfortable when not updated on social media*	3.20 ± 1.24	-	-	-	-
Carry phone with me always*	3.71 ± 1.12	-	-	-	-
Use mobile to avoid loneliness in public places**	3.70 ± 1.12	-	-	-	-
Panic when data/credit limit nearly exhausted*	3.31 ± 1.25	-	-	-	-
Do not answer calls at inappropriate times*	2.32 ± 0.92	-	-	-	-
Stress if unable to use phone for one week*	3.95 ± 0.91	-	-	-	-
Spend >3 hours/day on phone calls*	3.02 ± 1.22	-	-	-	-

* Statistically significant ($p < 0.05$); ** statistically non-significant

Table 4: Prevalence of risk of nomophobia and nomophobia among respondents by academic level

Academic Level	Risk of Nomophobia (%)	Nomophobic Subjects (%)
Preclinical	32.6	52.6
Clinical	24.4	41.8
Interns	20.9	37.3
Postgraduates	18.6	32.2
p-value	0.002*	0.001*

* Statistically significant

Discussion:

The present study assessed mobile phone dependence, nomophobia and their correlation with academic performance among dental students. The most notable findings were a high prevalence of problematic mobile phone use, significant anxiety

symptoms and nomophobia, with preclinical students demonstrating the greatest vulnerability. Mobile phones have now become deeply integrated into students' lives facilitating communication, note-taking, social interaction and access to academic content. However, the same ubiquity that makes smartphones useful renders overuses an insidious threat to academic productivity and psychological well-being [7]. They further established a link between smartphone dependency, sleep quality impairment and academic disengagement. The contribution of in-class and in-clinic mobile phone use to distraction is well documented. The finding that 39.5% of students reported impaired academic performance due to mobile phone use is consistent with recent evidence. Wang *et al.*

demonstrated that a substantial proportion of students affected by smartphone dependency experience concurrent impairment in both mental health and academic engagement [7]. Studies conducted among Indian students similarly report high screen time and smartphone addiction to be associated with poor academic performance and attentional difficulties. Among healthcare students, problematic mobile phone behaviour has been linked to compromised professionalism, altered learning habits and disrupted interpersonal relationships [8]. Zhang and Zeng (2024) identified smartphone addiction as an emerging public health concern among university students, resulting in serious psychological and educational consequences [9]. Zeerak *et al.* documented the prevalence of nomophobia among university students and underscored the importance of behavioural interventions based on early risk identification [10]. Jahrami *et al.* [11] demonstrated that nomophobia adversely affects quality of life and academic performance among healthcare students. The gradient in nomophobia severity from preclinical to postgraduate students observed in our study may reflect the progressive acquisition of professional identity and self-regulatory capacity across training years, as well as the structured clinical environment of later academic years that necessitates device restriction. Celikkalp *et al.* [12] noted that smartphone overuse diverts healthcare students from professional behaviour and communication skills, which may be mitigated as students advance through their clinical training. These findings collectively highlight the urgent need for educational institutions to implement awareness programmes, digital wellness curricula and behaviour-based interventions. Strategies combining open dialogue about responsible digital technology use, progressive psychological support for stress management and structured study techniques may substantially reduce the adverse impact of mobile phone dependency and nomophobia on academic performance and psychological well-being among dental students.

Conclusion:

Mobile phone dependency and nomophobia were highly prevalent among dental students and were associated with adverse academic and sleep-related outcomes. Preclinical students exhibited the greatest vulnerability to nomophobia compared with other academic groups. Early screening and targeted educational interventions may help promote healthier mobile phone use and improve student well-being.

Advancement of Knowledge:

This study contributes original evidence on the prevalence of mobile phone dependency and nomophobia among dental students in Jodhpur, Rajasthan. It documents a strong association between excessive mobile phone use and adverse academic outcomes including study distraction sleep disruption and lower academic achievement. By stratifying findings across academic levels, the study reveals that preclinical students are disproportionately affected, with greater smartphone dependency and nomophobia anxiety. The results support early identification strategies and preventive interventions – including digital literacy programmes and behaviour-based modifications – that can promote responsible smartphone use and thereby enhance psychological well-being and academic efficacy among dental students.

Conflict of Interest:

The authors declare no conflict of interest.

Funding:

No external funding was received for this study.

Ethical Approval:

Ethical approval was obtained from the Institutional Ethics Committee of Vyas Dental College and Hospital, Jodhpur, Rajasthan, India. Written informed consent was obtained from all participants prior to data collection.

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