Nomophobia and Its Impact on Mental Health Among School Students During The COVID-19 Lockdown: A Cross-Sectional Study

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Abstract

Background: The COVID-19 pandemic resulted in extended lockdowns and home confinement, drastically altering daily routines and increasing reliance on digital devices. Smartphones became essential tools for education, communication, and entertainment, but their excessive use has raised mental health concerns, especially among adolescents. This study investigates the relationship between nomophobia (the fear of being without a mobile phone) and mental health outcomes in school students during the lockdown.

Aim: To examine the impact of mobile phone usage on mental health, specifically levels of depression, anxiety, and stress, among school students during the COVID-19 lockdown.

Methodology: A correlational research design was employed to explore the association between nomophobia and mental health indicators. Descriptive statistics were used to determine the prevalence of nomophobia. A paired t-test assessed differences in smartphone usage pre- and post-lockdown. Standardized tools were used to measure levels of smartphone addiction, depression, anxiety, and stress among participants.

Results: The study found a 53% prevalence of nomophobia among school students, with female students showing higher levels than males. There was a significant increase in the average time spent online, exceeding two hours per day post-lockdown. Higher smartphone addiction scores correlated significantly with increased levels of anxiety, depression, and stress.

Conclusion: The findings suggest a strong link between increased smartphone dependency and deteriorating mental health among school students during the COVID-19 lockdown. This underscores the need for targeted interventions to address digital overuse and promote mental well-being among adolescents.

Keywords: *COVID-19; Depression; Anxiety; Stress.*

1. Introduction

The global spread of the COVID-19 pandemic has brought daily life to a standstill. As smartphones and their applications continue to rise in popularity, they have become indispensable tools for maintaining social connections, facilitating communication, exchanging information, and driving personal and professional progress(1). Because of their various functions, such as touch screens, internet connectivity, and sophisticated operating systems, smartphones have evolved from accessories to necessities(2). Additionally, smartphones can integrate services like communication and entertainment, as well as education and entertainment (3). Video games have been gaining while sports have been losing out (4). While we believe that someday we will be able to return to our old routines, we may also adopt some new routines that could outlast the stay-at-home orders as people start to use their phones in new ways (5). Numerous effects of smartphones on our lives could result in negative health consequences if they are used excessively (6).

Nomophobia – from "no mobile phone" and phobia – It is a debilitating fear of losing communication with a cell phone, not having a cell network, or having a low battery or balance (7). People with nomophobia may also protect themselves from social interactions by using their devices; they find themselves more comfortable, safer, or more successful when using electronic connections compared to interacting with the physical world (8). To circumvent direct personal connections, smartphones function as a protective shield (9). Individuals with nomophobia may circumvent direct social activities, relationships, and connections by utilizing the online world (10). The social features of smart devices may enhance self-confidence in comparison to in-person interactions, and they can reduce distances between individuals and unite them regardless of demographics (11).

Bragazzi et al. (12) state that excessive smartphone use in place of face-to-face interactions, owning multiple devices, always carrying a mobile charger, and experiencing anxiety when the phone is unavailable, not covered by the network, has technical issues, or has low credit are all examples of nomophobia. Individuals may also excessively check for messages or missed calls, and avoid places where mobile phone use is prohibited or coverage is limited. Smartphones are more widely used among youth due to their greater capacity to handle the rapid developments of technology than other generations (8). Young people are at risk of developing nomophobia (13). A study conducted

in India found that most participants aged 16–23 years felt isolated, lonely, and less connected when they were away from their smartphones (14). Smartphones may adversely affect students' psychosocial well-being, causing anxiety, depression, stress, and sleeplessness. They can have physiological health impacts, such as not eating regularly and not exercising, as well as leading to poor academic output (15) and performance (16). A study of 200 medical students in Bangalore found that nearly 43% of participants experienced severe adverse effects on their study and academic performance (17). Similarly, another investigation of 150 art students showed that academic performance, concentration on study, and practical work were negatively affected by smartphone dependency (18).

While there are studies in the West exploring the mobile phone usage data during this pandemic, there are no reported ones in India yet. This study examines the pattern of mobile phone usage among school students during the lockdown. This will help us understand the pattern and give more insight into devising ways to combat the stress and the mental health challenges that they are facing, being stuck at home.

1.1. Aim of the study

This study aims to see the impact of mobile phone usage on mental health during the COVID-19 lockdown period among school students

1.2. Objectives of the study

- To assess and compare the level of mobile phone usage before the lockdown period and after the lockdown period amongst school students.
- To assess the level of smartphone addiction among school students who have increased usage of mobile phones during and after the lockdown period.
- To assess the level of anxiety, depression, and stress amongst school students with more mobile phone usage during and after the lockdown period than before the lockdown period.
- To assess the relationship between the level of smartphone addiction and the level of anxiety, depression, and stress among school students.

2. Materials and methods

2.1. Study design

The present study employed a correlational design to examine the association between nomophobia and negative emotional states, specifically depression, anxiety, and stress. Descriptive statistics were used to assess the prevalence of nomophobia, while a paired t-test was conducted to determine significant differences in mobile phone usage before and during the COVID-19 lockdown.

2.2. Participants and sampling

Data were collected through convenience sampling from a semi-urban school, encompassing students from various classes and age groups. The final sample consisted of 152 students aged between 10 and 18 years, primarily from classes 6 to 12. Informed consent was obtained via a Google Form filled out by a parent or guardian in the presence of the student.

2.3. Ethical considerations

The study was approved by the Institutional Ethics and Scientific Committee of IMS & SUM Hospital, Bhubaneswar (Ref. No. IEC/IMS.SH/SOA/2024/706).

2.3.1. Instruments

- Sociodemographic Form: This form captured details such as the participant's age, gender, class, type of digital device used, primary purpose of internet use, and the duration of mobile phone usage before and during the lockdown.
- Nomophobia Questionnaire (NMP-Q): Developed by Yildirim and Correia (2015), the NMP-Q consists of 20 items rated on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The total score ranges from 20 to 140, with higher scores indicating more severe nomophobia(24). Severity was categorized as follows:
- 20 = Absence of nomophobia
- 21–59 = Mild
- 60–99 = Moderate
- 100 or more = Severe
- The scale has high internal consistency, with a Cronbach's alpha of 0.95.
- Depression, Anxiety, and Stress Scale (DASS-21): This self-report scale includes 21 items divided into three subscales—Depression, Anxiety, and Stress—each comprising 7 items. Items are rated from 0 (did not apply to me at all) to 3 (applied to me very much). Subscale scores are calculated by summing the item scores and multiplying by 2. Total scores range from 0 to 120, with a cut-off score of 60 for the overall DASS and 21 for the Depression subscale (25).

2.3.2. Procedure

A Google Form was created, incorporating all tools along with an initial section for informed consent. The link was distributed to parents/guardians, who completed the form in the presence of their child. Only responses with recorded consent were included in the final dataset. Data analysis was conducted using SPSS Version 25.

2.3.3. Results

Table 1: Shows The Frequency and Percentages of Various Socio-Demographic and Clinical Data

Variables		Frequency	Percentage
Gender	Male	89	58.6
	Female	63	41.4
	10	25	16.4
	11	14	9.2
	12	29	19.1
	13	12	7.9
Age	14	11	7.2
	15	12	7.9
	16	12	7.9
	17	33	21.7
	18	4	2.6
Education	Below 10th	101	66.4
	12th	51	33.6
	Desktop	4	2.6
	Laptop	3	2
Device used	Smartphone	122	80.3
	Tablet	1	0.7
	miscellaneous	22	14.5
	1-2hrs	94	61.8
	2-3hrs	28	18.4
Average time of use before lockdown	3-4hrs	17	11.2
	4-5hrs	8	5.3
	>5hrs	5	3.3
	1-2hrs	27	17.8
	2-3hrs	35	23
Average time of use during lockdown	3-4hrs	25	16.4
	4-5hrs	33	21.7
	>5hrs	32	21.1

Table 1 shows the frequency and percentages of various socio-demographic and clinical data. 58.6% of participants were male, while 41.4% were female students. Most students were 17 17years old with 21.7%. While 19.1% were of age 12 years, and 16.4% were of age 10 years. Most students, 66.4%, belonged to >= 10th std, while 33.6% belonged to 12th std. The most used device was a smartphone, with 80.3% of students using it. 14.5% used miscellaneous devices, 2.6% used desktops, 2% used laptops, and 0.7% used tablets for their purposes. The average time of use before the lockdown was 1-2 hours, with 61.8%. 18.4% of students used it for 2- 3 hours, 11.2% used it for 3- 4 hours, 5.3% used it for 4-5 hours, and 3.3% used it for more than 5 hours. While the average time of use during lockdown was 17.8%, with 1- 2 hours. 23% using for 2-3hours, 16.4% using for 3-4hours, 21.7% using 4-5hours and 21.1% using for more than 5 hours.

Table 2: Shows The Average Time of Use Among Male and Female Students

	Gender				Total	
	Male		Female			
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1-2hrs	59	66.3	35	56.6	94	61.8
2-3hrs	16	18	12	19	28	18.4
3-4hrs	7	7.9	10	15.9	17	11.2
4-5hrs	3	3.4	5	7.9	8	5.3
>5hrs	4	4.5	1	1.6	5	3.3

Table 2 shows the average time of use among male and female students. 66.3% of males were using the internet/smartphone for 1-2 hrs while only 56.6% of females were using it for 1-2 hrs. 18% of males and 19% of females were using smartphones for 2- 3 hours. 7.9% of males and 15.9% of females were using for 3- 4 hours. 3.4% of males and 7.9% of females were using smartphones for 4- 5 hours, and 4.5% of males and 1.6% of females were using them for more than 5 hours.

Table 3: Shows The Average Time of Use During the Lockdown

	Gender				Total	
	Male		Female			
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1-2hrs	22	24.7	5	7.9	27	17.8
2-3hrs	35	28.1	10	15.9	35	23
3-4hrs	11	12.4	14	22.2	25	16.4
4-5hrs	17	19.1	16	25.4	33	21.7
>5hrs	14	15.7	18	28.6	32	21.1

Table 3 shows the average time of use during the lockdown. 24.7% of males and 7.9% of females were using smartphones for 1-2 hours, while 28.1% of males and 15.9% of females were using them for 2- 3 hours. 12.4% of males and 22.2% of females were using for 3- 4 hours. 19.1% of males and 25.4% of females were found to be using smartphones for 4- 5 hours. While 15.75% of males and 28.6% of females were using for more than 5 hours.

Table 4: Shows the Frequency and Percentage of People Having Nomophobia.

variable	Gender				Total	
	Male		Female			
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
<20 absent	12	13.5	1	1.6	13	8.6
21-59 mild	18	20.2	12	19	30	19.7
60-99 moderate	46	51.7	36	57.1	82	53.9
100-40 severe	13	14.6	14	22.2	27	17.8

Table 4 shows the frequency and percentage of people having nomophobia. According to the table, 53.9% of students had a moderate level of nomophobia, out of which 51.7% were males and 57.1% were females. Followed by this, 19.7% had a mild level of nomophobia, out of which 20.3% were males and 19% were females. 17.8% had severe nomophobia, out of which 14.6% were males and 22.2% were females.

Table 5: Shows The Level of Depression Across the Genders

Variable	Gender				Total	
	Male		Female			
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
0-9 normal	66	75	46	68.3	109	72.2
10-13 mild	8	9.1	9	14.3	17	11.3
14-20 moderate	10	11.4	6	9.5	16	10.6
21-27 severe	4	4.5	2	3.2	6	4
>28 extremely severe	0	0	3	4.8	3	2

Table 5 shows the level of depression across the genders. 72.2% had no symptoms of depression. 11.3% had a mild level of depressive features, out of which 14.3% were females and 9.1% were males. 10.6% had a moderate level of depression symptoms, out of which 11.4% were males and 9.5% were females. 4% had a severe level of depression, out of which 4.5% were males and 3.2% were females, while 2% had extremely severe symptoms, out of which 4.8% were females.

Table 6: Shows the Level of Anxiety Across the Genders

Variables	Gender				Total	
	Male		Female			
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
0-7 normal	62	69.7	44	69.8	106	69.7
8-9 mild	3	3.4	4	6.3	7	4.6
10-14 moderate	11	12.4	7	11.1	18	11.8
15-19 severe	7	7.9	3	4.8	10	6.6
>20 extremely severe	6	6.7	5	7.9	11	7.2

Table 6 shows the level of anxiety across the genders. While 69.7% reported no anxiety, 4.6% had mild anxiety, 11.8% had moderate anxiety, of which 12.4%were males and 11.1% were females, 6.6% had severe anxiety, with 7.9% males and 4.85% females reporting the same. And 7.2% had extremely severe anxiety, with 6.7% males and 7.9% females reporting it.

Table 7: Shows the Stress Level Across Genders

Variable	Gender				Total	
	Male		Female			
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
0-14 normal	77	86.5	54	85.7	131	86.2
15-18 mild	5	5.6	3	4.8	8	5.3
19-25 moderate	6	6.7	4	6.3	10	6.6
26-33 severe	0	0	2	3.2	2	1.3
>34 extremely severe	1	1.1	0	0	1	0.7

Table 7 shows the stress level across genders. 86.2% report no stress. 5.3% consisting of 5.6% males and 4.8% females, report mild stress levels. 6.6% reported moderate stress levels, out of 6.7% were males, and 6.3% were females. 1.3% reported severe stress, consisting of 3.2% females, while 0.7% reported extremely severe stress, consisting of 1.1% males.

Table 8: Shows the T-Test Values

	Mean	Std. Deviation	df	T
avg bf lkdn - avg lkdn	-1.355	1.247	151	-13.40**

Table 8 shows the t-test values. The table shows that there is a significant difference between the average use of smartphones before and during the lockdown, with t= -13.40, p< 0.01, which indicates that there is an increase in internet use during and after the lockdown as compared to before the lockdown.

Table 9: Shows the Relationship between the Variables

	age	gender	level_nmp	dep_level	anx_level	strss_level
age	-	.154	.113	.206*	-.014	.088
gender		-	.195*	.084	-.015	.024
level_nmp			-	.332**	.230**	.315**
dep_level				-	.607**	.647**
anx_level					-	.631**
strss_level						-

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Table 9 shows the relationship between the variables. Age is positively correlated with the level of depression, r= 0.206,p< 0.05. gender has a positive relationship with the level of nomophobia, r= 0.195,p< 0.05. There is a significant positive relationship between the level of nomophobia and the level of depression, r=0.332,p< 0.01; with the level of anxiety, r=0.23,p<0.01; and the level of stress, r=0.315,p< 0.01. This suggests that the higher the level of nomophobia, the higher the depression, anxiety, and stress levels.

3. Discussion

Nomophobia, a catchy nomenclature derived from No mobile phobia, is identified as a mental disorder among school students and adolescents, which is on the rise due to addiction to mobile phone usage. Globally, the prevalence of the disorder is on the rise, and it's a serious threat to advanced and digitally developing nations to curtail it at an early stage. Nomophobia is identified as a threat to our social, mental, and physical health (19). The imposition of lockdown during COVID has resulted in high use of social media and the internet, and recent studies have shown an increase in nomophobia.

The study was conducted among students from classes 6 to 12 in schools. Most of the students were 17years old. This may be the case as students tend to adapt early to electronic devices and can be categorized as early adopters (20). For them, a smartphone is an interesting entertainment object that can connect with friends and gives them a sense of autonomy, identity, and credibility (21). This could also be because the schools were closed due to the lockdown, and classes were being conducted online.

In the present study, the prevalence was 53%, and females were more nomophobic (57.1%) than male participants (51.7%). The present study highlights a changing trend of nomophobia among female students compared to male students. Our study findings were like those of Harish et al, 2018, who reported a similar prevalence of 50% in females and 49.4% among males. In their study, the overall prevalence of nomophobia was 63.9%, which is considered a moderate risk. In a similar study, Rajyalakshmi (2020) observed that 58.96% of females and 42.06% of males were nomophobic (22). Results from a study by Yavuz et.al. 2019, 23) indicate that gender significantly predicts nomophobia, and nomophobia levels are higher in female adolescents than males. The research conducted on college students in Turkey revealed that the severity of nomophobia was higher in females compared to males, and the results are consistent with the results of the study done by Yildirim et al (24). This result may be related to the widespread use of smartphones for social communication purposes. It was shown that females are more likely to use smartphones for social interaction than males. However, findings from the study of Pavithra et al. 2015 (17), states that prevalence of Nomophobia was only 39.5% and more in males (44.8%) than females (33.7%), similar results were also identified in the study of Dixit et al, 2010 (13), with only 18.5% prevalence in the study by Billeux et al, 2007 (25).

This study found that before lockdown, the most time spent online was 1-2 hours. However, during the lockdown and after the lockdown, the amount of time spent increased to more than 2 hours. Previous findings show that around 45.0% of students spent 4-6 hours a day using their smartphones. The findings were also supported by Hatice et al. 2016, who found that 40.1% of students spend 4 to 6 hours a day (26). Meanwhile, 30% of the students spend more than seven hours on it, which is quite worrying. This is because time allocation for smartphones of more than 5 hours is inappropriate for a student who should prioritize academic issues and concentrate on learning rather than social issues, as it will affect academic achievement (27). Amidtaher et al. 2016) stated that an increase in smartphone dependency will decrease academic achievement (28). Besides that, a cross-sectional study in India found some students had experienced specific side effects of long-term mobile use, like headache, backache, and eye strain (29).

This study also compared smartphone usage before and during lockdown. It was found that there was a significant difference between them. This could be the fact that, because of the lockdown, there was a restriction on movement, leaving people stranded in their houses. Schools were closed, and the students had to remain confined to their homes. In this situation, social media and staying online became the only source of entertainment for people. So, there was a sudden rise in the amount of time spent online and on smartphones. Additionally, since the schools started organizing online classes, the students had no option but to spend maximum time on devices for educational purposes.

Students' psychological wellness is also negatively impacted by smartphones, which can lead to stress, anxiety, sadness, and insomnia. They may result in poor performance, academic output, and physiological health effects, including irregular eating and exercise (15,16).

This study highlights that there was a relationship between smartphone addiction with anxiety and depression. The students who reported high scores of smartphone addiction tended to report high scores of anxiety, depression, and stress. The results of this study were in line with previous studies (30-34) that there is a relationship between smartphone addiction and anxiety and depression among university students (30-34). A study by Demirci et al. (30) found that smartphone overuse may lead to anxiety and/or depression, which can lead to sleep problems. Based on several studies, they also found that excessive use of smartphones leads to anxiety and creates several disorders such as ringxiety, Nomophobia, and fear of missing out (FoMo). An addictive individual will also have a loss of self-control, a lack of desire, and the ability to communicate with others. As a result, the individual will start isolating himself or herself and continue to depend on smartphones. Indirectly, this also causes the individual to be worried when they cannot use their smartphone (35). A study of 200 medical students in Bangalore found that nearly 43% of participants experienced severe adverse effects on their study and academic Performance (36). Similarly, another survey of 150 art students revealed that smartphone dependence had a detrimental impact on academic achievement, study focus, and practical practice.

4. Limitations

A primary limitation of this study is that it was conducted in only one school, which restricts the generalizability of the findings. The results may not be representative of the broader population of school students. Additionally, the sample size was relatively small, which may limit the power to detect more nuanced patterns of nomophobia, internet dependence, and associated mental health issues such as anxiety and depression. Future research should consider conducting multi-site studies across diverse educational settings and geographic locations to enhance the validity and applicability of the findings. Increasing the sample size and diversity will help provide a more accurate and comprehensive understanding of these issues among students.

5. Conclusion

The present study revealed that school students are increasingly susceptible to smartphone addiction, which correlates with heightened levels of anxiety and depression. This underscores an urgent need for targeted health education programs and mental health interventions tailored to the needs of adolescents. To effectively address this growing public health concern, educators should implement digital literacy

sessions within the school curriculum to help students understand responsible mobile use, manage screen time, and recognize early signs of digital dependency. Parents play a critical role and should be encouraged to establish supervised screen-time routines, foster open communication about emotional well-being, and model balanced technology use. In parallel, policymakers should advocate for the integration of mental health education modules into school systems, including content on emotional regulation, mindfulness, and the psychological impact of excessive screen use. Additionally, public awareness campaigns should be launched to disseminate information about the adverse effects of smartphone overuse and to promote healthier digital habits. By working collaboratively across education, family, and policy domains, we can help students develop a healthier relationship with technology and foster their overall mental well-being.

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