Nomophobia and its relationship with depression, anxiety, and quality of life in adolescents

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Nomophobia (a portmanteau for “no mobile phone” and phobia or mobile phone addiction) refers to discomfort, anxiety, nervousness, or anguish caused by being out of contact with a mobile phone.[1-5] The use of smartphones has increased, and this has made smartphone addiction a significant public health concern in recent years.[6] Nomophobia is considered a disorder of the contemporary digital and virtual society.[7] In general, it is the pathological fear of remaining out of touch with technology. The portable smartphones allow for shorter use periods of multiple internet-based mobile applications (“apps”) in contrast to relatively long periods of computer-based internet use. Smartphone addiction has been considered to be a technological addiction, which is defined as behavioral addictions of a nonchemical nature that involve human–machine interaction.[8]

Surveys performed in different countries and cultures[6-10] indicate that nomophobia is universally widespread and present. Recent literature has drawn on addiction symptoms to measure problematic,[11] compulsive,[12] heavy,[13] intensive,[14] maladaptive,[15] dependent,[16] and

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**Background:** Nomophobia is a portmanteau for “no mobile phone” and phobia or mobile phone addiction. Nomophobia refers to discomfort, anxiety, nervousness, or anguish caused by being out of contact with a mobile phone. There is a paucity of literature from India on this emerging mental health condition. **Objectives:** The objectives of this study were to assess the prevalence of nomophobia and its relationship with depression, anxiety, and quality of life among adolescent students. **Materials and Methods:** A cross-sectional study was carried out in 1386 high school students aged between 14 and 17 years. The Nomophobia Questionnaire (NMP-Q) was used to assess nomophobia. Beck’s Depression Inventory (BDI), Beck’s Anxiety Inventory (BAI), and Short Form-36 (SF-36) were used to measure depression, anxiety, and quality of life, respectively. **Results:** Out of 1386 adolescents, 569 (41.05%), 303 (21.86%), and 82 (5.1%) have mild, moderate, and severe nomophobia, respectively. There were significantly more males with nomophobia. There was a statistically significant relationship between NMP-Q score and BDI, BAI, and SF-36 scores. A significant positive correlation was observed between NMP-Q score and scores on BDI and BAI and a significant negative correlation between SF-36 score. **Conclusion:** The results of the study indicate that nomophobia is an emerging mental health condition, especially in male adolescents. Nomophobia is significantly associated with depression, anxiety, and poor quality of life. Multicentric studies are needed to better understand this disorder.

**Keywords:** Adolescents, anxiety, depression, mobile phone, nomophobia, quality of life
addictive tendencies\textsuperscript{17} for mobile phone uses. The use of smartphones has both positive and negative impacts on the lives of people across the globe. However, studies examining the effect of nomophobia on quality of life in adolescents are limited.

Although there has been an increasing academic interest in investigating the problems emanating from smartphone use, research into nomophobia has been scarce.\textsuperscript{18,19} A study involving high school students reported the prevalence of mobile phone dependence in adolescents to be 31.3\%.\textsuperscript{20} Most Indian studies\textsuperscript{21-23} on nomophobia have been conducted on adults and are limited by small sample sizes and variability in tools employed. India is one of the largest markets for smartphones, and adolescents are major consumers. Despite this, there is a paucity of Indian literature with regard to nomophobia and its impact on mental health. The present study aims to study the prevalence of nomophobia and its relationship with depression, anxiety, and quality of life in adolescents.

**MATERIALS AND METHODS**

The present study was conceptualized and data analysis was conducted in the department of psychiatry of a medical college in Rajasthan, India. The study protocol was approved by the institutional ethics committee. After obtaining permission from the principals, students of class 11 and 12 of seven private coeducational schools with English medium of instruction in an urban area of a major city in the state of Rajasthan, India, were invited to participate in this survey conducted in December 2016. The students were assembled with the help of school authorities and appraised regarding the objectives and method of the study by the principal author during the recess period. Students possessing a smartphone and willing to participate in the study were included. Written informed assent for the study was obtained from the participants. The parents/guardians of the students were contacted via E-mail, and their written informed consent was obtained. The study tools used were in English and of pencil-paper type. The principal author was present to provide clarifications to the participants and made the requisite number of visits to the school in order to collect data from all consenting students. The data obtained were recorded in a specific pro forma prepared for the study. Correspondence with the parent/guardian of eight students could not be made, and three students refused to participate in the study. A total of 1386 students were surveyed.

The Nomophobia Questionnaire (NMP-Q)\textsuperscript{24} was used to assess nomophobia. This is a twenty item self-reported questionnaire with a Likert scale rating. The overall internal consistency of the questionnaire has been reported to be very good (Cronbach’s alpha = 0.945).\textsuperscript{25} The scores on the NMP-Q and the Mobile Phone Involvement Questionnaire\textsuperscript{26} were strongly correlated, which indicated that two questionnaires measured similar constructs and ensured the construct validity of the NMP-Q.\textsuperscript{24} The qualitative data analysis\textsuperscript{24} revealed four dimensions of nomophobia, namely not being able to communicate, losing connectedness, not being able to access information, and giving up convenience. Adolescents were classified into mild nomophobia (NMP-Q score of 21–59), moderate nomophobia (NMP-Q score: 60–99), and severe nomophobia (NMP-Q score: >100).

Beck’s Depression Inventory (BDI),\textsuperscript{26} Beck’s Anxiety Inventory (BAI),\textsuperscript{26,27} and Short Form-36 (SF-36)\textsuperscript{28,29} were used to measure depression, anxiety, and quality of life, respectively. These tools have been found to be psychometrically sound measures for the abovementioned constructs in adolescents.\textsuperscript{28-30} The data obtained were analyzed using the Statistical Package for the Social Sciences for Windows, version 16 (SPSS Inc., Chicago, IL, USA).\textsuperscript{31}

**RESULTS**

Table 1: Sample characteristics of the study population

| Profile (n=1386) | Variables | Frequency (%) |
|------------------|-----------|--------------|
| **Age (years)**  |           |              |
| 14               |           | 6 (0.43)     |
| 15               |           | 143 (10.01)  |
| 16               |           | 547 (39.47)  |
| 17               |           | 690 (49.97)  |
| **Gender**       |           |              |
| Male             |           | 928 (66.96)  |
| Female           |           | 458 (33.04)  |
| **Education**    |           |              |
| 11th             |           | 701 (50.58)  |
| 12th             |           | 685 (49.42)  |
| **Religion**     |           |              |
| Hindu            |           | 1218 (87.88) |
| Muslim           |           | 74 (5.33)    |
| Christian        |           | 36 (2.59)    |
| Others           |           | 58 (4.20)    |
| **Location of residence** | |              |
| Urban            |           | 1147 (82.76) |
| Rural            |           | 209 (15.08)  |
| Others           |           | 30 (2.16)    |
| **Family size**  |           |              |
| <5               |           | 803 (57.94)  |
| 5-10             |           | 500 (36.07)  |
| 10               |           | 83 (5.99)    |
| **Type of family** |       |              |
| Nuclear          |           | 785 (56.64)  |
| Joint            |           | 465 (33.55)  |
| Extended         |           | 136 (9.81)   |
| **NMP-Q score (intensity of nomophobia)** | |              |
| <21 (no)         |           | 432 (31.2)   |
| 21-59 (mild)     |           | 569 (44.4)   |
| 60-99 (moderate) |           | 303 (21.9)   |
| >100 (severe)    |           | 82 (5.9)     |

NMP-Q – Nomophobia Questionnaire

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The average age of the study population was 15.5 years. There were 928 (67%) males and 458 (33%) females [Table 1]. Majority of the adolescents were from class 11 (50.5%), residing in urban areas (82.7%) in nuclear families [Table 1]. Out of 1386 adolescents, 569 (41%), 303 (21.9%), and 82 (5.9%) have mild, moderate, and severe nomophobia, respectively [Table 1]. There were significantly more males with nomophobia in comparison to females [Table 2]. No significant relationship was observed with other sociodemographic variables.

There is a significant relationship between NMP-Q score and BDI score ($P < 0.05$) and BAI score ($P < 0.001$) [Tables 3 and 4]. A significant relationship is observed between NMP-Q score and SF-36 score ($P < 0.001$) [Table 5].

A significant positive correlation was observed between NMP-Q score and scores on BDI and BAI. A significant negative correlation was found between NMP-Q score and SF-36 score [Table 6].

**DISCUSSION**

The concept of behavioral addiction has received attention of researchers, and it has been considered to be equivalent to substance dependence as understood by the current nosological systems.$^{[11,21,32]}$ Nomophobia has been referred to as mobile phone dependence, mobile phone problematic use, problem cell phone use, and mobile phone abuse.$^{[14,35-36]}$

Not much is known about the psychological bases of mobile phone behavior of young people. Studies indicate that it is younger people whose mobile phone behavior is most likely to resemble an addictive pattern of behavior.$^{[37]}$ For this reason, this cross-sectional study aimed to study the prevalence of nomophobia in adolescents attending private schools of Udaipur city in Rajasthan, India. To our knowledge, this is the first such study reported from north-western India.

Our study found 41% of adolescents with features of nomophobia and 5.9% with severe nomophobia. Indian researchers have reported 18.5%–39.5%$^{[6,22]}$ of medical students having features of nomophobia. According to a survey, about 53% of British mobile users in Britain suffer from nomophobia.$^{[38]}$ An Indian study$^{[20]}$ found 31.33% of secondary school adolescents to have features of mobile phone dependence. Studies from across the world have confirmed nomophobia to be an emerging and widespread entity.$^{[8,39,40]}$

In the present study, males were found to have nomophobia more than females [Table 2]. This was similar to finding...
Table 5: Relationship between nomophobia and quality of life in adolescent students

| NMP-Q score | SF-36 score, n (%) | Chi-square statistic |
|-------------|--------------------|---------------------|
|             | <1800   | >1800  | χ²=36.200, df=3, P<0.001 |
| No <21      | 25 (5.8) | 407 (94.2)  |
| Mild 21-59  | 50 (8.8) | 519 (91.2)   |
| Moderate 60-99 | 41 (13.5) | 262 (86.5)  |
| Severe >100 | 21 (25.6) | 61 (74.4)    |
| Total       | 137 (9.9) | 1249 (90.1)  |

NMP-Q – Nomophobia Questionnaire; SF-36 – Short Form-36

Table 6: Correlation between nomophobia, depression, anxiety, and quality of life in adolescent students (n=1386)

|                          | NMP-Q score |
|--------------------------|-------------|
| BDI score                |             |
| Pearson correlation      | 0.141       |
| Significance (two-tailed)| <0.001      |
| BAI score                |             |
| Pearson correlation      | 0.305       |
| Significance (two-tailed)| <0.001      |
| SF-36 score              |             |
| Pearson correlation      | -0.191      |
| Significance (two-tailed)| <0.001      |

NMP-Q – Nomophobia Questionnaire; BDI – Beck’s Depression Inventory; SF-36 – Short Form-36; BAI – Beck’s Anxiety Inventory

In the present study, nomophobia is positively correlated with depression and anxiety. A survey revealed that 77% of adolescents have reported having anxiety and worries about being without their phone. The psychological factors such as self-negative views, low esteem, younger age, impulsivity, a sense of urgency, and sensation seeking could be related to mobile phone overuse. Depression and dysthymia, alcohol and other substance use disorders, panic disorder, social phobia obsessive–compulsive disorder, eating disorders, and other behavioral addiction disorders (including mobile and/or Internet dependence, gambling, online gaming, compulsive shopping, and sexual behaviors) have been reported to be comorbid with nomophobia. We humbly speculate that it is likely that depressed adolescents may seek social networking platforms or “apps” in order to feel less lonely and good about themselves. On the contrary, it is also likely that documents by several studies. In contrast, previous studies have documented that the association between mobile phone use and gender is inconclusive. In the Udaipur district of Rajasthan, the number of boys enrolled in school is more than girls and in our study, males outnumbered females. This should be taken into account while interpreting this result. Bianchi and Phillips suggested that mobile phones appeal to and are embraced by both genders equally.

In the present study, nomophobia is positively correlated with depression and anxiety. A survey revealed that 77% of adolescents have reported having anxiety and worries about being without their phone. The psychological factors such as self-negative views, low esteem, younger age, impulsivity, a sense of urgency, and sensation seeking could be related to mobile phone overuse. Depression and dysthymia, alcohol and other substance use disorders, panic disorder, social phobia obsessive–compulsive disorder, eating disorders, and other behavioral addiction disorders (including mobile and/or Internet dependence, gambling, online gaming, compulsive shopping, and sexual behaviors) have been reported to be comorbid with nomophobia. We humbly speculate that it is likely that depressed adolescents may seek social networking platforms or “apps” in order to feel less lonely and good about themselves. On the contrary, it is also likely that symptoms of depressed and anxious adolescents may worsen if they perceive the lives of others through such “apps” to be better than theirs. Adolescents may experience anxiety when they are unable to use a mobile phone and/or the services it offers, when they are unable to access information through smartphones, or when they have to give up the convenience that smartphones provide. Excessive mobile phone use may disrupt adolescents’ academic achievement and contribute to anxiety. Adolescents with anxiety disorders, particularly those with social anxiety disorder, may develop a more severe dependence on mobile phone technologies than those without anxiety disorders.

The present study found a negative correlation between nomophobia and quality of life. It may be reasoned that distress and anxiety associated with not being connected with a mobile phone are negatively related to life satisfaction and subjective well-being (happiness) among nonclinical populations. Excessive mobile phone use by adolescents may be associated with internet addiction which can lower SF-36 score, poorer perceived health than less frequent users. Frequent mobile phone users report health complaints, such as tiredness, stress, headache, anxiety, concentration difficulties, sleep disturbances, and poorer perceived health than less frequent users. Srivastava and Tiwari reported that limited users of cell phones have better mental health and quality of life than unlimited users of cell phones. Excessive time spent on gaming, cyber-sexual activities, online shopping, social networking platforms, etc., are likely to affect interpersonal relationships, coping mechanisms, self-esteem, physical activity, and academic and nonacademic achievement of adolescents.

A large sample of adolescent students and assessment using valid and reliable tools are relative merits of the present study. The limitations of the study include the fact that it is a cross-sectional study based on self-report questionnaires administered to students of selected private urban schools. The use of self-report questionnaires to collect information on health aspects has several limitations. It is important to emphasize that the present study concerns subjective symptom-reports and not actual mental disorders or diagnoses. A sleep variable is not taken into consideration in SF-36. The authors have not looked into the individual items and scales of SF-36 and have focused on the total score obtained. There is no consensus validity for nomophobia, as there are no defined diagnostic criteria for mobile phone dependence. However, the Diagnostic and Statistical Manual of Mental Disorders-5 has expanded the criteria for addictive disorders to include certain nonsubstance behavioral addictions such as gambling disorders. Due to the design of the study, it is not possible to conclude whether nomophobia, depression, and anxiety are cause, consequence, or comorbidity. Further studies...
The results of the study indicate that nomophobia is an emerging mental health condition. Male adolescents are more frequently represented than females. Nomophobia is significantly associated with depression, anxiety, and poor quality of life. Multicentric studies are needed to better understand this disorder.

**CONCLUSION**

There are no conflicts of interest.

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