Severity of Nomophobia and its Association with Anxiety, Stress and Depression among Medical Students during the Covid-19 Pandemic.

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ABSTRACT

Objective

Nomophobia is a psychological condition associated with fear of being detached from mobile phone connectivity.The COVID-19 pandemic resulted in lockdowns and closure of educational institutions.The study's objective is to find the severity of nomophobia and its association with stress, anxiety and depression in medical students in a tertiary care medical college hospital.

Materials and Methods

This is a cross-sectional analytical study. 307 students were included in the study by simple random sampling. A questionnaire as a google form was administered, which contained four parts. This included socio-demographic details, details related to mobile phone use, a pre-validated questionnaire called Nomophobia questionnaire and the DASS-21 scale.

Results

In our study, we found most students (45.0%) spent 3-6 hours daily on an average on mobile phone use.The most common use was online streaming of movies (24.8%) followed by social networking (23.1%). Statistical analysis revealed that 100 % of students had some degree of nomophobia. Severe nomophobia was present in 19.2% of the students. The severity of nomophobia was associated with the daily duration of mobile phone use, the amount spent on mobile recharge and self-perception of having a mobile phone dependence. There was a strong association between the severity of nomophobia and the severity of stress, anxiety, and depression.

Conclusion

This study has found that a significant percentage of students suffer from nomophobia during the COVID-19 pandemic. Future studies to explore the associations and other causative factors for nomophobia would help in devising intervention methods to decrease the impact of this neglected social health problem.

Key words - anxiety,covid 19,depression,nomophobia,stress

INTRODUCTION

Nomophobia is a portmanteau coined from the words "NO Mobile PHOBIA". It is used to describe a psychological condition when people have a fear of being detached from mobile phone connectivity.[1] The term "Nomophobia" was first coined by the UK Post Office in 2008 during a study who commissioned YouGov, a UK-based research organisation. In that study, it was found that nearly 53.0% British who used mobile phones, tend to be apprehensive when they "lose their mobile phone, run out of battery, or have no network coverage".[2]

It is very difficult to differentiate between patients who have nomophobia due to smartphone addiction and those with existing anxiety disorders manifesting as nomophobia symptoms.[3] Many studies have revealed that a large percentage of students have been addicted to smartphones.[4,5,6] A meta-analysis done in India shows that smartphone addiction has a magnitude in India ranging from 39.0% to 44.0% as per fixed effects calculated.[7] It can be construed that Nomophobia develops as a symptom in students with smartphone addiction. Nomophobia has been on the rise in recent years in India and the world.[8]

On February 12, 2020, the World Health Organization officially named the disease caused by the novel coronavirus as coronavirus disease 2019 (COVID-19).[9] Since its outbreak, in December 2019, the coronavirus disease (COVID-19) has rapidly spread into a global pandemic. This has resulted in lockdowns across the world with the closure of schools, colleges and many workplaces. Although many schools and universities have started online classes, the students still have lesser engagement and fewer avenues for entertainment and leisure. This has resulted in increased screen time exposure in many students.[10] This has the potential to lead to smartphone addiction and eventually result in Nomophobia in a significant percentage of the students. Also, there has been a dearth of studies which have explored any associated factors for nomophobia. Hence, considering all these factors, we felt that this situation presented an opportunity to conduct this research. We conducted this study to assess the severity of nomophobia in medical students and to assess its association with Depression, Anxiety and Stress symptoms.

MATERIALS AND METHODS

Study Design

A cross-sectional study was conducted among the undergraduate medical students and interns belonging to the age groups from 18 to 25 years studying in a Tertiary care Medical College and Hospital in Chennai from April to June 2020.

Study Population

All the 600 students studying in the college and the 150 interns were the study population which gave a total of 750.

Study Procedure

Permission and approval from the institutional ethics committee were obtained before the conduct of the study. Since the study was conducted during the COVID-19 pandemic when all educational institutions were in lockdown, the best possible method of collecting data was by online survey using a google form. The google form included a questionnaire with relevant instruments and also an informed consent form. The inclusion criteria for the study were students having a mobile phone and a willingness to participate. Exclusion criteria were not having a mobile phone or a lack of consent. The sample size was calculated, and simple random technique was used. The online link to the form was shared to the selected participants, and we ensured that the form can be filled by each person only once and that there were no duplicates. Also, we tried to confirm that the actual participant submitted the form since each person's email address was

required to submit the form. The data was obtained from the forms through an excel sheet and later analysed using SPSS software version 26.

Sample Size

For sample size calculation, a population proportion of 50.0% was considered since previous studies have reported prevalence ranging from 30.0% to 100%. Allowing for a margin of error of 5.0% and the total population of students in the institution of 750, we calculated a minimum sample size of 255. Adding for non-responders of 20.0% (since it was an online questionnaire), we calculated a required sample size of 307.

Sampling Technique

The method of sampling was simple random sampling using a computer-generated randomisation table. All the 750 students currently studying in the college were allotted numbers from 1-750, and a simple random technique was used to choose 307 students as the sample.

Instruments Used

The google form was created as a questionnaire which contained four parts

1.   Socio-demographic details
2.   Details regarding mobile phone use
3.   Nomophobia questionnaire
4.   DASS-21 questionnaire.

The 1st part assessed demographic details including age, gender, year of study, place of residence, residential background, marital status and family status.

The 2nd part collected details regarding mobile phone usage like time spent on the mobile phone daily, the usual purpose of using a mobile phone, frequency of changing mobile phone, and money spent on recharge.

The **nomophobia questionnaire**, which is an instrument developed by Yildirim and Correia contains 20 questions, each scored on a 7-point Likert scale, with 1 being "strongly disagree" and 7 being "strongly agree".[11] The total score on the NMP-Q is 20 at its lowest (20 * 1) or 140 (7 * 20) at its highest. A total score of 20 indicates the absence of nomophobia, while scores between 21-59,60-99 and 100-140

indicate mild, moderate and severe nomophobia, respectively. This scale has been used previously mainly to assess the severity of nomophobia.

The DASS-21 scale, i.e. depression, anxiety and stress scale, is a tool to measure depression, stress and anxiety.[12] It contains 3 scales, each containing 7 items which are further divided into subscales having the same content. The scale contained 4 options, namely 0,1,2,3. 0 meant that "it did not apply to me at all" whereas 3 meant "applied to me very much or most of the time ". Based on the option that suited them over the past week, the participant had to choose one of the four options. The sum of the scores was calculated separately for depression, stress and anxiety and then multiplied by 2 to determine the final score. For depression, a score of 0-9 was considered normal,10-13 mild,14-20 moderate, 21-27 severe and 28+ was extremely severe. For anxiety, a score of 0-7 was taken to be normal,8-9 mild,10-14 moderate,15-19 severe, and 20+ was extremely severe. For stress a score of 0-14 was considered normal,15-18 mild,19-25 moderate,26-33 severe and 34+ extremely severe.

Statistical analysis

Descriptive statistics were implemented for the socio-demographic and variables associated with mobile use. The variables assessed were age, gender, year of study, residence and its type, family status, marital status, daily duration of mobile use, the most common type of mobile use, frequency of change of mobile phone, average monthly spend of mobile recharge, self-perception of mobile dependence and the stress, anxiety and depression scores as per DASS-21. All the data was converted into nominal variables, and the chi-square test was employed

RESULTS

Demographic Details

A total of 307 students were studied out of which 160(52.1%) students were males, and 147(47.9%) were females. A majority (51.5%) of the students were under the age group of 18-20 years of age, and most of them (43.3%) belonged to 3rd year of medical education. In this study, 233 (75.9%) students were day

scholars. Most of the students (76.9%) had an urban background, and most of them (75.9%) belonged to nuclear families. 275 (89.6%) stated their relationship status as single.

Data related to mobile phone use

Regarding the daily duration of mobile phone use, a majority of 45.0% of students reported 3-6 hours of use (Figure 1). To the question of "What is the purpose for which you spend most of the time on your mobile for?", 24.8% reported online movie streaming sites like Netflix and Amazon, 23.1% answered social networking, 10.1% for gaming, 10.1% for YouTube and 9.4% for talking with friends (Figure 2). Only 7.2% reported using mobile most for academic activities. When asked about the frequency of changing their mobile phone, the majority (58.3%) said that they changed their mobiles once every 2-5 years. Regarding expenditure, a majority (31.3%) of the students said that they spend less than Indian rupees 400 per month for mobile recharge. When students were asked if they felt that they are dependent on their mobile phone, 38.1% responded with maybe, 36.2% said a resounding yes and only 25.4% said No.
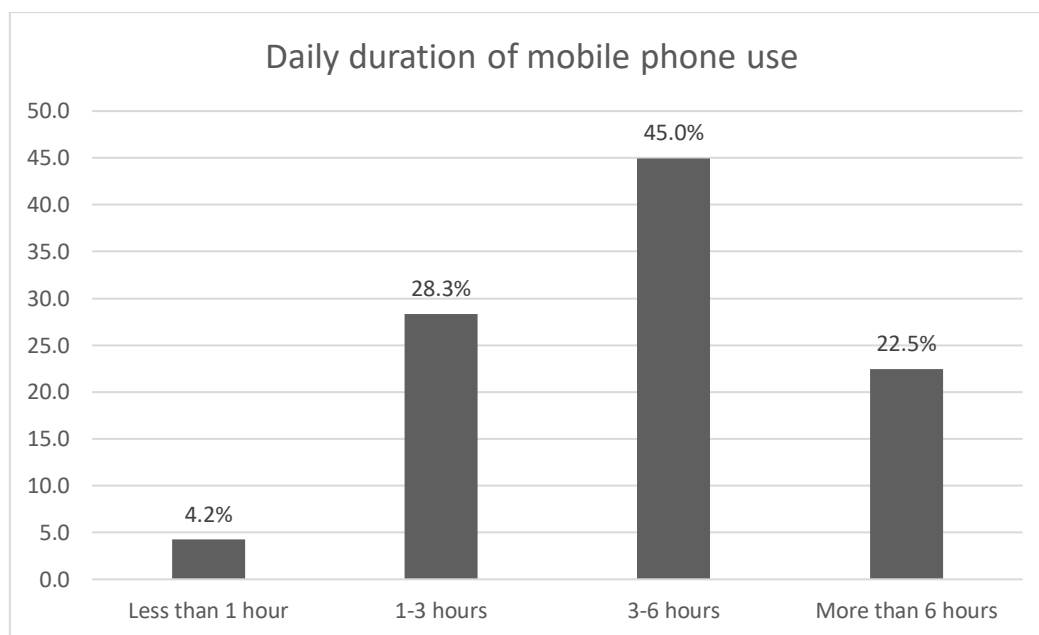

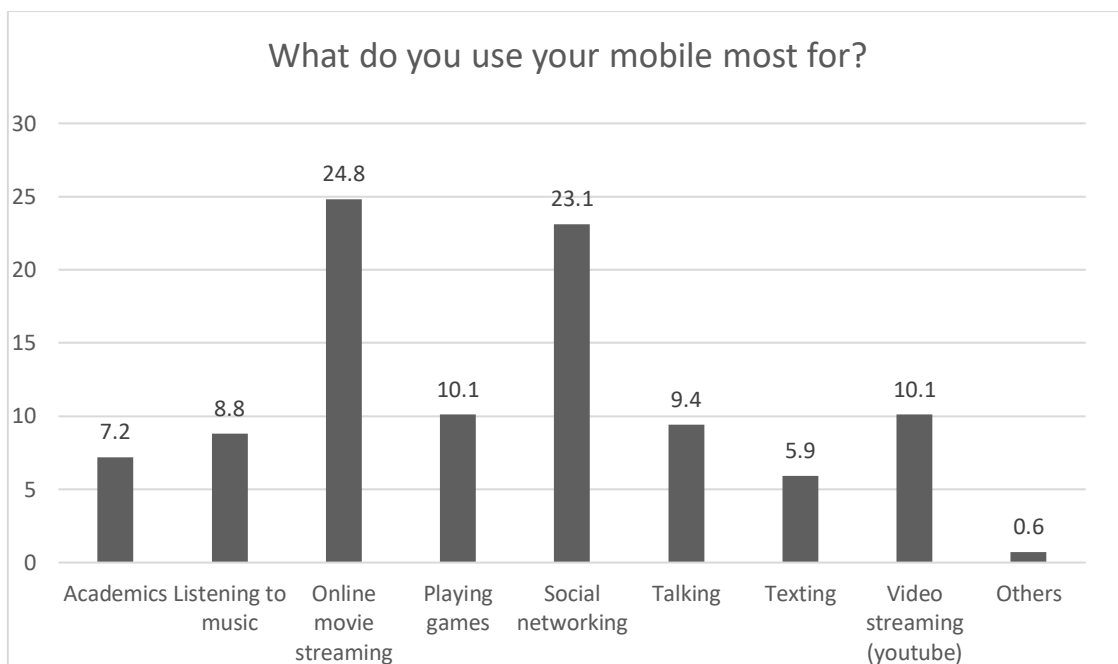*Figure 1: Shows the Daily Duration of mobile phone use*

Figure 2: Shows the most common use of mobile phone

Nomophobia Severity

As per the nomophobia questionnaire, all the students scored above the 20 cut off which showed the presence of nomophobia in 100% of students. The severity of nomophobia among the students was distributed as follows (Figure3)
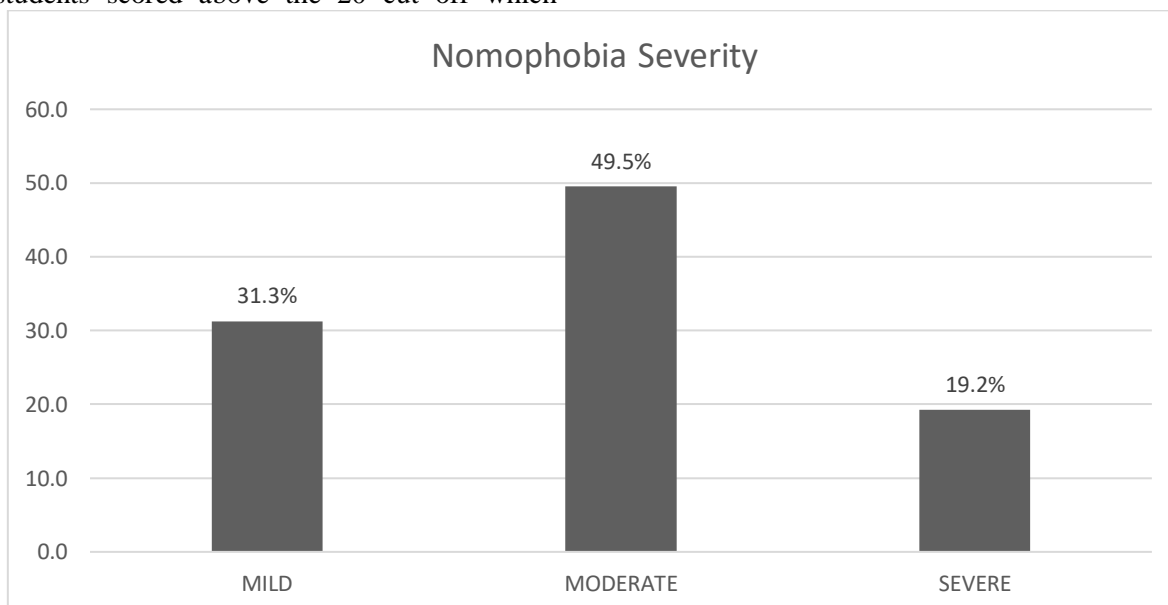

Figure 3: Shows Nomophobia severity

Association between nomophobia severity and socio-demographic details

Table 1: Shows Association between nomophobia severity and socio-demographic details

S.NO	VARIABLES	NOMOPHOBIA SEVERITY	

		Mild nomophobia N(%)	Moderate nomophobia N(%)	Severe nomophobia N(%)	P VALUE (<.0.05)
1.	**Age (in years)**				.124
	18-20	40(25.3%)	87(55.1%)	31(19.6%)	
	21-23	51(36.4%)	62(44.3%)	27(19.3%)	
	24-26	5(55.5%)	3(44.4%)	1(11.11%)	
2.	**Gender**				.643
	Male	43(29.3%)	73(49.7%)	31(21.0%)	
	Female	53(33.1%)	79(49.4%%)	28(17.5%%)	
3.	**Year of study**				.476
	1st year	5(16.1%)	19(61.3%)	7(22.6%)	
	2nd year	13(28.3%)	24(52.2%)	9(19.6%)	
	3rd year	43(32.3%)	62(46.6%)	28(21.1%)	
	4th year	17(30.9%)	30(54.5%)	8(14.5%)	
	INTERN	18(42.9%)	17(40.5%)	7(16.7%)	
4.	**Place of residence**				.264
	Home	71(30.5%)	121(51.9%)	41(17.6%)	
	Hostel	25(33.8%)	31(41.9%)	18(24.3%)	
5.	**Residential background**				.634
	Rural	19(26.8%)	38(53.5%)	14(19.7%)	
	urban	77(32.6%)	114(48.3%)	45(19.2%)	
6.	**Marital status**				.104
	Single	84(30.5%)	135(49.1%)	56(20.4%)	

	In a relationship	9(56.3%)	6(37.5%)	1(6.3%)	
	Prefer not to answer	3(18.8%)	11(68.8%)	2(12.5%)	
7.	**Family status**				.200
	Nuclear family	76(32.6%)	110(47.2%)	47(20.2%)	
	Single parent family	4(26.7%)	6(40.0%)	5(33.3%)	
	Extended or joint family	16(27.1%)	36(61.0%)	7(11.9%)	

Chi-square test was employed to test the significance of the associations between nomophobia severity and the socio-demographic details.Here p-value of less than 0.05 was considered statistically significant. It was found that there was no statistically significant association between any of the socio-demographic variables and the severity of nomophobia.

Table 2: Shows Association between nomophobia severity and variables related to mobile phone use

S.NO	VARIABLES	NOMOPHOBIA SEVERITY			P VALVE (<.0.05)
		Mild nomophobia **N(%)**	**Moderate nomophobia** **N(%)**	**Severe nomophobia** **N(%)**	
1.	**Average time spent on the mobile phone per day**				0.031
	Less than 1 hour	9 (69.2%)	2 (15.4%)	2 (15.4%)	
	Between 1- 3 hours	30 (34.5%)	42 (48.3%)	15(17.2%)	
	Between 3 - 6 hours	42 (30.4%)	72(52.2%)	24 (17.4%)	
	More than 6 hours	15 (21.7%)	36 (52.0%)	18 (26.1%)	
2.	**Most time spent on mobile for**				.111
	Academics	7 (31.8%)	12(54.5%)	3(13.6%)	

	Listening to Music	11(40.7%)	15(55.6%)	1(3.7%)	
	Online Movie Streaming (Netflix, Amazon)	17(22.4%)	44(57.9%)	15(19.7%)	
	Playing Games	12(38.7%)	15(48.4%)	4(12.9%)	
	Social Networking	23(32.4%)	32(45.1%)	16(22.5%)	
	Talking	10(34.5%)	12(41.4%)	7(24.1%)	
	Texting	5(27.8%)	5(27.8%)	8(44.4%)	
	Video Streaming like Youtube	9(29.0%)	17(54.8%)	5(16.1%)	
	Others	2(100%)	0	0	
3.	**Frequency of Mobile change**				
	Every year	5(23.8%)	10(47.6%)	6(28.6%)	0.302
	Every 2 years	17(27.4%)	37(59.7%)	8(12.9%)	
	Every 2-5 years	61(34.1%)	82(45.8%)	36(20.1%)	
	> 5 years	13(28.9%)	23(51.1%)	9(20.0%)	
4.	**How much do you spend per month to recharge your mobile?**				**0.008**
	< INR 400	43(44.8%)	42(43.8%)	11(11.5%)	
	INR 400-500	29(27.1%)	54(50.5%)	24(22.4%)	
	INR 500-600	15(20.8%)	43(59.7%)	14(19.4%)	
	> INR 600	9(28.1%)	13(40.6%)	10(31.3%)	
5.	**Do you feel that you are dependent on your mobile?**				
	Yes	33(29.5%)	43(38.4%)	36(32.1%)	**0.000**
	No	39(50.0%)	31(39.7%)	8(10.3%)	

	Maybe	24(20.5%)	78(66.7%)	15(12.8%)	

On using the Chi-square test for testing the significance of the association between nomophobia and variables related to mobile phone use, only 3 variables were found to have a statistically significant association. Nomophobia severity was significantly associated with the time spent on mobile use, the monthly spend for mobile recharge and the self-perception of having a mobile phone dependence.

Association between nomophobia severity and severity of anxiety, stress and depression

There was a strong association between the severity of nomophobia and the severity of anxiety, stress, and depression. These associations were statistically significant, with a p-value of 0.000.

Table 3: Shows Association between nomophobia severity and severity of anxiety, stress and depression

ANXIETY						
ANXIETY SEVERITY						
NOMOPHOBIA SEVERITY	**No Anxiety N (N%)**	**Mild Anxiety N (N%)**	**Moderate Anxiety N (N%)**	**Severe Anxiety N (N%)**	**Extremely Severe Anxiety N (N%)**	**P-value**
Mild Nomophobia	67 (69.8%)	7 (7.3%)	13 (13.5%)	1 (1.0%)	8 (8.3%)	0.000
Moderate Nomophobia	77 (50.0%)	13 (8.6%)	25 (16.4%)	9 (5.9%)	28 (18.4%)	
Severe Nomophobia	21 (35.6%)	1 (1.7%)	12 (20.3%)	5 (8.5%)	20 (33.9%)	
STRESS						
	STRESS SEVERITY					
NOMOPHOBIA SEVERITY	**No Stress N(N%)**	**Mild Stress N(N%)**	**Moderate Stress N(N%)**	**Severe Stress N(N%)**	**Extremely Severe Stress N(N%)**	**P-value**
Mild Nomophobia	70 (72.9%)	10 (10.4%)	9 (9.4%)	3 (3.1%)	4 (4.2%)	
Moderate Nomophobia	89 (58.6%)	16 (10.5%)	26 (17.1%)	11 (7.2%)	10 (6.6%)	0.000
Severe Nomophobia	22 (37.3%)	4 (6.8%)	8 (13.6%)	16 (27.1%)	9 (15.3%)	
DEPRESSION						
	DEPRESSION SEVERITY					

NOMOPHOBIA SEVERITY	No Depression N(N%)	Mild Depression N(N%)	Moderate Depression N(N%)	Severe Depression N(N%)	Extremely Severe Depression N(N%)	P-value
Mild Nomophobia	66 (68.8%)	3 (3.1%)	17 (17.7%)	5 (5.2%)	5 (5.2%)	0.000
Moderate Nomophobia	78 (51.3%)	15 (9.9%)	31 (20.4%)	12 (7.9%)	16 (10.5%)	
Severe Nomophobia	17 (28.8%)	3 (5.1%)	15 (25.4%)	8 (13.6%)	16 (27.1%)	

DISCUSSION

Mobile phone use has become very much ingrained into our daily lives which has increased the incidence of smartphone addiction and the emergence of the concept of Nomophobia. COVID 19 pandemic has resulted in increased time students spend with the mobile phone, due to online academic sessions and due to the absence of alternate entertainment options and means to keep themselves occupied.

Nomophobia Prevalence and Severity

In our study, we used the nomophobia questionnaire and the suggested cut of 20 for assessing nomophobia which gives a prevalence of 100% of nomophobia in the students. Such a high rate of prevalence was seen in previous studies from Puducherry [8] and Odisha.[13] The high prevalence reported can be explained by the inclusive nature of the Nomophobia questionnaire and the exceptionally low cut off used in the questionnaire. This has prompted investigators to focus on the prevalence of severe nomophobia rather than nomophobia in general. In our study, the prevalence of severe nomophobia was 19.2 % (figure 3). This implies that mobile phone use has a significant impact on everyday life and that there is severe anxiety and fear associated with having no mobile. Although this significant prevalence was presumed to be due to the pandemic enforced lockdown and its consequence, many previous studies had similar prevalence of severe nomophobia. For example, the Puducherry study reported a prevalence of 23.5% [8] and the study conducted in Odisha reported a prevalence of 21.0% [13] of severe nomophobia. A study by Ayar et al in Turkey revealed a prevalence of 13.6% of severe nomophobia.[14] So, this

suggests that a high prevalence of severe nomophobia may be present in students even during non-COVID times. A follow-up study conducted in the aftermath of COVID-19 can throw some light in this regard.

Mobile Phone Use

In our study, most students reported spending 4-6 hours on average daily for mobile phone use (figure 1). Regarding the most common use, 24.4% reported using mobile phones for viewing online movie streaming platforms like Amazon, Netflix, etc (figure 2). This shows that smartphones are being used more for entertainment purposes rather than academics and socialising. Also, this may be due to mushrooming and easy accessibility of such streaming platforms in recent years. The use of mobile phone for purposes other than communication may be instrumental in not developing alternate avenues for entertainment and in turn, may lead to a phobia of losing mobile.

Association of nomophobia severity with variables

In our study, we looked for an association between nomophobia severity and several variables. Although we did not employ regression analysis, we used the Chi-square test to assess the statistical significance of the associations. Still, we cannot attribute these associations as factors or consequences of nomophobia.

Our study revealed that there were no significant associations between nomophobia severity and socio-demographic variables like age, gender, residence, family status, marital status, etc(table

1). But one previous study reported that male gender and increasing age were significantly associated with nomophobia severity.[8] However, in a study by Moreno et al, it was found that age did not have any association with nomophobia severity, but that male gender had an association. [15]

Among the variables related to mobile use, we found an association between money spent on monthly recharge and severity of nomophobia. 31.3% of students spending more than 600 rupees had severe nomophobia, but only 11.5% of students spending less than 400 rupees had severe nomophobia (table 2). This is probably because, students having severe nomophobia tend to spend more time on mobile phone and consume more mobile internet data which may prompt them to spend more for recharge.

Another variable that had an association with nomophobia severity was the time spent on mobile phone use. Among students who spent less than 1 hour on mobile on an average per day, 15.2% had severe nomophobia, but among students who spent more than 6 hours on an average per day, 26.1% had severe nomophobia. This association was statistically significant. The study by Jilisha et al.[8] , found that the duration of smartphone usage was significantly related to nomophobia. Another study by Yildiz Durak [16], also reported such an association. Although the association is apparent, it does suggest a factor that can be used to predict severe nomophobia. So, since students who use mobile for more duration are more likely to suffer from severe nomophobia, future screening methods could employ this as a tool to identify nomophobia. Also, future interventions could be directed at reducing the daily average duration of mobile use. This association also supports the theory of a strong association between nomophobia and smartphone addiction since the duration of use is an important parameter in evaluating smartphone addiction as per a study done in Switzerland.[17] In the study by Yildiz Durak[16], it was found that smartphone addiction had a strong association with nomophobia and also that increased duration of daily smartphone use was an important risk factor common to both.

There was also an association between self-perception of having a mobile phone dependence and the severity of nomophobia.

32.1% of students who reported having a mobile dependence had severe nomophobia but only 10.3% of students who reported not having a mobile dependence had severe nomophobia. This again reiterates the above hypothesis of an association between smartphone addiction and nomophobia.

There was also a strong association between the severity of nomophobia and the severity of all the measures in DASS-21 scale, which includes stress, anxiety and depression (table 3).

Since nomophobia is a form of anxiety, the association between nomophobia severity and severity of anxiety is quite an obvious assumption. Nonetheless, it is confirming to see that in the form of an association. Only 1.0% and 8.3 % of students with mild nomophobia had severe and extremely severe anxiety, respectively. But among students with severe nomophobia, 8.5% and 33.9% had severe and extremely severe anxiety, respectively.

There was a statistically significant association between nomophobia severity and severity of stress . In the mild nomophobia group, only 3.1% and 4.2% had severe and extremely severe stress respectively, but in the severe nomophobia group, 27.1% and 15.3% had severe and extremely severe stress respectively. Though the association between anxiety and nomophobia is apparent, the association between stress and nomophobia is not so. This is hence an important finding which suggests a possible causal relationship between nomophobia and stress, with nomophobia leading to increased stress in students.

There was a significant association between nomophobia severity and severity of depression . In the mild nomophobia group, only 5.2% each suffered from severe and extremely severe depression, but in the severe nomophobia group, 13.6% and 27.1% suffered from severe and extremely severe depression, respectively.

There have been very few studies which have explored an association between nomophobia and psychological parameters like anxiety, stress and depression. In an article by Kuscu et al.[18], nomophobia was found to be associated with depression and anxiety. In another study by Thomee et al.[19], it was found that high mobile phone use was associated with stress, sleep disturbances, and depression.

Ozdemir et al. [20], found that the nomophobia appeared to be positively correlated with loneliness and self-esteem while negatively correlated with self-happiness. So, previous findings correlate with our study findings of a positive association between nomophobia severity and stress, anxiety and depression. But, the associations of stress, depression and anxiety could not be exactly attributed as causation or consequence of nomophobia. In one study by Jun et al.[21], it was even found that the casual relationship between depressive symptoms and mobile phone addiction was bidirectional across 3 years.

Limitation

The study was conducted in a private medical college attached to a tertiary care hospital in South India. Hence, the results cannot be extrapolated to the general population as other influencing factors regarding geography and also the potential difference between government and private college would have to be considered. Besides, the study was conducted in a medical college and hence cannot be used to predict similar results in other types of colleges. Another limitation was that only associations were found and their statistical significance assessed using Chi-square test, but no regression analysis was employed. Yet another limitation was that the questionnaire employed was online which has the potential for error when compared to administering them in person. However, this was not possible due to the COVID-19 pandemic situation. Also, we did not explore the subscales of nomophobia, which has been done in some previous studies. Futures studies can be employed to explore this aspect in detail.

Conclusion

Nomophobia has emerged as one of the critical psychological problems associated with advancement in technology, especially among college students. The COVID-19 pandemic has created an unprecedented situation that has the potential to increase nomophobia. This study is important because it has found that a significant number of medical students have severe nomophobia during the COVID-19 pandemic. The important associated factors were daily duration of mobile use, monthly expenditure on mobile recharge and the self-perception of having a mobile phone dependence. There was also a strong positive association between the severity of nomophobia and the severity of stress, anxiety and depression. Further studies constituted to explore these associations and to identify possible predictors for nomophobia would help to devise screening and intervention methods to curtail the significant problem of nomophobia in students.

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