

ORIGINAL RESEARCH ORJİNAL ARAŞTIRMA

DOI: 10.5336/healthsci.2025-110233

Nomophobia in Physiotherapy and Rehabilitation Students and Associations with Psychological Well-Being and Academic Performance: A Cross-Sectional Research

Fizyoterapi ve Rehabilitasyon Öğrencilerinde Nomofobi ve Psikolojik İyi Oluş ve Akademik Performans ile İlişkisi: Kesitsel Araştırma

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ABSTRACT Objective: This study aimed to determine the prevalence and level of nomophobia among physiotherapy and rehabilitation (PTR) students. In addition, the nomophobia levels were compared according to their individual and academic characteristics. The associations between nomophobia levels and their psychological well-being and academic performance were investigated. **Material and Methods:** A total of 457 PTR students were included in the study. The structured survey form created using Google Forms was sent to the students through messaging apps. Students' nomophobia levels were assessed with the Nomophobia Questionnaire (NMP-Q). Their psychological well-being and academic performance levels were assessed with the Depression, Anxiety and Stress Scale (DASS-21) and cumulative grade point averages (CGPA). **Results:** The nomophobia prevalence among PTR students was 99.7%. The students' NMP-Q total score was 89.00 (72.00/105.00). Female students had higher total scores on the NMP-Q ($p<0.001$). The total scores obtained by the students from the NMP-Q were similar in terms of age, academic level, and CGPA ($p=0.066$, $p=0.438$, $p=0.669$, respectively). There was a weak positive correlation between the total and subscale scores of the NMP-Q and the depression, anxiety, and stress subscales of the DASS-21 ($p<0.001$). **Conclusion:** Nomophobia was common among PTR students and students exhibited moderate levels of nomophobia. Female students had higher levels of nomophobia and students' nomophobia levels were associated with their psychological well-being. Accordingly, raising awareness among PTR students about nomophobia and its potential negative impact on their mental health may be crucial. To this end, offering digital detox programs and counseling services is recommended.

Keywords: Anxiety; communication; depression; internet addiction disorder; mobile phone addiction

ÖZET Amaç: Bu çalışmada, fizyoterapi ve rehabilitasyon (FTR) öğrencilerinde nomofobinin yaygınlığının ve düzeyinin belirlenmesi amaçlandı. Ayrıca, nomofobi düzeyleri bireysel ve akademik özelliklerine göre karşılaştırıldı. Nomofobi düzeyleri ile psikolojik iyi oluş ve akademik performansları arasındaki ilişki incelendi. **Gereç ve Yöntemler:** Çalışmaya toplam 457 FTR öğrencisi dâhil edildi. Google Forms kullanılarak oluşturulan yapılandırılmış anket formu, mesajlaşma uygulamaları aracılığıyla öğrencilere gönderildi. Öğrencilerin nomofobi düzeyleri Nomofobi Ölçeği (NÖ) ile değerlendirildi. Psikolojik iyi oluş ve akademik performans düzeyleri ise Depresyon, Anksiyete ve Stres Ölçeği (DASÖ-21) ve genel ağırlıklı not ortalamaları (GANO) ile değerlendirildi. **Bulgular:** FTR öğrencileri arasında nomofobi yaygınlığı %99,7 idi. Öğrencilerin NÖ toplam puanı 89,00 (72,00/105,00) idi. Kadın öğrencilerin NÖ toplam puanları daha yüksekti ($p<0,001$). Öğrencilerin NÖ'den elde ettikleri toplam puanlar yaş, akademik düzey ve GANO açısından benzerdi (sırasıyla, $p=0,066$, $p=0,438$, $p=0,669$). NÖ toplam ve alt ölçek puanları ile DASÖ-21 depresyon, anksiyete ve stres alt ölçekleri arasında pozitif yönde zayıf bir korelasyon vardı ($p<0,001$). **Sonuç:** Nomofobi FTR öğrencilerinde yaygındı ve öğrenciler orta düzeyde nomofobiye sahipti. Kız öğrenciler daha yüksek düzeyde nomofobiye sahipti ve öğrencilerin nomofobi düzeyleri psikolojik iyi oluşları ile ilişkiliydi. Buna göre, FTR öğrencileri arasında nomofobi konusunda farkındalık yaratmak ve nomofobinin potansiyel olumsuz etkilerini vurgulamak önemli olabilir. Bu amaçla, dijital detoks programları ve danışmanlık hizmetleri sunulması önerilir.

Anahtar Kelimeler: Anksiyete; iletişim; depresyon; internet bağımlılığı bozukluğu; cep telefonu bağımlılığı

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Peer review under responsibility of Türkiye Klinikleri Journal of Health Sciences.

Received: 07 Mar 2025

Received in revised form: 03 May 2025

Accepted: 20 May 2025

Available online: 25 Jun 2025

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Communication technology has become an integral part of daily life worldwide. The evolution of mobile phones from simple communication devices to feature-rich smartphones has made them the most popular tools in this technological age. They now also serve as multifunctional devices for data storage, photography, music, and gaming.¹ In particular, internet access through smartphones has taken mobile phones beyond their basic communication functions, enabling the management of large amounts of instant and easily accessible information.² Therefore, features such as rapid communication and effortless internet and information access have rendered smartphones indispensable in today's world.³ Moreover, due to increasing demand and decreasing costs, smartphone addiction is growing worldwide.⁴ However, along with the convenience and comfort it provides, the use of smartphones has also brought about numerous physical and psychological problems such as a loss of concentration, impaired cognitive functions, and nomophobia.³

Nomophobia, the primary psychological disorder resulting from the unlimited use of smartphones, is a significant condition characterized by unwarranted anxiety and fear when individuals are unable to use their phones for a period of time, often followed by frustration, expectations, and obsessive thoughts.⁵ Accompanied by various signs and symptoms such as anxiety, respiratory changes, tremors, sweating, agitation, disorientation, and tachycardia, nomophobia has been described as a disorder of the 21st century, especially due to its negative impact on the younger population.³ The prevalence of nomophobia varies across different populations, with university students being a particularly affected group, exhibiting a notably high prevalence.⁶

Studies conducted among health sciences students have reported that the prevalence of nomophobia is 98.4% among physiotherapy and rehabilitation (PTR) students, and 88% among nursing students, while it varies between 83-85% among medical students.^{3,7-9} While educational settings benefit from readily available references and professional guidance, and smartphones facilitate easy information retrieval, excessive smartphone use can negatively impact students by diminishing attention spans, im-

pairing concentration, and reducing the ability to recall clinical information.¹⁰ In addition, excessive smartphone use has been linked to psychopathological effects and psychological well-being. Psychological well-being is based on the eudaimonic perspective, which suggests that happiness involves more than mere satisfaction with one's choices and the experience of pleasure.¹¹ Furthermore, psychological well-being is the ability to seek balance between individual and social interests while addressing life-related concerns.¹¹ The most important indicators of psychological well-being are considered to be depression, anxiety, and stress.¹² On the other hand, the high levels of these indicators are known to negatively affect academic performance.¹³

Studies on nomophobia in PTR students are limited.^{3,14} However, studies indicate a high prevalence (such as 98.4-99.6%) of nomophobia in this population, with students generally experiencing moderate levels.^{3,14} While, some previous studies have found different results regarding the relationship between PTR students' nomophobia level and their academic performance, a positive correlation between nomophobia and anxiety has been reported.¹⁴⁻¹⁷ Furthermore, the relationship between nomophobia and depression or stress has not been sufficiently investigated. Therefore, the aim of this study was to determine the nomophobia prevalence and level, to compare nomophobia levels according to individual and academic characteristics, and to investigate the associations between nomophobia levels and psychological well-being and academic performance in PTR students. We hypothesized that nomophobia prevalence and level would be high, that nomophobia levels would differ according to individual and academic characteristics, and that nomophobia would be associated with psychological well-being and academic performance in this population.

MATERIAL AND METHODS

This study was conducted in December 2024. Informed consent was obtained from all participating students via a survey form. Ethical approval was granted by the Manisa Celal Bayar University Health Sciences Ethics Committee (date: November 27, 2024; no: 2759). All researchers adhered to the prin-

principles outlined in the Declaration of Helsinki throughout the study.

Based on the power analysis (G*Power 3.1.9.2, Heinrich-Heine-Universität, Düsseldorf, Germany) conducted using the means and standard deviations of the total scores obtained from the Nomophobia Questionnaire (NMP-Q) by students from urban and rural areas in a previous study (with an effect size of 0.302 and a power of 0.90), it was concluded that a minimum of 376 students needed to be included in the study.^{18,19} The population of the study consisted of 672 students from the PTR department of a public university. Of those, 457 students [median age; 21.00 (20.00/22.00) years] accessed the structured questionnaire, filled it out completely and returned it. A “post hoc” power analysis, using the total scores from the NMP-Q for male and female students, demonstrated a study power of 99%. The inclusion criteria for the study were as follow: volunteering to participate, being enrolled in the PTR department, and being able to read and understand Turkish. The exclusion criterion was the incomplete completion of the structured questionnaire.

Data for this study was collected using Google Forms, an online survey tool developed by Google (Mountain View, California, USA). The structured survey form created using this application was sent to the students via a link through messaging apps such as WhatsApp (Mountain View, California, USA). Completing all questions was mandatory to submit the questionnaire. Duplicate entries from the same participant were prevented, ensuring that users with the same login credentials could not access the survey more than once. The structured survey consisted of four sections. The 1st section of the questionnaire provided an informed consent form and general information about the study. The 2nd section collected data on students’ individual and academic characteristics, including age, gender, academic level, and cumulative grade point averages (CGPA). The 3rd and 4th sections utilized the NMP-Q and the Depression, Anxiety, and Stress Scale (DASS-21), respectively. The students’ responses to the structured survey were used to determine the level and prevalence of nomophobia among the PTR students. Additionally, the relationship between the nomophobia

levels of students and their psychological well-being and academic performance was examined.

The NMP-Q was used to assess nomophobia in this study. This questionnaire was developed by Yildirim and Correia and adapted for use in Turkish by Yildirim et al.^{20,21} It employs a 7-point Likert scale, ranging from “strongly disagree” to “strongly agree”, to assess 20 items distributed across 4 subscales: “not being able to access information”, “giving up convenience”, “not being able to communicate, and “losing connectedness”. Additionally, it yields total scores ranging from 20-140, where a score of 20 signifies no nomophobia, 21-59 indicates mild nomophobia, 60-99 denotes moderate nomophobia, and 100-140 represents severe nomophobia.^{20,21} The total NMP-Q score was employed for statistical analysis in this study.

The DASS-21 was used to assess psychological well-being, originally developed by Lovibond and Lovibond in 1995 and subsequently adapted for Turkish usage by Sarıçam.^{22,23} It consists of 21 items, divided into 3 subscales of 7 items each, designed to measure depression, anxiety, and stress, which are considered key indicators of psychological well-being. The DASS-21 items are scored on a 4-point Likert scale, from 0 (never) to 3 (always), and a score of 5 or higher on the depression subscale, 4 or higher on the anxiety subscale, or 8 or higher on the stress subscale suggests the presence of corresponding psychological difficulties.^{22,23}

The CGPA, a standardized metric representing a student’s overall academic standing across all completed courses, was used to assess academic performance. To facilitate analysis and comparison, the student participants were subsequently classified into 3 distinct performance groups based on their individual CGPA scores. These categories were defined as follows: students with a CGPA ranging from 1.00-1.99 were categorized as having weak academic performance; those with a CGPA between 2.00-2.99 were classified as demonstrating moderate academic performance; and finally, students achieving a CGPA within the range of 3.00-4.00 were grouped under the strong academic performance category. This categorization allowed for a comparative examination of

nomophobia levels across different strata of academic achievement within the studied population of PR students.

The statistical analysis of the data was performed using IBM SPSS Statistics Standard Concurrent User Version 25.0, a software package developed by IBM Corporation, Armonk, New York, USA. The Shapiro-Wilk test, complemented by visual inspection of histograms, was used to assess the normality of numerical variables. Categorical variables were presented with frequency and percentage, while numerical variables were presented with median and interquartile range due to the violation of the normal distribution assumption. Nonparametric tests were used for group comparisons. For statistical comparisons, the Mann-Whitney U test was used to compare 2 independent groups, and the Kruskal-Wallis test was used to compare more than 2 independent groups. Additionally, to analyze the relationships between numerical variables, Spearman's rank correlation coefficient was calculated. The strength of the relationship between variables, as represented by correlation coefficients, was categorized as follows: a correlation between 0.00-0.10 indicated a negligible relationship, 0.10-0.39 represented a weak relationship, 0.40-0.69 signified a moderate relationship, 0.70-0.89 denoted a strong relationship, and a correlation between 0.90-1.00 indicated a very strong relationship.²⁴ Statistical significance was determined at an alpha level of 0.05.

RESULTS

Table 1 provides a detailed overview of the demographic and academic profiles of the students who participated in the study.

Figure 1 provides a summary of the students' scores on the NMP-Q.

Figure 2 reveals the distribution of nomophobia levels among the students, based on their total scores from the NMP-Q.

Table 2 highlights the prevalence of nomophobia among the students.

Table 3 provides a comparative analysis of the NMP-Q total scores across various individual and

TABLE 1: Students' individual and academic characteristics

Individual and academic characteristics	
Age, median (IQR)	21.00 (20.00/22.00)
Age, n (%)	
Aged 19 and under	104 (22.8)
Aged 20-21	215 (47.0)
Aged 22 and over	138 (30.2)
Gender, n (%)	
Female	318 (69.6)
Male	139 (30.4)
Academic level, n (%)	
1 st -year	76 (16.6)
2 nd -year	139 (30.4)
3 rd -year	122 (26.7)
4 th -year	120 (26.3)
Cumulative grade point average, n (%)	
Weak (1.00-1.99)	22 (4.8)
Moderate (2.00-2.99)	279 (61.1)
Strong (3.00-4.00)	156 (34.1)
Depression, Anxiety, and Stress Scale, (median/IQR)	
Depression subscale score	7.00 (3.00/10.00)
Anxiety subscale score	5.00 (2.00/8.00)
Stress subscale score	8.00 (5.00/12.00)

IQR: Interquartile range

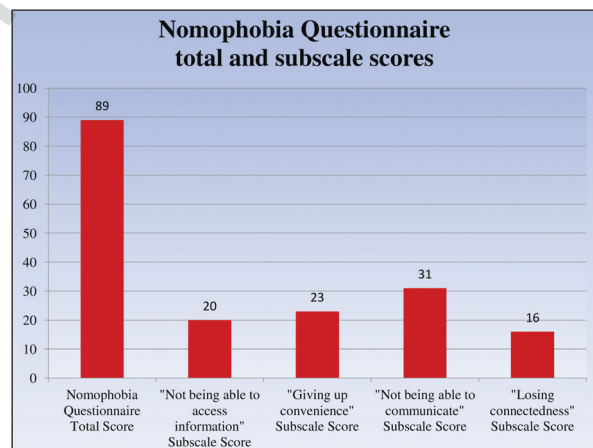


FIGURE 1: Students' total and subscale scores for NMP-Q
NMP-Q: Nomophobia Questionnaire

academic characteristics of the students. The analysis revealed a statistically significant difference in nomophobia levels between genders, with female students exhibiting significantly higher NMP-Q total scores than male students ($p < 0.001$), thus indicating a greater degree of nomophobia among females. Conversely, no statistically significant differences in NMP-Q total scores were observed among students

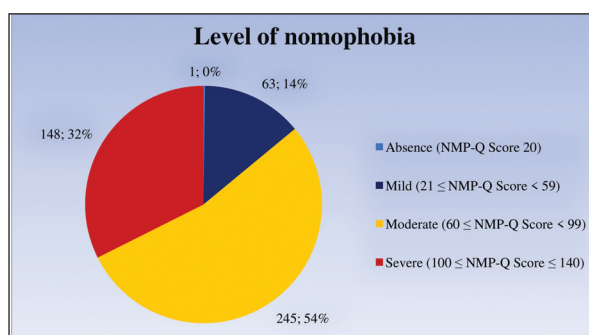


FIGURE 2: Levels of nomophobia among students based on total scores from the NMP-Q

NMP-Q: Nomophobia Questionnaire

TABLE 2: Prevalence of nomophobia among students	
Prevalence of nomophobia among students	
General, n (%)	456 (99.7)
Age, n (%)	
Aged 19 and under	104 (100)
Aged 20-21	214 (99.5)
Aged 22 and over	138 (100)
Gender, n (%)	
Female	318 (100)
Male	138 (99.9)
Academic level, n (%)	
1 st -year	76 (100)
2 nd -year	139 (100)
3 rd -year	121 (99.1)
4 th -year	120 (100)
Cumulative grade point average, n (%)	
Weak (1.00-1.99)	22 (100)
Moderate (2.00-2.99)	278 (99.6)
Strong (3.00-4.00)	156 (100)

when categorized by age ($p=0.066$), academic level ($p=0.438$), or CGPA (among all students, $p=0.669$; among 1st-year students, $p=0.741$; among 2nd-year students, $p=0.446$; among 3rd-year students, $p=0.070$; among 4th-year students, $p=0.343$), suggesting that these factors did not significantly influence nomophobia levels within this study population.

Table 4 details the correlations between students' NMP-Q scores (total and subscale) and their DASS-21 subscale scores, as well as their CGPA. The analysis revealed weak positive correlations between NMP-Q scores and DASS-21 subscale scores (depression, anxiety, and stress), with correlation co-

efficients (ρ) ranging from 0.154-0.305, all statistically significant ($p<0.001$). This suggests that higher nomophobia levels are associated with increased levels of depression, anxiety, and stress. Conversely, no significant correlation was found between NMP-Q total scores and CGPA ($\rho=-0.033$, $p=0.518$). Figure 3 visually represents these relationships through scatterplots.

DISCUSSION

This study revealed several key findings regarding nomophobia among PTR students. Firstly, nomophobia was found to be highly prevalent within this population, with students exhibiting a moderate level of the condition. Notably, female students demonstrated significantly higher levels of nomophobia compared to male students. Interestingly, the study found no significant association between students' nomophobia levels and their academic performance. However, a clear relationship was observed between nomophobia levels and students' psychological well-being, indicating that higher levels of nomophobia were associated with increased levels of depression, anxiety, and stress.

Research on nomophobia in health sciences students is still emerging.^{8,19,25-28} Studies with 230 to 1,428 participants using the NMP-Q, DASS-21, and CGPA have shown a high prevalence of moderate nomophobia. A clear link exists between higher nomophobia levels and increased depression, anxiety, and stress. However, the relationship between nomophobia and academic performance has been inconsistent across studies.

Current research on nomophobia in PTR students is limited. While many studies suggest moderate levels, one study found lower levels but a high prevalence (98.4%), with females, students with lower CGPAs, and those in higher academic years showing higher nomophobia.^{2,3,14,17,29} Another study reported an even higher prevalence (99.6%) and a positive correlation with social appearance anxiety, but no link to academic performance.¹⁴ Similarly, other research found no correlation between nomophobia and academic performance.¹⁵ However, a consistent finding across studies is the positive correlation between nomophobia and anxiety.^{16,17} The

TABLE 3: Comparison of students' total scores obtained from the NMP-Q according to individual and academic characteristics

Individual and academic characteristics	Median (IQR)	p ^{a,b} values	ES
Age			
Aged 19 and under	85.00 (68.50/97.50)	p ^a =0.066	
Aged 20-21	92.00 (77.00/107.00)		
Aged 22 and over	87.50 (70.00/104.00)		
Gender			
Female	92.00 (79.75/108.00)	p ^b =0.001*	0.814
Male	80.00 (60.00/95.00)		
Academic level			
1 st -year	86.50 (67.25/99.00)	p ^a =0.438	
2 nd -year	89.00 (71.00/105.00)		
3 rd -year	90.50 (70.00/107.00)		
4 th -year	89.00 (78.25/104.00)		
CGPA (among all students)			
Weak (1.00-1.99)	82.00 (68.25/107.25)	p ^a =0.669	
Moderate (2.00-2.99)	89.00 (76.00/104.00)		
Strong (3.00-4.00)	89.00 (69.00/105.75)		
CGPA (among 1 st -year students)			
Weak (1.00-1.99)	96.00 (65.50/111.75)	p ^a =0.741	
Moderate (2.00-2.99)	88.00 (69.25/99.25)		
Strong (3.00-4.00)	82.50 (62.50/95.25)		
CGPA (among 2 nd -year students)			
Weak (1.00-1.99)	80.50 (62.75/102.25)	p ^a =0.446	
Moderate (2.00-2.99)	88.50 (74.25/104.00)		
Strong (3.00-4.00)	96.00 (67.50/110.50)		
CGPA (among 3 rd -year students)			
Weak (1.00-1.99)	87.00 (72.00/108.25)	p ^a =0.070	
Moderate (2.00-2.99)	93.50 (78.50/110.25)		
Strong (3.00-4.00)	85.50 (67.00/104.25)		
CGPA (among 4 th -year students)			
Moderate (2.00-2.99)	87.00 (79.00/102.00)	p ^b =0.343	
Strong (3.00-4.00)	93.00 (72.00/108.00)		

*p<0.05; *Kruskal-Wallis test; ^bMann-Whitney U test. IQR: Interquartile range; ES: Effect size; CGPA: Cumulative grade point average

TABLE 4: The relationship between the total and subscale scores of the NMP-Q and the DASS-21 subscale scores

NMP-Q		DASS-21			CGPA
		Depression subscale	Anxiety subscale	Stress subscale	
Total score	rho	0.263*	0.297*	0.305*	-0.033
	p value	<0.001	<0.001	<0.001	0.518
Not being able to access information	rho	0.154*	0.173*	0.200*	-0.064
	p value	0.001	<0.001	<0.001	0.215
Giving up convenience	rho	0.269*	0.294*	0.302*	-0.045
	p value	<0.001	<0.001	<0.001	0.382
Not being able to communicate	rho	0.193*	0.233*	0.240*	-0.003
	p value	<0.001	<0.001	<0.001	0.957
Losing connectedness	rho	0.259*	0.282*	0.294*	-0.047
	p value	<0.001	<0.001	<0.001	0.363

*p<0.05; NMP-Q: Nomophobia Questionnaire; DASS-21: Depression, Anxiety, and Stress Scale; Spearman correlation analysis; CGPA: Cumulative grade point average; rho: Spearman correlation coefficient

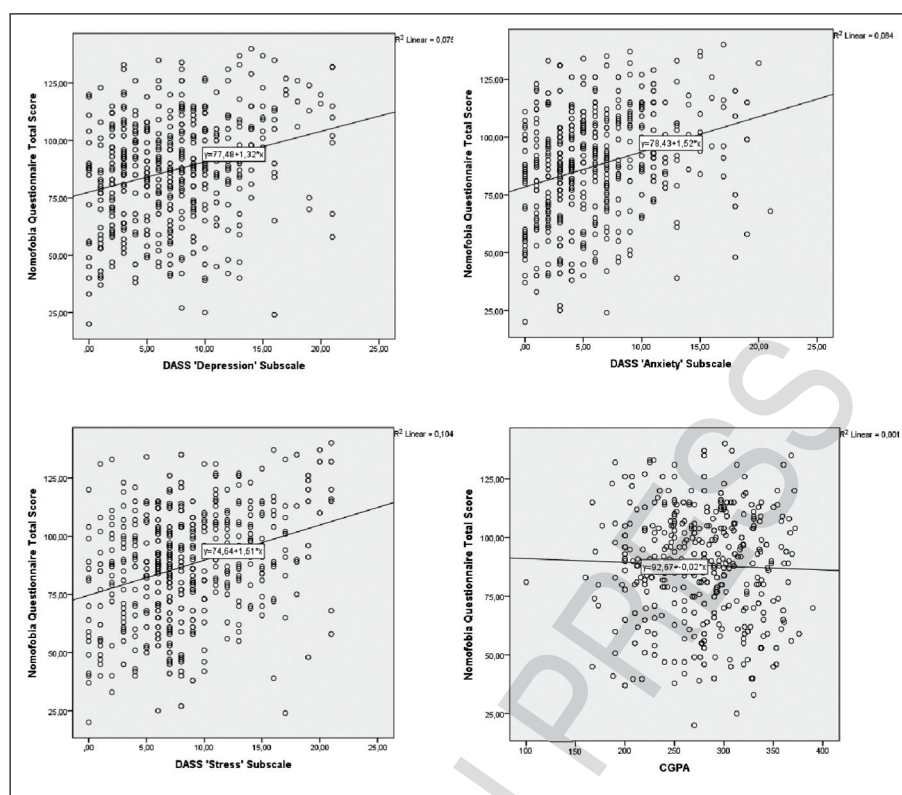


FIGURE 3: Scatterplots showing the relationship between students' NMP-Q total scores and the depression, anxiety, and stress subscale scores of the DASS-21 and CGPA NMP-Q: Nomophobia Questionnaire; DASS-21: Depression, Anxiety, and Stress Scale; Spearman correlation analysis; CGPA: Cumulative grade point average; rho: Spearman correlation coefficient

number of students in these studies ranged from 118-806, with nomophobia and academic performance measured by NMP-Q and CGPA, respectively, while anxiety was assessed using different scales. Overall, nomophobia is common among PTR students and linked to anxiety, but its relationship with academic performance is inconsistent. Notably, research lacks sufficient investigation into the connection between nomophobia and depression and stress in this population.

In this study, a power analysis, informed by data from a previous study, indicated a minimum requirement of 376 participants.¹⁹ Consequently, to ensure adequate statistical power, a total of 457 students were included in the study. This larger sample size strengthens the study's ability to detect significant effects and enhances the reliability and generalizability of the findings. The level of nomophobia, the levels of depression, anxiety, stress, and academic performance were evaluated with the NMP-Q,

DASS-21, and CGPA, respectively. This study demonstrates a substantial convergence with previous studies in terms of the evaluative methodologies utilized to assess the outcome measures.^{8,19,25-28} The study's finding of a 99.7% nomophobia prevalence and moderate nomophobia levels among PTR students aligns with results reported in previous studies.^{2,14,17,29} This consistency strengthens the understanding of nomophobia as a significant issue within this student population.

Female students had significantly higher total scores on the NMP-Q compared to male students, indicating a higher level of nomophobia among female students in this study. The result obtained from this study confirmed the results of previous studies.^{3,27} This result suggests that female students have a higher rate of smartphone addiction compared to male students and indicates a potential predisposition among female students towards greater smartphone use, which may be attributed to their higher propen-

sity for social connectivity and rapid communication.^{3,27}

The results of this study revealed that the nomophobia levels of PTR students did not vary according to age, consistent with some previous studies.^{28,30} On the other hand, it is suggested that a younger age is indicative of higher levels of nomophobia.³¹ This correlation may be attributed to the faster adoption of technology and smartphone functionalities among younger individuals.³² However, it is essential to recognize that individuals of all ages can develop this condition. The observation that nomophobia levels did not vary significantly across different age groups within this study may be attributed to the relatively narrow age range of the participating students.²⁸ Consequently, to more effectively explore a potential relationship between nomophobia and age, future studies should aim to include participants from a broader age spectrum, allowing for a more comprehensive analysis of this demographic factor.

This study found that nomophobia levels among PTR students remained consistent across different academic years, a result that contradicts the findings of Aldhahir et al. who reported an increase in nomophobia with academic progression.²⁷ While potential explanations for this discrepancy include variations in the student populations studied, the cultural contexts, or the specific structures of the PTR programs, the current lack of extensive research specifically examining this relationship within PTR students limits our ability to fully interpret this finding. It's worth noting the contrasting perspective from health science education, where smartphones, while offering academic benefits, can also lead to increased nomophobia as students advance, potentially due to heightened reliance during clinical training.^{27,33} However, this study did not observe a similar trend among PTR students. This suggests that the relationship between academic progression and nomophobia might be discipline-specific. Given the limited understanding of this phenomenon within the field of PTR, future studies should prioritize dedicated investigations into how nomophobia levels evolve across the academic journey of PTR students. Such studies could explore the specific ways PTR students utilize smartphones for their learning and professional development and con-

sider factors unique to their educational experiences.

This study also examined the relationship between nomophobia levels and psychological well-being among PTR students. The findings indicated a positive correlation between PTR students' nomophobia levels and their reported anxiety. This result obtained from the study is similar to the results of previous studies.^{14,16,17} Unlike the literature, this study also focused on depression and stress within the scope of psychological well-being. The study's results demonstrated a positive correlation between nomophobia levels in PTR students and their levels of depression, stress, and anxiety. These results obtained from the study confirm the results obtained from the previous studies conducted on students studying in the field of health.^{8,19,25} Nomophobia, defined as the psychological disorder caused by the inability to access one's smartphone, is characterized by frustration and obsessive-compulsive thoughts. On the other hand, it is known that depression, anxiety, and stress are characterized by feelings of hopelessness, helplessness, and decreased interest in daily activities.³³ In addition, it is reported that constantly and repeatedly checking the network signal on a smartphone reflects compulsive behavior, a common symptom of depression, anxiety, and stress.³⁴ The similarity between these definitions regarding nomophobia, depression, anxiety, and stress explains the relationship between nomophobia and depression, anxiety, and stress. Additionally, the observed similar positive correlations between students' nomophobia levels and their reported depression, anxiety, and stress levels could potentially stem from the shared underlying pathophysiological mechanisms that contribute to these psychological states.²⁵

The finding in this study that nomophobia levels among PTR students did not significantly correlate with their academic performance adds to the existing mixed evidence in the literature. While some studies suggest a negative impact of excessive smartphone use and nomophobia on academic focus, this study's results, along with others, indicate a more complex relationship.^{3,14,15} Several factors could contribute to this lack of a clear correlation. Firstly, the impact of nomophobia on academic performance might be indirect and mediated by other variables not examined

in this study. For instance, while high nomophobia could lead to distraction, a student's time management skills, study habits, or motivation levels might buffer or exacerbate this effect. Secondly, the role of smartphones in modern education is multifaceted. They serve not only as potential distractions but also as essential tools for accessing learning materials, online resources, and communication platforms.³⁵ Therefore, students with higher nomophobia might also be more adept at leveraging their smartphones for academic benefits, potentially mitigating any negative impact on their grades. Thirdly, academic performance is a complex construct influenced by a wide array of individual (e.g., prior academic achievement, learning styles), academic (e.g., teaching quality, course difficulty), and sociodemographic (e.g., socioeconomic status, parental education) factors.²⁸ The influence of nomophobia might be relatively small compared to these other significant determinants of academic success. The heterogeneity in findings across studies underscores the need for more nuanced research. Future studies should consider employing longitudinal designs to examine the relationship over time, explore potential mediating and moderating variables (such as study habits, self-regulation skills, and the specific ways students use their smartphones for academic vs. non-academic purposes), and utilize more comprehensive measures of both nomophobia and academic performance. Understanding the specific context of PTR education and its demands on technology use could also provide valuable insights into this relationship.

We acknowledge that the present study had some limitations, which should be considered when interpreting the findings. Firstly, the data was collected through an online structured survey, rather than through in-person interactions. This prevented the students from asking the researchers possible question(s) regarding the content (unclear words or sentences, etc.) while filling out the survey form. Secondly, this study used a self-reported questionnaire from students. Therefore, the results obtained from this study are limited by the accuracy of students' self-reporting, and the potential for recall bias exists. However, this limitation applies to all studies using self-reported surveys. Thirdly, the students' sociode-

mographic characteristics (perceived socioeconomic status, parents' education and employment status, marriage status, daily internet usage time etc.) were not questioned, and additional analyses were not conducted according to these characteristics in this study. Possible differences in students' sociodemographic characteristics may have affected the results obtained from the study. Lastly, the sample of this study consisted of PTR students from a single state university. Comparative analyses of PTR students studying in various countries, regions, cities, or universities can be important. It is recommended that future studies consider these details.

CONCLUSION

In summary, this study revealed that nomophobia is a prevalent issue among PTR students, with students generally exhibiting moderate levels. Notably, female students reported higher levels of nomophobia compared to male students. While no significant relationship was found between nomophobia levels and academic performance, a clear association emerged between nomophobia and psychological well-being.

Given the prevalence of nomophobia among PTR students and its association with psychological well-being, PTR departments should proactively implement comprehensive support systems. Digital detox programs can be designed to raise awareness and foster healthier technology habits through structured challenges encouraging reduced screen time, workshops on mindful technology use, promotion of tech-free zones and times, resources highlighting engaging offline activities, and peer support groups. Simultaneously, bolstering counseling services is crucial. This involves actively promoting available mental health support, training counselors to address technology-related anxiety like nomophobia, integrating technology use assessment into initial consultations, offering group therapy sessions focused on digital well-being, and providing accessible online self-help resources. By integrating these digital detox initiatives with robust counseling support, PTR departments can effectively address the potential negative impacts of nomophobia and contribute to the overall mental health and well-being of their students.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise,

working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Erhan Seçer, Melda Başer Seçer, Derya Özer Kaya; **Design:** Erhan Seçer, Melda Başer Seçer; **Control/Supervision:** Derya Özer Kaya; **Data Collection and/or Processing:** Erhan Seçer, Melda Başer Seçer, Derya Özer Kaya; **Analysis and/or Interpretation:** Derya Özer Kaya; **Literature Review:** Erhan Seçer, Melda Başer Seçer; **Writing the Article:** Erhan Seçer, Melda Başer Seçer; **Critical Review:** Melda Başer Seçer.

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