Predictors of Nomophobia and its Association with Personality Traits: A Cross-Sectional Survey among Undergraduates

Arshia Kanwal[1], Muhammad Hamza Shoaib[2], Mahnoor Tariq[3], Hafsa Shamim[4]

[1,2,3,4] Medical students of Islamic International Medical College(IIMC), Riphah International University, Rawalpindi, Pakistan.

Dr.Tahira Sadiq[5]

[5] Professor of Community Medicine, Assistant Director RILM, Islamic International Medical College (IIMC), Riphah International University,Rawalpindi, Pakistan.

Dr. Tehniat Faraz Ahmed[6]

[6]Lecturer Department of biochemistry, Dow University of Health Sciences (DUHS), Karachi, Pakistan

Abstract:

Background: Mobile phones have revolutionized our lives and have become a need in today's life.However, for some people, they could be a source of stress. Nomophobia is a psychological condition in which individuals experience fear or anxiety if they do not have their mobile phones. The study objectiveswere to assess the levels of nomophobia in youth in relation to their demographic characteristics, to assess the correlation of nomophobia with personality traits; and to determine the predictive influence of personality traits on nomophobia.

Methods: This descriptive, cross-sectional study was conducted at Riphah International University from March to October 2022. The sample size of 784 participants was raised using the convenience sampling technique. Two validated questionnaires, the 20-item Nomophobia Questionnaire (NMP-Q) and the 44-item Big Five Inventory (BFI) were circulated via Google form and analyzed using SPSS version 26.

Results: The prevalence of nomophobia was 95.8% among students. 7.0% of students had a severe level of nomophobia, 53.1% had moderate nomophobia, and 35.7% of students had mild nomophobia. There was no significant difference in the nomophobia scores of males and females. The age group 21-23 years was observed to have the highest nomophobia scores. Neuroticism and openness scores were directly proportional to nomophobia scores (p<0.01).The results showed that neuroticism (β=0.295; t=8.055, p<0.001), extraversion (β=0.076; t=2.127, p=0.03) and openness (β=0.117; t=3.07, p=0.002) positively and significantly predict nomophobia.

Conclusions: Nomophobia is a prevalent issue among youth affecting the majority of participants moderately and severely. Personality traits of a person, particularly neuroticism, affect nomophobia scores. Neuroticism is also the most significant predictor of nomophobia.

I. INTRODUCTION

Mobile phones have radically altered the way how people think, socialize, entertain and organize themselves. The rapidly increasing global trends of smartphone usage and addiction have reinforced the need to analyze the psychological, social, and economic impacts of a mobile telephone on the personality traits of the youth(1). Nomophobia, a contraction for "no-mobile-phone-phobia'', is a recent term characterized by feelings of discomfort, loss of interaction anxiety, and nervousness caused by an irrational fear of not having a mobile phone or being detached from mobile phone connectivity. Although nomophobia has not been 'officially' recognized as a mental health disorder, given its adverse effects, it has been recommended that it be included in the new DSM-V categorization(2).

People with nomophobia are more prone to health-related issues such as anxiety, trembling, disturbed sleep, headaches, tachycardia, and respiratory alterations due to their poor lifestyle habits. They are also more likely to not engage in physical activity. Additionally, the auditory and central nervous system (CNS) can also have altered cell responses as a result of the electromagnetic radiation emitted by mobile phones. Nomophobia has now become a dilemma worldwide. Fortunately, research into nomophobia has been flourishing, especially since the development of the Nomophobia Questionnaire(NMP-Q). The questionnaire has been translated into different languages and helped researchers to look into the biggest non-drug addiction of the 21st century.

The American Psychological Association (APA) defines personality as a person's unique thoughts, feelings, and behavior patterns. The big five personality domains or traits include extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience(4). Personality traits reflect continuous distributions rather than particular personality types is a significant aspect of personality traits. The criteria that characterize personality traits are that individuals must be "consistent, stable, and different from others"in their behaviors across situations related to the trait(5).Personality traits indicate the key differences among personalities(6).

Although some studies have been conducted worldwide; limited data is available about what is the role of personality traits in predisposing adults to nomophobia in Pakistan. Thus, this multidisciplinary study was designed to provide insight into the prevalence and levels of nomophobia in youth, to compare the nomophobia scores with demographic characteristics, to determine the relationship of personality traits with the level of nomophobia, and to find the predictive influence of personality traits on nomophobia score.

II. MATERIALS AND METHODS

This was a descriptive, cross-sectional conducted at Riphah International University, from March 2022 to October 2022. After the approval from the Institutional Review Committee of Riphah International University (Ref No. Riphah/IIMC/IRC/22/2026) was taken. The sample size was calculated with a 5% margin of error, 95% confidence level, and 50% response distribution using an online sample size calculator, Raosoft(7). Convenience sampling was done and 784 responses were collected.

In our inclusion criteria, the male and female undergraduate students, aged 18-29 years, of various departments – Bachelor of Medicine, Bachelor of Surgery (MBBS), Bachelor of Dental Surgery (BDS), Psychology, Doctor of physiotherapy(DPT), Media Studies, Bachelor of Business Administration (BBA), and Software Engineering - were included. Exclusion criteria included students with known psychiatric illnesses and those who were not willing to participate. The participants were informed about the research objectives and informed consent was taken. Confidentiality and anonymity were strictly ensured for all the participants.

Data were collected using an online questionnaire comprising of the demographic section which included variables like age, gender, and department of education. Nomophobia Scale, developed by Yildrim and Correia(8), consists of 20 items with four subdimensions: "Losing connectedness (N-LC, 5 items)," "Not being able to communicate (N-NBC, 6 items)," "Giving up convenience (N-GC, 5 items)," and "Not being able to access information (N-NBI, 4 items)." 7-point Likert-scale was used to collect responses which ranged from "I disagree-1 point" to "I agree-7 points".

NMP-Q score of 20 indicated the absence of nomophobia, scores 21-59 corresponded to a mild level of nomophobia, scores 60-99 corresponded to a moderate level of nomophobia, and finally, a score greater than or equal to 100 corresponded to a severe nomophobia. In addition to calculating scores out of 140, we also represented our total mean score out of 5.

The Big Five-Factor Personality Traits Inventory(9), developed by

John & Srivastava, consisting of 44 items in total and five sub-dimensions: "Neuroticism-8 items",

"Extraversion-8 items," "Openness to experience-10 items", "Agreeableness-9 items", and

"Conscientiousness-9 items". The response scale ranges from "I disagree-1 point" to "I agree-5 points".

Data were analyzed using Statistical Package for Social Sciences version 26. Participant characteristics were summarized using frequencies and percentages, and scores of the sample population were expressed as mean and standard deviation. Cronbach's alpha internal consistency coefficient for the NMP-Q scale and its sub-dimension was calculated. The reliability coefficients for the sub-dimensions of NMP-Q are 0.89, 0.91, 0.80, and 0.74 respectively with an overall internal consistency coefficient of NMP-Q being 0.94 which is excellent and fairly reliable. The internal consistency coefficient found for each sub-dimension of the BFI scalewas between 0.62 and 0.73.

Nomophobia and personality trait scores across different demographic variables were compared using the nonparametric Mann-Whitney U test and Kruskal Wallis one-way ANOVA. Significant values were adjusted for Bonferroni correction with multiple tests. Pearson correlation coefficient was used to assess the relationship between personality traits and nomophobia score. Multiple linear regression analysis was performed to find the predictive influence of personality traits on nomophobia scores. All tests were performed at a 95% confidence level and a p-value < 0.05 was considered statistically significant.

III. RESULTS

A. Prevalence and levels of nomophobia
The prevalence of nomophobia was 95.8% among undergraduate students. Out of the 784 students, 559 (71%) were female and 225 (29%) were male. 7.0% (n = 55) students had severe level of nomophobia, 53.1% (n = 416) had moderate nomophobia, 35.7% (n = 280) had mild nomophobia, and 4.2% (n = 33) were identified as not having nomophobia. The mean nomophobia score of the sample (n = 784) was 85.33 (SD = 24.27) which is a moderate level of nomophobia score.

B. Mean Score of Participants comparison with demographic details
Mean NMP-Q and BFI scores, along with their sub-dimensions have been summarized in Table 1. The mean total NMP-Q score was calculated as 4.26 ± 1.48 with N-NBC having the highest mean score of 4.55 ± 1.48, and N-LC is the lowest at 3.94 ± 1.56.

C. Comparison of NMP-Q and BFI scores according to demographic characteristics
Males and females had no significant difference in the overall nomophobia score using the nomophobia questionnaire (NMP-Q). However, females scored significantly higher than males for the NBC sub-dimension of NMP-Q (p=0.01).

The age group 21-23 years was observed to have significantly higher scores than the other age groups (p=0.03). The comparison revealed that the NMP-Q, N-LC,

and N-NBC scores differed significantly across different age groups (p-values of 0.03, 0.02, 0.001 respectively).

Most of the nomophobia and personality trait sub-dimension scores differed in students belonging to different disciplines. The scores of students from the BBA discipline were significantly higher than the students from the MBBS, BDS, DPT, and software engineering departments (p=0.02). The results of the pairwise comparison of these scores have been mentioned in Table 2.

D. Co-relation between NMP-Q and BFI

Pearson correlation coefficients between personality traits and NMP-Q scores have been summarized in Table 3. It was found that NMP-Q scores of students had no significant relationship with extraversion personality traits, while all other personality traits showed weak to moderate significant correlation with most sub-dimensions of the NMP-Q scale. Neuroticism scores were moderately and positively associated with nomophobia scores, while openness scores were weakly and positively associated with NMP-Q scores. However, agreeableness and conscientiousness scores had a weak, significant, and inverse relationship with NMP-Q scores.

E. Predictive influence of personality trait on nomophobia score

The regression model significantly predicts the nomophobia score (p < 0.001). Neuroticism is the strongest and positively predicts NMP-Q (β=0.295; p < 0.001). Extraversion and openness were also significant predictors of nomophobia scores (β=0.076; p < 0.03 and β=0.117; p < 0.002 respectively). 11.3% change in nomophobia scores could be explained by personality traits according to the regression model. Refer to Table 4 to see the multiple linear regression analysis.

IV. DISCUSSION

In the current study, a sample size of 784 students was chosen, including 71% (n = 559) females and 29% (n=225) males from different departments of Riphah International University. Compared to male students, more female students participated in this study. It highlights the fact that female students are more inclined to fill out the surveys(10). Another explanation is that women have outnumbered men in universities offering undergraduate programs (11)(12). This study found a prevalence of 95.8%, which is in the range (42.6-99%) of previously conducted studies with the majority of students having a moderate level of nomophobia(13)(14)(15)(16).

Importantly, this study endeavored to further understand the gender differences in nomophobia levels. The study results reveal there does not exist a relationship between gender and the overall nomophobia scores which is supported by many previous studies conducted previously(17)(18). To explain why there was no association between gender and nomophobia, it may be stated that mobile phones are appealing to both genders. Hence, male and female students equally accepted and adopted them. However, a few studies have shown that there is a statistically significant difference between gender and

nomophobia scores, with females scoring higher than males(19)(20).

The N-NBC (not being able to communicate) sub-dimension scored significantly higher in females, and without smartphones, the feeling of inability to use phones for instant communication prevails. Hence, connectedness is the most important reason for a female student to use a phone(21). N-LC sub-dimension scored the least. This domain is related to being unable to connect to the online world and one's online identity on social media or the internet. Our results show that the anxiety of 'not being able to communicate with people is higher than the 'discomfort of losing one's online,parallel to a study by Kanmani et al(22).

This study targeted the youth aged between 19 and 28 years owing to increasing levels of nomophobia in this particular age group mainly as reported by the previous researchers(23). NMP-Q scores of 21-23 years old students were significantly higher than the students of 24-26, 18-20, and 27-29 age range with p-values of 0.03, 0.2, and 0.2 respectively. Adults aged 21-23 had higher nomophobia scores (24) in contrast to other age groups which showed a significant decrease in nomophobia levels with age.

When the NMP-Q scores were compared across different disciplines, a significant difference was found in the nomophobia scores.Students studying medical sciences have lower levels of nomophobia than those studying non-medical sciences.The scores of MBBS, BDS, and DPT were significantly less when compared to the scores of BBA students with a p-value of 0.02. The mean score was found highest for BBA students, while the lowest mean scores were found in MBBS and BDS students. The reason for business students being more technologically-oriented may be due to the benefits technology provides in terms of growing needs and requirements in the business field.

Another objective of the current study was to examine the relationship between nomophobia and personality traits among university students. A meta-analysis done on big personality traits found that there is a strong association between the domains of personality and psychopathology. Thus, finding the association between personality traits and nomophobia was worthwhile(25).

In terms of these five personality traits, neuroticism (r=0.312, p<0.001) was positively and significantly associated with the nomophobia score. A study done in Istanbul also demonstrated that neuroticism is directly proportional to nomophobia levels(26). This may be because individuals with high neuroticism are highly emotional,impulsive, and liable to become stressed. Openness to experience (r=0.132, p<0.001) showed a weak but significant and positive correlation with nomophobia scores. This conclusion may be explained by the fact that people who are receptive to new experiences and ideas are more unwilling to put down their phones since they are eager to experience new experiences,intellectually curious, and more interested in day-to-day innovations.

On the other hand, conscientiousness (r=-0.114, p< 0.001) showed a significant but weak and negative relationship with nomophobia scores. Agreeableness also had an inverse relationship with nomophobia scores but it was not significant.

Agreeable individuals tend to be trusting, straightforward, compliant, and friendly to others while conscientiousness is related to self-control, self-discipline, orderliness, and dutifulness. These characteristics may provide insight into why they do not experience irrational anxiety or nomophobia(27)(28).

In the present study, the extraversion trait was not found to correlate with nomophobia levels. Extraverts are fundamentally social, lively, outgoing, and assertive. It could be because extroverts may develop other behaviors to fulfill their social needs.

The last objective was to analyze the predictive influence of personality on nomophobia.The result shows that neuroticism (β=0.295; t=8.055, P<0.001) positively and most significantly predicts nomophobia, extraversion (β=0.076; t=2.127 p < 0.03) significantly predicts nomophobia and openness (β=0.117; t=3.07, p<0.002) positively and significantly predicts nomophobia. Finally, agreeableness and conscientiousness (β= -0.060; p<0.13 and β= 0.051; p<0.20 respectively) do not significantly predict nomophobia. These findings are quite similar to a study done in Nigeria (30). The only difference is that in our study, conscientiousness does not predict nomophobia whereas it does in the previously mentioned study.

V. CONCLUSION

It is concluded that nomophobia is a highly prevalent issue in the youth of Pakistan.Although females did score significantly higher for the NBC dimension, there was no significant difference found in the overall nomophobia scores of male and female students. The age group 21-23 years was observed to have the highest nomophobia scores. The personality trait neuroticism was associated positively with nomophobia scores. Lastly, neuroticism is the strongest predictor of nomophobia scores as compared to other personality traits.

VI. RECOMMENDATIONS

It is recommended that students should be educated on nomophobia which is a new source of anxiety. So far, no noticeable efforts have been made by stakeholders and policymakers. To avoid such addictions, it is necessary to counsel the youth at university - preferably even before that - regarding smartphone dependency and its ill effects. Individuals that are likely to have nomophobia should be identified according to demographic characteristics and personality traits and should be counselled accordingly. They should be encouraged to adopt healthy lifestyle choices.

However, there is still a need for more extensive and integrative research in this area which will bring nomophobia into more focus. After that, the development of appropriate preventative measures, such as educational programs and potential therapeutic interventions can be done.

LIMITATIONS

- This research employed a sample with a narrow age range. The generalizability of the ideas can be reinforced by more thorough investigations employing samples with a wider age range.
- This study was limited to different campuses of a private university in Rawalpindi and Islamabad. Data were collected from students only and not from the general public.

ACKNOWLEDGMENTS

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	Mean	SD	Cronbach's alpha
NMP-Q	4.26	1.48	0.94
N-LC	3.94	1.56	0.89
N-NBC	4.55	1.48	0.91
N-GC	4.16	1.39	0.80
N-NBI	4.36	1.31	0.74
Personality traits			
Extraversion	3.11	0.63	0.65
Agreeableness	3.73	0.64	0.73
Conscientiousness	3.26	0.56	0.60
Neuroticism	3.15	0.59	0.72
Openness	3.51	0.46	0.62

Table 1: Mean scores of NMP-Q and personality traits

	Mean	SD	Cronbach's alpha

	N= 784 n (%)	Nomophobia Scores				
		NMP-Q Mean ± SD	N-LC Mean ± SD	N-NBC Mean ± SD	N-GC Mean ± SD	N-NBI Mean ± SD
Gender						
Male	225 (27)	4.13 ± 1.1	3.86 ± 1.4	4.33 ± 1.4	4.02 ± 1.3	4.28 ± 1.2
Female	559 (71)	4.3 ± 1.2	3.97 ± 1.6	4.64 ± 1.5	4.21 ± 1.4	4.39 ± 1.3
Test statistics Statistical significance		t= -1.96 p=0.50	t= -0.73 p=0.46	t = -2.51 p=0.01*	t= -1.4 p=0.138	t= -0.89 p=0.37
Age (years)						
18-20	236 (30)	4.27 ± 1.2	3.82 ± 1.6	4.68 ± 1.4	4.15 ± 1.4	4.35 ± 1.3
21-23	397 (51)	4.35 ± 1.2	4.07 ± 1.5	4.64 ± 1.4	4.20 ± 1.3	4.46 ± 1.3
24-26	132 (17)	4.05 ± 1.2	3.87 ± 1.4	4.17 ± 1.4	4.02 ± 1.4	4.12 ± 1.3
27-29	19 (2)	3.82 ± 1.2	3.31 ± 1.5	3.74 ± 1.6	4.20 ± 1.3	4.13 ± 1.2
Test statistics Statistical significance		F= 8.49 p= 0.03* [a]24-26 < 21-23	F= 9.13 p= 0.02* [a]18-20 < 21-23 27-29 < 21-23	F= 17.15 p= 0.001* [a]27-29 < 18-20 and 21-23 24-26 < 18-20 and 21-23	F= 1.54 p= 0.67	F= 6.25 p= 1.0
Discipline						
MBBS	161	4.08 (1.3)	3.41 (1.6)	4.46 (1.6)	4.02 (1.5)	4.43 (1.3)
BDS	109	4.08 (1.1)	3.54 (1.5)	4.60 (1.4)	3.87 (1.3)	4.24 (1.3)
DPT	100	4.31 (1.1)	4.25 (1.5)	4.64 (1.4)	4.10 (1.4)	4.14 (1.2)
BBA	101	4.60 (1.1)	4.47 (1.3)	4.83 (1.4)	4.42 (1.2)	4.64 (1.1)
Psychology	107	4.32 (1.3)	3.94 (1.7)	4.63 (1.6)	4.21 (1.4)	4.49 (1.2)
Media	104	4.32 (0.9)	4.22 (1.1)	4.37 (1.2)	4.32 (1.1)	4.38 (1.1)
Engineering/ Comp science	102	4.23 (1.3)	4.09 (1.5)	4.38 (1.4)	4.24 (1.4)	4.17 (1.4)
Test statistics Statistical significance		F= 14.71 p= 0.02* [a]BDS, MBBS, DPT, Engg< BBA	F= 45.0 p < 0.001* [a]MBBS< all others except BDS BDS< all others except MBBS Psych < BBA Engg. < BBA	F= 9.30 p= 0.15	F= 12.86 p= 0.04* [a]BDS< Media, BBA MBBS < BBA	F= 10.36 p= 0.11

Table 2: NMP-Q and personality type scores compared across different demographic variables

t= standardized test statistic for Mann Whitney U test

F= standardized test statistics for Kruskal Wallis test
[a]Significance values have been adjusted by Bonferroni correction
* = significant p value (< 0.05)

	NMP-Q	N-LC	N-NBC	N-GC	N-NBI
Extraversion	0.021	0.04	0.047	-0.017	-0.018
Agreeableness	-0.061	-0.123*	0.100*	-0.148**	-0.072*
Conscientiousness	-0.114**	-0.093*	0.000	-0.179**	-0.015**
Neuroticism	0.312**	0.222**	0.267**	0.309**	0.247**
Openness	0.132**	0.035	0.188**	0.079*	0.135**

* $p < 0.05$

** $p < 0.001$

Table 3: Correlation between NMP-Q and BFI

	R^2_{adj}	B	β	95% CI	p-value
	0.113				<0.001*
Extraversion		0.147	0.076	0.01-0.28	0.03*
Agreeableness		-0.112	-0.060	-0.25-0.03	0.13
Conscientiousness		-0.109	-0.051	-0.27-0.59	0.20
Neuroticism		0.596	0.295	0.45-0.74	<0.001*
Openness		0.306	0.117	0.11-0.50	0.002*

Table 4: Multiple linear regression analysis of personality and nomophobia

R^2 = coefficient of determination (adjusted)

B = unstandardized coefficient

β = standardized coefficient

CI = confidence interval

*P value significant at < 0.05