ORIGINAL ARTICLE

VALIDITY, RELIABILITY AND PREVALENCE ESTIMATES OF NOMOPHOBIA AMONG UNDERGRADUATE DENTAL STUDENTS OF BHUBANESWAR, INDIA

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ABSTRACT

Background. Considered a modern phobia, Nomophobia (NO MObile PHOne PhoBIA) is a term describing irrational fear or anxiety of being unable to access one's own mobile phone.

Objectives. To develop and validate the nomophobia questionnaire, administering it to a sample of adolescents representing undergraduate dental students. To assess the prevalence of Nomophobia, determine the usage pattern of mobile phones and evaluate the impact due to lack of access to mobile phones among undergraduate dental students.

Material and method. A cross-sectional study was conducted on 302 undergraduate students of Bhubaneswar through a self-administered questionnaire via Google Forms consisting of 19 items evaluating the pattern and anxiety related to usage of mobile phones. Responses were recorded on a 5-point *Likert* scale. *Kruskal Wallis*, *Mann-Whitney* U and *Chi*-square tests were used for statistical analysis.

Results. Test-Retest reliability showed kappa of k=0.86 and Internal consistency Chronbach's-Alpha to be α=0.82. Prevalence of nomophobia (score ≥ 58) was 32.1%, and students at risk of being nomophobic (score 39-57) was 61.9%. It was highest in males (32.6%) and amongst the interns (41.9%) and lowest (25.5%) amongst the second-year students. Participants felt nervous/insecure if their phones were away from them because of the fear that somebody might have accessed their data (3.07±1.93) and or tried to contact them (3.09±1.13) which were not statistically significant (p>0.05).

Conclusions. The present study confirms that nomophobia is an emerging behavioural addiction among dental students. Adequate prevention strategies would be helpful in reducing the impact of the chronic mobile usage. Effect of the mobile phone on dental students and the fear of not having it with them is increasing elaborately, that needs to be controlled. Otherwise, it would negatively affect their academic achievement and well-being.

Key words: *addiction, dental students, mobile phones, nomophobia, India*

INTRODUCTION

The present world has been captivated by the grip of fastest communication technology, which is the wireless network. The aggressive development in the field of technology has shown the world its way towards accelerated progress in all spheres of life. Technological development is a process, which encompasses invention, innovation and diffusing of the technology. In this revolving process of development, the technology-driven mobile phones are in the phase of being used globally [3]. The development of mobile phones has opened up new vistas for multimodal communication among various corners of the world [14]. This has an effect on the personal and professional lives of individuals [1]. In addition, the wireless networks have also positively impacted the global relationships. Most of the strata of population have given in to the addiction of mobile phones and internet use. This can also be attributed to the continual cost reduction of mobile phones. The mobile phones, along with enabling people to communicate with far-reaching parts of the world, also help us to improve our socioeconomic relationships globally [9].

Wireless networks also have seen a vast expansion in its course of development. In the older days, they only served to connect within a limited reach over phone. But, the range of connection has leaped to a different region altogether. In the present day world, mobile phones with the facility of internet connection suffice

purposes apart of mere communication, like internet banking, social network access, communication through messages and e-mails, calculator, calendar, game station, camera functions, audio station, news access, etc. [11].

India's digital journey is one of exuberance. The Indian country had the world's second-largest internet population at over 749 million users in 2020. Of these, 744 million users accessed the internet via their mobile phones. Estimates suggest that this figure would reach over 1.5 billion by 2040 [5]. India also ranks just next to China (largest mobile phones consumer market) in the usage of mobile phones.

The usage of mobile phones and wireless technology has been maximally used by youth of the present day. They tend to use mobile phones to carry out most of their assignments, both at personal and professional level [7]. Since adolescence is marked as a transition phase, wherein they undergo many developmental processes in their physical and mental status, occurring in response to changes in the ecology, this stage of life has been proved to have witnessed the development of risk-taking abilities, which if not made to fall into regulated pattern, would lead to dangerous risk-taking [2, 15]. They easily build a strong connection with association with things that provide them with the facility to connect themselves easily with the world [4]. This has helped in their increased inclination towards mobile phones.

This is where the rightly-coined term, Nomophobia (NO MObile PHone PhoBIA) comes into play. Nomophobia arises from a feeling of not being able to make and receive phone calls, send or receive text messages, losing internet connectivity and access to social networking sites and being able to access information online [6]. It is used to describe a psychological condition when people have a fear of being detached from mobile phone connectivity. The youth, today, focus more on carrying out the work through the electronic gadgets and the wireless network, rather than utilizing their own energy and indigenous properties. Hence, this would not be wrong to state that, Nomophobia, in a way leads to disturbances not only in their professional life, but also in their personal life and imparts a negative direction to concentration and one's own virtues towards studies. It could be reduced if one is not enslaved by the mobile phones and their use is regulated as per the individual's actual needs. Along with making their job easier, mobile phones have forced their life to be pushed towards a poor state. This status of mental and physical health requires immediate attention, which if delayed, might cause an irreversible damage to multiple spheres of life [12].

However, despite the relevance of such an issue, there is a dearth of information concerning the nomophobic behavior and attitudes in India, besides the lack of a formally validated instrument. Hence, the objectives of present were to develop and validate the nomophobia questionnaire, administering it to a sample of adolescents representing undergraduate dental students. Also, to assess the prevalence of Nomophobia, determine the usage pattern of mobile phones and evaluate the impact due to lack of access to mobile phones among undergraduate dental students.

MATERIAL AND METHODS

A descriptive cross-sectional study was carried out amongst the undergraduate dental students of Institute of Dental Sciences, Bhubaneswar during June to August 2021. Students of all the academic years, including interns who used mobile phones, and who gave their consent to participate were included in the study. All the procedures carried out in the present study have been conducted in accordance with the ethical standards of the 1964 Helsinki declaration and its subsequent amendments. Furthermore, the study protocol of the present research was reviewed and approved by the Institutional Review Board. Participation in the study was voluntary and confidentiality of data was maintained.

A questionnaire was designed to assess the prevalence of Nomophobia, understand the usage pattern of mobile phones, and to understand the effects of over usage of mobile phones on self-perceived academic performance and social connectivity among undergraduate dental students. It was adapted from a study conducted by *Prasad* et al, (2017) in India [11] and was further tested and validated. It included a total of 19 questions with the responses recorded on a 5-point *Likert* scale. It consisted of two a period. First part assessed demographic information of the students including name (optional), e-mail ID, age, gender, qualification and age at which they started using mobile phones. The second part assessed the associated anxiety related to mobile phones and, their attitude towards mobile phones. The questionnaires were distributed through Google Forms among 383 students. Providing a prior consent was mandatory to proceed with responding to the questionnaire. Couple of reminders were sent in a duration of one week.

The questionnaire was modified and pretested by a pilot study on 30 participants, which comprised of 10% of the total participants. Reliability of the questionnaire was analyzed by using Test-Retest conducted over two-week duration, and the intra-rater reliability of the participants for the questions was assessed using kappa (k) values (0.92). Internal consistency of the questionnaire was estimated by applying *Chronbach's*-Alpha (0.88).

The individual responses were subsequently compiled, processed and analysed. All the questions were scored on a 5-point Likert Scale which ranged from strongly disagree (1) to strongly agree (5). The sum of scores to all items in the questionnaire indicated maximum (95) to minimum (19) mobile phone association. Participants having score ≥58 were categorized as Nomophobic, 39-57 as at risk of nomophobia and ≤ 38 as normal.

Statistical analysis

The responses were moved to MS Excel, coded and then ultimately transferred to SPSS (Statistical Package for Social Sciences) software, version 20.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics included means, standard deviation and percentages. *Kruskal Wallis, Mann-Whitney* U and *Chi*-square tests were applied for statistical analysis. The level of significance was set at $p<0.05$.

RESULTS

Among 383 students, 302 students [93 (30.5%) males and 209 (69.5%) females] responded to the questionnaire. Hence, the response rate was 79%. Only completely filled questionnaires were considered for analysis. The mean age of subjects was 21.8 ± 1.867 (range: 18 to 31) years. Mean age when subjects started using mobile phones was 16.38 ± 2.445 years. According to the representation of their academic year majority 78 (25.8%) belonged to 1st year followed by 3rd years 72 (23.8%) and others (Table 1).

Table 1. Distribution of study subjects according to gender and educational qualification

Characteristics	n = 302 (%)
Gender	
Males	93 (30.5)
Females	209 (69.5)
Academic year	
First year	78 (25.8)
Second year	55 (18.2)
Third year	72 (23.8)
Final year	54 (18)
Interns	43 (14.2)
Age at which participants started using the mobile phone (in years)	
≤ 14	54 (17.9)
15-19	230 (76.2)
≥ 20	18 (6.0)

Table 2 shows the percentage wise responses of students along with mean scores towards the attitude and associated anxiety with mobile phone based on their academic year. It was found that there was a statistically significant difference among the 5 groups in the questions assessing the duration of mobile usage in a day, if they were disturbed if they didn't stay updated about social media, news, and/or online networks, and if they were nervous if their mobile phones were away from them.

Table 3 shows the response of students towards the attitude and associated anxiety with mobile phone in terms of mean scores based on their gender. It was found that there is statistically significant difference between the 2 groups for the questions which assessed whether they always kept their mobile phones with them, duration of usage of mobile phones, whether they used social media or SMS even during studying or doing clinical work, and whether they wanted to use their mobile phone to not feel lonely when they are in public places.

The overall prevalence of nomophobia (score ≥ 58) was 32.1%, and that of students at risk of being nomophobic (score 39-57) was 61.9% (Table 4). Nomophobic subjects were almost similar among males (32.6%) and females (31.9%). Female subjects were at higher risk of nomophobia than males, 65.2% and 54.3% respectively. These differences observed within gender was statistically significant (p=0.002). When the participants were stratified according to academic year, the prevalence of nomophobia was more than average among higher class students; interns (41.9%) and final years (40.7%). It was comparatively lower among second (25.5%) and third years (27.8%). Subjects at risk of nomophobia was higher among second (69.1%) and third year (65.3%) students. The difference in the distribution was not statistically significant (p=0.611) (Table 5).

DISCUSSION

Mobile phones have undoubtedly helped the mankind in many spheres of communication, but it can also be said without doubt that, their inadvertent use has made human beings completely dependent on them in various ways. Also, they have left them absolutely captivated by its facilities.

This study showed that 32.1% of the total participants were nomophobic and 61.9% of them were at the risk of developing nomophobia. Majority of nomophobes were found amongst the interns (41.9%) and the least amongst the BDS second year students (25.5%). But, the highest number of participants at risk of being nomophobes was amongst the BDS second year students (69.1%) and the lowest was noted amongst the final year BDS students (51.2%). This can be attributed to the fact they stay away from their family, which makes them more indulged in the mobile phones. A study conducted by *Prasad* et al in

Table 2. Frequency of students' responses regarding the pattern of usage of mobile phones based on academic year

Questions	Academic year	Strongly disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly agree n (%)	Mean score (Mean±SD)	p-value
1. I keep my phone with me at all the times.	First year	5 (6.4)	12 (15.4)	33 (42.3)	22 (28.2)	6 (7.7)	3.15±0.99	0.057
	Second year	1 (1.8)	9 (16.4)	17 (30.9)	24 (43.6)	4 (7.3)	3.38±0.91	
	Third year	1 (1.4)	15 (20.8)	24 (33.3)	21 (29.6)	11 (15.3)	3.36±1.02	
	Final year	1 (1.9)	6 (11.1)	13 (24.1)	24 (44.4)	10 (18.5)	3.6±0.97	
	Interns	6 (14.0)	3 (7.0)	9 (20.9)	18 (41.9)	7 (16.3)	3.40±1.26	
	Total	14 (4.6)	45 (14.9)	96 (31.8)	109 (36.1)	38 (12.6)	3.37±1.032	
2. I prefer keeping my mobile phone within my easy reach while sleeping	First year	7 (9.0)	12 (15.4)	13 (16.7)	42 (53.8)	42 (53.8)	3.31±1.09	0.139
	Second year	6 (10.9)	8 (14.5)	9 (16.4)	24 (43.6)	24 (43.6)	3.36±1.22	
	Third year	2 (2.8)	18 (25.0)	15 (20.8)	27 (37.5)	27 (37.5)	3.36±1.02	
	Final year	1 (1.9)	6 (11.1)	11 (20.4)	26 (48.1)	26 (48.1)	3.67±0.97	
	Interns	5 (11.6)	1 (2.3)	7 (16.3)	21 (48.8)	21 (48.8)	3.65±1.19	
	Total	21 (7.0)	45 (14.9)	55 (18.2)	140 (46.4)	41 (13.6)	3.45±1.11	
3. I answer immediately when my phone rings at inappropriate time	First year	12 (15.4)	32 (41.0)	25 (32.1)	8 (10.3)	1 (1.3)	2.41±0.92	0.292
	Second year	9 (16.4)	25 (45.5)	11 (20.0)	7 (12.7)	3 (5.5)	2.45±1.09	
	Third year	17 (23.6)	30 (41.7)	17 (23.6)	8 (11.1)	0 (0.0)	2.22±0.94	
	Final year	12 (22.2)	23 (42.6)	10 (18.5)	6 (11.1)	3 (5.6)	2.35±1.12	
	Interns	16 (37.2)	12 (27.9)	12 (27.9)	2 (4.7)	1 (2.3)	2.07±1.03	
	Total	66 (21.9)	122 (40.4)	75 (24.8)	31 (10.3)	8 (2.6)	2.31±1.01	
4. I spend more than three hours on mobile phone per day	First year	3 (3.8)	11 (14.1)	30 (38.5)	29 (37.2(	5 (6.4)	3.28±0.92	0.001*
	Second year	2 (3.6)	12 (21.8)	15 (27.3)	21 (38.2)	5 (9.1)	3.27±1.03	
	Third year	3 (4.2)	8 (11.1)	18 (25.0)	35 (48.6)	8 (11.1)	3.51±0.98	
	Final year	1 (1.9)	7 (13.0)	9 (16.7)	30 (55.6)	7 (13.0)	3.65±0.96	
	Interns	2 (4.7)	2 (4.7)	4 (9.3)	24 (55.8)	11 (25.6)	3.93±0.96	
	Total	11 (3.6)	40 (13.2)	76 (25.2)	139 (46.0)	36 (11.9)	3.49±0.99	
5. I respond to phone calls while studying or doing clinical work	First year	14 (17.9)	39 (50.0)	15 (19.2)	9 (11.5)	1 (1.3)	2.28±0.94	0.104
	Second year	12 (21.8)	25 (45.5)	12 (21.8)	5 (9.1)	1 (1.8)	2.24±0.96	
	Third year	19 (26.4)	34 (47.2)	15 (20.8)	3 (4.2)	1 (1.4)	2.07±0.88	
	Final year	9 (16.7)	19 (35.2)	15 (27.8)	8 (14.8)	3 (5.6)	2.57±1.11	
	Interns	9 (20.9)	15 (34.9)	15 (34.9)	4 (9.3)	0 (0.0)	2.33±0.93	
	Total	63 (20.9)	132 (43.7)	72 (23.8)	29 (9.6)	6 (2.0)	2.28±0.97	

Questions	Academic year	Strongly disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly agree n (%)	Mean score (Mean±SD)	p-value
6. I frequently use SMS or social networking while studying or doing clinical work	First year	19(24.4)	37(47.4)	16(20.5)	5(6.4)	1(1.3)	2.13±0.90	0.246
	Second year	13(23.6)	24(43.6)	14(25.5)	3(5.5)	1(1.8)	2.18±0.93	
	Third year	16(22.2)	32(44.4)	15(20.8)	8(11.1)	1(1.4)	2.25±0.96	
	Final year	7(13.0)	23(42.6)	15(27.8)	9(16.7)	0(0.0)	2.48±0.93	
	Interns	11(25.6)	17(39.5)	12(27.9)	3(7.0)	0(0.0)	2.16±0.90	
	Total	66(21.9)	133(44.0)	72(23.8)	28(9.3)	3(1.0)	2.24±0.93	
7. I frequently check the cell phone during the classes or while doing clinical work	First year	21(26.9)	39(50.0)	15(19.2)	3(3.8)	0(0.0)	2.00±0.80	0.603
	Second year	17(30.9)	26(47.3)	10(18.2)	1(1.8)	1(1.8)	1.96±0.87	
	Third year	19(26.4)	36(50.0)	13(18.1)	2(2.8)	2(2.8)	2.06±0.90	
	Final year	12(22.2)	24(44.4)	12(22.2)	5(9.3)	1(1.9)	2.24±0.98	
	Interns	12(27.9)	19(44.2)	10(23.3)	2(4.7)	0(0.0)	2.05±0.85	
	Total	81(26.8)	144(47.7)	60(19.9)	13(4.3)	4(1.3)	2.06±0.87	
8. I use my phone to not feel lonely in a public place	BDS 1st yr	4(5.1)	8(10.3)	23(29.5)	34(43.6)	9(11.5)	3.46±0.11	0.507
	First year	3(5.5)	9(16.4)	9(16.4)	24(43.6)	10(18.2)	3.53±1.13	
	Second year	2(2.8)	7(9.7)	18(25.0)	33(45.8)	12(16.7)	3.64±0.97	
	Third year	3(5.6)	8(14.8)	5(9.3)	24(44.4)	14(25.9)	3.70±1.18	
	Final year	3(7.0)	3(7.0)	10(23.3)	20(46.5)	7(16.3)	3.58±1.08	
	Total	15(5.0)	35(11.6)	65(21.5)	135(44.7)	52(17.2)	3.58±1.06	
9. I get disturbed if I don't stay updated with news, social media and or online networks	First year	8(10.3)	22(28.2)	31(39.7)	15(19.2)	2(2.6)	2.76±0.97	0.026*
	Second year	8(14.5)	22(40.0)	12(21.8)	11(20.0)	2(3.6)	2.58±1.09	
	Third year	8(11.1)	23(31.9)	25(34.7)	14(19.4)	2(2.8)	2.71±0.10	
	Final year	11(20.4)	26(48.1)	12(22.2)	4(7.4)	1(1.9)	2.22±0.93	
	Interns	8(18.6)	14(32.6)	7(16.3)	8(18.6)	6(14.0)	2.77±1.37	
	Total	43(14.2)	107(35.4)	87(28.8)	52(17.2)	13(4.3)	2.62±1.06	
10. I feel nervous if I fail to receive timely response	First year	7(9.0)	33(42.3)	26(33.3)	11(14.1)	1(1.3)	2.56±0.89	0.370
	Second year	10(18.2)	23(41.8)	14(25.5)	7(12.7)	1(1.8)	2.38±0.99	
	Third year	15(20.8)	31(43.1)	16(22.2)	8(11.1)	2(2.8)	2.32±1.02	
	Final year	8(14.8)	21(38.9)	13(24.1)	7(13.0)	5(9.3)	2.63±1.07	
	Interns	11(25.6)	16(37.2)	5(11.6)	8(18.6)	3(7.0)	2.44±1.26	
	Total	51(16.9)	124(41.1)	74(24.6)	41(13.6)	12(4.0)	2.47±1.05	

Questions	Academic year	Strongly disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly agree n (%)	Mean score (Mean±SD)	p-value
11. I would be annoyed if I could not use my phone and/or its capabilities when I wanted to do so.	First year	3(3.8)	18(23.1)	38(48.7)	18(23.1)	1(1.3)	2.95±1.26	
	Second year	3(5.5)	19(34.5)	13(23.6)	17(30.9)	3(5.5)	2.96±1.05	
	Third year	10(13.6)	21(29.2)	25(34.7)	12(16.7)	4(5.6)	2.71±1.08	0.517
	Final year	6(11.1)	16(29.6)	9(16.7)	19(35.2)	4(7.4)	2.98±1.18	
	Interns	6(14.0)	11(25.6)	9(2.09)	13(30.2)	4(9.3)	2.95±1.23	
	Total	28(9.3)	85(28.1)	94(31.1)	79(26.2)	16(5.3)	2.90±1.06	
12. It will scare/worry me if I am running out of battery or out of signal in phone	First year	4(5.1)	19(24.4)	27(34.6)	25(32.1)	3(3.8)	2.05±0.97	
	Second year	5(9.1)	14(25.5)	18(32.7)	14(25.5)	4(7.3)	2.96±1.09	
	Third year	4(5.6)	18(25.0)	17(23.6)	25(34.7)	8(11.1)	3.21±1.13	0.606
	Final year	6(11.1)	12(22.2)	13(24.1)	19(35.2)	4(7.4)	3.06±1.16	
	Interns	5(11.6)	10(23.3)	6(14.0)	13(30.2)	9(20.9)	3.26±1.35	
	Total	24(7.9)	73(24.2)	81(26.8)	96(31.8)	28(9.3)	3.10±1.11	
13. I would be in stress if I could not use my phone for a week	First year	4(5.1)	18(23.1)	25(32.1)	22(28.2)	9(11.5)	3.18±1.08	
	Second year	2(3.6)	7(12.7)	22(40.0)	17(30.9)	7(12.7)	3.36±0.99	
	Third year	5(6.9)	18(25.0)	15(20.8)	21(29.2)	13(18.1)	3.26±1.22	0.808
	Final year	4(7.4)	10(18.5)	12(22.2)	22(40.7)	6(11.1)	3.30±1.27	
	Interns	3(7.0)	9(20.9)	8(18.6)	14(32.6)	9(20.9)	3.40±1.28	
	Total	18(6.0)	62(20.5)	82(27.2)	96(31.8)	44(14.6)	3.28±1.13	
14. I feel nervous if my cell phone is away from me because I am afraid that someone might have tried to contact me	First year	5(6.4)	14(17.9)	25(32.1)	28(35.9)	6(7.7)	3.21±1.04	
	Second year	6(10.9)	16(29.1)	13(23.6)	17(30.9)	3(5.5)	2.91±1.27	
	Third year	5(6.9)	18(25.0)	20(27.8)	26(36.1)	3(4.2)	3.06±1.03	0.043*
	Final year	8(14.8)	13(24.1)	13(24.1)	18(33.3)	2(3.7)	2.87±1.15	
	Interns	6(14.0)	3(7.0)	6(14.0)	22(51.2)	6(14.0)	3.44±1.24	
	Total	30(9.9)	64(21.2)	77(25.5)	111(36.8)	20(6.6)	3.09±1.11	
15. I feel insecure if my cell phone is away from me because I am afraid that someone might have accessed my data.	First year	6(7.7)	21(26.9)	16(20.5)	26(33.3)	9(11.5)	3.14±1.17	
	Second year	6(10.9)	13(23.6)	12(21.8)	19(34.5)	5(9.1)	3.07±1.84	
	Third year	6(8.3)	26(36.1)	12(16.7)	21(29.2)	7(9.7)	2.96±1.18	0.480
	Final year	7(13.0)	17(31.5)	9(16.7)	16(29.6)	5(9.3)	2.91±1.23	
	Interns	3(7.0)	10(23.3)	9(20.9)	13(30.2)	8(18.6)	3.30±1.22	
	Total	28(9.3)	87(28.8)	58(19.2)	95(31.5)	34(11.3)	3.07±1.19	

Questions	Academic year	Strongly disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly agree n (%)	Mean score (Mean±SD)	p-value
16. I feel distracted by my mobile phone during examination or clinical work	First year	17(21.8)	24(30.8)	19(24.4)	16(20.5)	2(2.6)	2.51±1.13	0.668
	Second year	9(16.4)	20(36.4)	9(16.4)	12(21.8)	5(9.1)	2.71±1.24	
	Third year	22(30.6)	19(26.4)	14(19.4)	14(19.4)	3(4.2)	2.40±1.22	
	Final year	15(27.8)	17(31.5)	8(14.8)	12(22.2)	2(3.7)	2.43±1.22	
	Interns	10(23.3)	16(37.2)	5(11.6)	10(23.3)	2(4.7)	2.49±1.22	
	Total	73(24.2)	96(31.8)	55(18.2)	64(21.2)	14(4.6)	2.50±1.20	
17. I feel that overuse of mobile phone has deteriorated my quality of life, including food habits	First year	7(9.0)	25(32.1)	27(34.6)	13(16.7)	6(7.7)	2.82±1.06	0.281
	Second year	8(14.5)	13(23.6)	16(29.1)	13(23.6)	5(9.1)	2.89±1.18	
	Third year	11(15.3)	10(13.9)	18(25.0)	29(40.3)	4(5.6)	3.07±1.18	
	Final year	4(7.4)	16(29.6)	15(27.8)	12(22.2)	7(13.0)	3.04±1.17	
	Interns	3(7.0)	9(20.9)	13(30.2)	11(25.6)	7(16.3)	3.23±1.17	
	Total	33(10.9)	73(24.2)	89(29.5)	78(25.8)	29(9.6)	2.99±1.15	
18. I have sleep loss due to use of cell phone at nights.	First year	18(23.1)	29(37.2)	14(17.9)	14(17.9)	3(3.8)	2.42±1.17	0.247
	Second year	13(23.6)	20(36.4)	15(27.3)	6(10.9)	1(1.8)	2.31±1.02	
	Third year	18(25.0)	29(40.3)	7(9.7)	16(22.2)	2(2.8)	2.38±1.17	
	Final year	10(18.5)	15(27.8)	9(16.7)	14(25.9)	6(11.1)	2.83±1.31	
	Interns	12(27.9)	11(25.6)	7(16.3)	9(20.9)	4(9.3)	2.58±1.35	
	Total	71(23.5)	104(34.4)	52(17.2)	59(19.5)	16(5.3)	2.49±1.20	
19. I feel that overuse of mobile phone has decreased my contacts with friends and relatives	First year	15(19.2)	38(48.7)	19(24.4)	3(3.8)	3(3.8)	2.24±0.94	0.933
	Second year	11(20.0)	22(40.0)	12(21.8)	9(16.4)	1(1.8)	2.40±1.08	
	Third year	16(22.2)	30(41.7)	19(26.4)	6(8.3)	1(1.4)	2.25±0.95	
	Final year	13(24.1)	25(46.3)	5(9.3)	9(16.7)	2(3.7)	2.30±1.28	
	Interns	15(34.9)	9(20.9)	8(18.6)	8(18.6)	3(7.0)	2.42±1.33	
	Total	70(23.2)	124(41.1)	63(20.9)	35(11.6)	10(3.3)	2.31±1.05	

Test applied - Kruskal Wallis test; *statistical significance at $p < 0.05$.

Table 3. Mean scores of students regarding the pattern of use of mobile phones based on gender

Questions	Males	Females	p-value
1. I keep my phone with me at all the times	3.17±1.11	3.46±0.99	0.022*
2. I prefer keeping my mobile phone within my easy reach while sleeping	3.38±1.15	3.48±1.10	0.575
3. I answer immediately when my phone rings at inappropriate time	2.35±0.98	2.30±1.03	0.582
4. I spend more than three hours on mobile phone per day	3.24±1.13	3.60±0.91	0.005*
5. I respond to phone calls while studying or doing clinical work	2.20±1.01	2.32±0.95	0.177
6. I frequently use SMS or social networking while studying or doing clinical work	2.03±0.93	2.32±0.92	0.006*
7. I frequently check the cell phone during the classes or while doing clinical work	1.91±0.98	2.12±0.82	0.011*
8. I use my phone to not feel lonely in a public place	3.23±1.22	3.73±0.94	0.002*
9. I get disturbed if I don't stay updated with news, social media and or online networks	2.70±1.01	2.59±1.06	0.454
10. I feel nervous if I fail to receive timely response	2.41±1.06	2.49±1.05	0.593
11. I would be annoyed if I could not use my phone and/or its capabilities when I wanted to do so	2.83±1.06	2.93±1.06	0.540
12. It will scare/worry me if I am running out of battery or out of signal in phone	3.11±1.09	3.08±1.18	0.833
13. I would be in stress if I could not use my phone for a week	3.17±1.82	3.33±1.10	0.266
14. I feel nervous if my cell phone is away from me because I am afraid that someone might have tried to contact me	3.11±1.21	3.08±1.07	0.678
15. I feel insecure if my cell phone is away from me because I am afraid that someone might have accessed my data	3.14±1.24	3.03±1.18	0.452
16 I feel distracted by my mobile phone during examination or clinical work	2.58±1.29	2.47±1.62	0.589
17. I feel that overuse of mobile phone has deteriorated my quality of life, including food habits	2.84±1.22	3.06±1.12	0.135
18. I have sleep loss due to use of cell phone at nights	2.35±1.18	2.55±1.02	0.168
19. I feel that overuse of mobile phone has decreased my contacts with friends and relatives	2.35±1.20	2.29±0.99	0.937

Test applied – *Mann Whitney* U test; *statistical significance at p<0.05

Table 4. Prevalence and risk of nomophobia among the students

Risk of nomophobia	n (%)
Normal	18 (6)
At risk of nomophobia	187 (61.9)
Nomophobia	97 (32.1)

Table 5. Prevalence and risk of nomophobia based on gender and academic year

Variables	Categories			p-value
	normal n (%)	at risk of nomophobia n (%)	nomophobia n (%)	
Gender				
Females	6 (2.9)	137 (65.2)	67 (31.9)	0.002*
Males	12 (13.0)	50 (54.3)	30 (32.6)	
Academic year				
First	4 (5.1)	51 (65.4)	23 (29.5)	
Second	3 (5.5)	38 (69.1)	14 (25.5)	
Third	5 (6.9)	47 (65.3)	20 (27.8)	0.611
Fourth	3 (5.6)	29 (53.7)	22 (40.7)	
Internship	3 (7.0)	22 (51.2)	18 (41.9)	
Total	18 (6.0)	187 (61.9)	97 (32.1)	

Test applied - *Chi*-square; *significance at p<0.05

2017 revealed than 24.12 % of the participants were nomophobic and 40.97 % of them were under the risk of developing nomophobia [11]. They also showed that highest number of nomophobes were seen amongst the preclinical students and the lowest being in the clinical students and that the maximum number of participants at risk of being nomophobic were noted on the clinical group and the lowest in the interns. Another study conducted by *Soumitra Sethia* in 2018 [12] reveals that a total of 61.5% of the participants were suffering from moderate nomophobia and 6.1% of them from severe nomophobia.

This study revealed that prevalence of nomophobia was higher in males (32.6%) than females (31.9%), whereas, risk of developing nomophobia was higher among the females (65.2%) than males (54.3%), the difference being statistically significant. The study conducted by *Prasad* et al in 2017 showed that prevalence of nomophobia was higher among females (28.66%) than the males (20.68%), whereas, the risk of nomophobia were higher in males (45.21%) than females (39.59%) [11].

46.4% of the total participants in this study answered that they would be in stress if they stayed away from their mobile phones for a week. 57.9% of the participants agreed that they used their mobile phones for more than 3 hours a day. These findings were consistent with those from the study conducted by *Sodhani* et al in 2020, which showed that 52.7% of the participants used mobile phones for 2-3 hours in a day [13]. A study by *Li M* et al., which shows that 50.8% students spent their time about more than four hours on cell phone usage [8].

Our study revealed that 5.8% of the participants frequently checked their respective mobile phones while being in their class or doing clinical work. But, these findings were contraindicated by the study conducted by *Sodhani* et al in 2020, which showed that 69% of the participants checked their phones in their class [13]. 25.7% of the participants in this study agreed that they got distracted by their mobile phones during their examination or clinical work, which shows that mobile phones can easily shift the attention and concentration of the students from their regular task. 43.4% of the participants agreed that they felt nervous if their mobile phones were away from them because of their fear that someone might have tried to contact them and 32.8% of them agreed that they were worried if their mobile phones were away from them because of their fear that someone might have tried to access their data. This indicates the obsession of the students towards mobile phones. They desire their mobile phones to be with them at all times so that they would be able to secure them.

41.1% of the participants in this study agreed that they will be scared or worried if their phone was running out of battery or out of signal in phone. A study by *Myakal* in 2019 revealed that 53% of the subjects tend to be anxious when they lose their mobile phone, run out of battery or credit or have no network coverage [10]. This proves that the students are completely dependent on the mobile phones, which alters their social and mental behaviour.

This cross-sectional study has few limitations. The sample of undergraduate dental students belonged to one dental college; hence, caution needs to be exercised to generalize the findings. We could not assess the cause-effect relationship between the causative factors and nomophobia among students. Longitudinal, multicentre studies should be conducted to identify the trends of digital device usage among dental students and its likely implications on their daily performance. Moreover, our results and analysis depended upon the students' self-reported responses to the questionnaire which can have a reporting bias.

CONCLUSIONS

It was found that nomophobia was prevalent amongst the dental students. Many of them were at risk of developing nomophobia, which if not checked, might cross the thin margin between being at risk and developing nomophobia. Hence, the proper time has approached where the over-usage of mobile phones should be limited. Since in present era smart phone is a necessity, we cannot ignore its use completely. These cases should be treated appropriately depending on the situation. This can be brought about by educating the communities about the ill-effects of mobile phones and thereby making them aware about the condition, called nomophobia. The dental colleges should take adequate steps to inculcate the habit of doing without mobile phones within the undergraduate students before nomophobia takes over the academic performances of the students and also result in new disorders and dependencies.

Conflict of interest
The authors declare no conflict of interest.

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