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Prevalence and Effects of Smartphone Use on Academic Performance of Undergraduate Student Nurses: An Analytical Cross-Sectional Study

Prevalencia y efectos del uso de teléfonos inteligentes sobre el rendimiento académico de estudiantes de enfermería: un estudio analítico transversal

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Abstract

Smartphones have become a widely used tool for information and communication, and their use for academic purposes is also growing. Usage of smartphones by undergraduates is rising substantially, which can lead to undesirable behavior and may have detrimental effects on academic performance. **Objective.** To determine the prevalence and effects of smartphone use on academic performance of undergraduate student nurses. **Methods.** Analytical cross-sectional study was conducted among 187undergraduate student nurses in Islamabad, Pakistan from December 2023to August 2024. Convenience sampling method was used to recruit undergraduate student nurses. Smartphone use was measured through a smartphone addiction scale (SAS). Students' Cumulative Grade (CGPA)was taken as a measure to evaluate academic achievement. Chi square test was applied to determine association between CGPA and smartphone use. SPSS version 27.0 was used to analyze data. **Results.** Study comprised of 62.6% female and 37.4% male. Majority students (70.6%) had moderate level of smartphone use. However-value (0.28) suggested that there is no significant effect of smartphone use on academic performance as determined by chi-square test. Analysis of variance showed that there was no significant difference in the group means (F = 0.674, P = 0.419).Participants identified that smartphone use did lead to lightheadedness, blurred vision, missing planned work, and lack of sleep. **Conclusion.** Further studies need to be conducted on problems highlighted by the student nurses, to assess the ethical implications of smartphone use, to measure what level of smartphone use results in negative implications, and to determine point of addiction clinically.

Keywords: Academic performance**;** Addiction; Effect; Student Nurses; Smartphone; Undergraduate.

Resumen

Los teléfonos inteligentes se han convertido en una herramienta muy utilizada para la información y la comunicación, en general, y su uso con fines académicos también va en aumento. El uso de teléfonos inteligentes por parte de estudiantes universitarios se está incrementando considerablemente, lo que puede dar lugar a comportamientos no deseados y llegar a tener efectos perjudiciales sobre tal rendimiento académico. **Objetivo.** Determinar la prevalencia y efectos del uso de teléfonos inteligentes sobre el rendimiento académico de las y los estudiantes universitarios de enfermería. **Métodos.** Se realizó un estudio transversal analítico entre 187 estudiantes de enfermería en Islamabad, Pakistán, de diciembre de 2023 a agosto de 2024. Se utilizó un método de muestreo por conveniencia para reclutar a las y los estudiantes de enfermería. El uso se midió a través de una escala de adicción a teléfonos inteligentes (SATI). El promedio acumulativo de los estudiantes (promedio académico) se tomó como medida para evaluar el rendimiento académico. Se aplicó la prueba de Chi cuadrada para determinar la asociación entre promedio académico y uso de teléfonos inteligentes. Se utilizó la versión 27.0 de SPSS para analizar los datos. **Resultados.**El estudio incluyó 62.6% de mujeres y 37.4% de hombres. La mayoría de las y los estudiantes (70.6%) hacían uso moderado de uso de teléfonos inteligentes. El valor P (0.28) sugirió que no hay un efecto significativo del uso de teléfonos inteligentes en el rendimiento académico, según lo determinado por la prueba de chi-cuadrada. El análisis de la varianza mostró que no había diferencias significativas en las medias de los grupos (F = 0.674; P = 0.419). Las y los participantes identificaron que el uso de teléfonos inteligentes sí les provocó mareos, visión borrosa, falta de planificación en torno al trabajo y de sueño. **Conclusiones**. es necesario realizar más estudios sobre los problemas destacados por las y los estudiantes de enfermería, para evaluar las implicaciones éticas del uso de teléfonos inteligentes, para determinar qué nivel de uso de teléfonos inteligentes resulta en implicaciones negativas y el punto de adicción clínica.

Palabras clave: rendimiento académico; adicción; efecto; estudiantes de enfermería; smartphone; pregrado.

Introduction

Mobile phone use has penetrated into every part of our lives.[1,2] According to a recent survey the number of Mobile phone users was estimated to be 3.8 billion in 2021.[3] Another study put this number as 6.6 billion and has described that it may surge to 7.7 billion in 2028.[4] Currently rates of mobile phone ownership are very high among the people of various countries, such as Saudi Arabia 94-99%, United State 91%, United Kingdom 83%, Australia 81% and Ghana 74%.[5] In Pakistan, the use of smartphone ownership increased from 10% in 2014 to 51% in 2022, of which 77% of smartphone users are between the ages of 21 and 30 years.[6]

With the emergence of internet, the smartphone yields numerous benefits along with phone calls and text messages, such as installation of useful applications, record keeping, medical reference, billing, and telemedicine.[7] Moreover, previous studies have shown that smartphones could revolutionize the field of nursing by enabling access to evidence-based resources, such as information retrieval.[8] Smartphone use is increasing worldwide, and has become a global concern.[7] Negative correlation between smartphone use and subjective well-being, and positive correlation between smartphone use and loneliness among university students has been identified.[2] Researchers have demonstrated significant association of smartphone addiction with sleep quality (0.005), high stress (0.003), anxiety ($p<0.001$) and depression ($p<0.001$).[4] Smartphone addiction has also been linked to social, domestic and academic problems, such as loneliness, negatively impacted relationships and decrease learning.[9]Theexcessive obsession with smartphones that disrupts individual's daily life is described as "smartphone addiction".[10]

The rampant use of smartphones has also affected the lives of student nurses. Many student nurses use smartphone for social media sites such as Facebook, Twitter, and Instagram, for more time than they use to do their school work.[11] Many studies have revealed negative effects of smartphone dependency on academic performance, sleep quality, body weight, eating habits, physical activity, and students' participation and readiness to learn.[12]Some research studies have demonstrated that students at high risk of smartphone addiction had lower Cumulative Grade Point Average (CGPAs).[13,14]

Baert *et al*.[15] conducted a correlation studyt o examine the relationship between Smartphone use and academic success, comparing he first-year test scores of students at two higher education institutions in Belgium with external usage indicators and other aspects of academic achievement. Researchers discovered that for every standard deviation rise in daily smartphone use, students' average exam scores decrease by about 1%.[15]

Conversely, another study investigated the impact of college students' smartphone usage on their perceptions of academic performance. The study found that students with higher levels of smartphone self-efficacy were more inclined to believe that their academic performance would improve.[16]

A local study examined the link between Pakistani higher education students' academic achievement and smartphone addiction. The findings reveal a weak correlation between academic performance and smartphone addiction. Moreover, students who were active on social media platforms like Facebook, Instagram, and Twitter tended to have higher grades and GPAs.[17] A cross-sectional study including 181 Saudi Arabian undergraduate medical students found that 36.5% of the students were addicted to smartphones, and 55% of the addicted students reported using their smartphones for more than five hours a day.[18]

Given the extensive use of smartphone, it is increasingly important to understand smartphone use among the undergraduate student nurses within Pakistan. Considering the heavy use of smartphones by the student nurses in Pakistan, and its impact on their academic performance, it is crucial to investigate potential issues. The findings of the current study will explore the credible evidence among student nurses regarding

smartphone addiction. This evidence may be used across the country. The findings of this study present facts that may be utilized by the nursing education administration for policies to mitigate the negative impact of smartphones on student nurses. Additionally, the findings will be useful for parents to support their children and to enhance their academic performance. The objective of this study is to identify smartphone prevalence, and its impact on the academic performance of undergraduate student nurses.

Methodologies

An analytical cross-sectional survey was carried out to collect data from 187 participants from December 2023 to August 2024. Participants were selected by convenience sampling from two nursing institutes, College of Nursing Rawalpindi from the public sector, and College of Nursing Islamabad from the private sector. The inclusion criteria were all undergraduate student nurses enrolled in 3rd, 5th and 7th semester who had smartphones. Exclusion criteria were newly enrolled first semester undergraduate students, as they had taken exams, and students who were already under any kind of psychiatric treatment. The sample size was calculated by the Raosoft sample calculator with a confidence interval of 95% and a margin of error of 5%, with a total of 360 population sizes, therefore the final sample size was 187.

Ethical permission was obtained from Armed Forces Postgraduate Medical Institute, Rawalpindi, Pakistan (Re: 424-AAA-ERC-AFPGMI). The researcher formally obtained written permission from the relevant authorities of the selected institutions, and informed written consent from the participants to record their responses. The students were briefed about the aim of the study and ensured about their confidentiality and privacy. Data were collected with the help of the adopted questionnaire Smartphone Addiction Scale (SAS actual version developed by Kwon et al., 2013).[19] It is a reliable and validated tool with Cronbach's alpha of 0.96. Formal permission was sought from the author through email to use the questionnaire. The first section of questionnaire consisted of the students' demographic characteristics (age, gender, current semester and latest CGPA), followed by the SAS, including 33 items to measure the smartphone addiction. Each item was scored on a 6- point Likert scale ranging from 1= strongly disagree to 6= strongly agree. The scores of each participant were compiled and summed up to get total score for each participant.

On the scale, 33 were the lowest possible score and 198 were the highest possible score, with higher scores highlighting the increased level of smartphone addiction. The cut-off points for the score were: 33-88 mild use, 89-143 moderate use and 144-198 severe use. Students' academic performance was measured in terms of their latest CGPA as Satisfactory=less than 2.50, Good=2.51-3.00, Very Good=3.01- 3.5, Excellent=3.51 - 4.00. The analysis was performed by using a Statistical Package for Social Sciences (SPSS) version 27.0. Whereas categorical data were expressed as percentages, continuous variables were presented as mean and standard deviation. An association between variables were determined using the chi-square test and was considered significant if the P-value was less than 0.05. Moreover, a one-way ANOVA was employed to assess the variance among group means.

Results

Table 1 shows the demographic characteristic. A total of the 187 participants completed the questionnaire. Most of the participants fall between 18 to 21 years old. Of the participants, 117 (62.6%) were female while 70 (37.4%) were male. The demographic characteristics of the participants are described (Table1)

The Table 2 illustrates the widespread usage of smartphones. Many participants report detrimental effects on their jobs (32.1%), and physical and professional health (25.7% suffering pain). 42.2% of smartphone users admit to using their phones when in the toilet, even though 29.4% of users report feeling less worried while using the phone, and 34.2% of users report feeling excited, despite many efforts, 22.5% of survey participants report frequent struggles in reducing smartphone usage.

Table 1 Demographic profile of the participants

Characteristics	Variables	Frequency	Percentages
Age	18 to 21 years	105	56.1
	22 to 25 years	82	43.9
	Total	**187**	**100**
Gender	Male	70	37.4
	Female	117	62.6
	Total	**187**	**100**
Current Semester	3rd Semester	63	33.7
	5th Semester	61	32.6
	7th Semester	63	33.7
	Total	**187**	**100**
Screen Time	< 6 hours	101	54.0
	6-10 hours	72	38.5
	>10 hours	14	7.5
	Total	**187**	**100**
Participants CGPA	Good (2.51- 3.00)	35	18.7
	Very Good (3.01-3.5)	93	49.7
	Excellent (3.51-4.00)	59	31.5
	Total	**187**	**100**

Table 2 Frequency and percentage table for Smartphone Addiction Scale (N=187)

S#	Items	Strongly Disagree n (%)	Disagree n (%)	Weakly Disagree n (%)	Weakly Agree n (%)	Agree n (%)	Strongly Agree n (%)
1	Missing planned work due to smartphone use	22(11.8)	30(16.0)	18(9.6)	38(20.3)	60(32.1)	19(10.2)
2	Having a hard time concentrating in class, while doing assignments, or while working due to smartphone use	20(10.7)	51(27.3)	25(13.4)	41(21.9)	34(18.2)	16(8.6)
3	Experiencing light headedness or blurred vision due to excessive smartphone use	25(13.4)	31(16.6)	21(11.2)	31(16.6)	48(25.7)	31(16.6)
4	Feeling pain in the wrists or at the back of the neck while using a Smartphone	25(13.4)	41(21.9)	15(8.0)	36(19.3)	48(25.7)	22(11.8)
5	Feeling tired and lacking adequate sleep due to excessive smartphone use	20(10.7)	41(21.9)	21(11.2)	33(17.6)	45(24.1)	27(14.4)
6	Feeling calm or cozy while using a smartphone	10(5.3)	22(11.8)	30(16.0)	59(31.6)	61(32.6)	5(2.7)
7	Feeling pleasant or excited while using a smartphone	3(1.6)	13(7.0)	26(13.9)	59(31.6)	64(34.2)	22(11.8)
8	Feeling confident while using a smartphone	6(3.2)	28(15.0)	33(17.6)	45(24.1)	60(32.1)	15(8.0)
9	Being able to get rid of stress with a smartphone	9(4.8)	19(10.2)	31(16.6)	45(24.1)	55(29.4)	28(15.0)
10	There is nothing more fun to do than using my smartphone	29(15.5)	33(17.6)	35(18.7)	35(18.7)	35(18.7)	20(10.7)
11	My life would be empty without my smartphone	30(16.0)	40(21.4)	22(11.8)	33(17.6)	38(20.3)	24(12.8)
12	Feeling most liberal while using a smartphone	23(12.3)	39(20.9)	37(19.8)	43(23.0)	35(18.7)	10(5.3)
13	Using a smartphone is the most fun thing to do	10(5.3)	39(20.9)	30(16.0)	52(27.8)	45(24.1)	11(5.9)

14	Won't be able to stand not having a smartphone	43(23.0)	42(22.5)	37(19.8)	23(12.3)	29(15.5)	13(7.0)
15	Feeling impatient and fretful when I am not holding my Smartphone	32(17.1)	43(23.0)	41(21.9)	39(20.9)	19(10.2)	13(7.0)
16	Having my smartphone in my mind even when I am not using it	37(19.8)	51(27.3)	21(11.2)	36(19.3)	24(12.8)	18(9.6)
17	I will never give up using my smartphone even when my daily life is already greatly affected by it.	35(18.7)	38(20.3)	35(18.7)	39(20.9)	29(15.5)	11(5.9)
18	Getting irritated when bothered while using my smartphone	17(9.1)	31(16.6)	36(19.3)	49(26.2)	38(20.3)	16(8.6)
19	Bringing my smartphone to the toilet even when I am in a hurry to get there	79(42.2)	35(18.7)	17(9.1)	24(12.8)	16(8.6)	16(8.6)
20	Feeling great meeting more people via smartphone use	27(14.4)	32(17.1)	36(19.3)	38(20.3)	35(18.7)	19(10.2)
21	Feeling that my relationships with my smartphone buddies are more intimate than my relationships with my real-life friends	46(24.6)	39(20.9)	21(11.2)	34(18.2)	38(20.3)	9(4.8)
22	Not being able to use my smartphone would be as painful as losing a friend.	31(16.6)	46(24.6)	28(15.0)	36(19.3)	30(16.0)	16(8.6)
23	Feeling that my smartphone buddies understand me better than my real-life friends	51(27.3)	47(25.1)	25(13.4)	21(11.2)	24(12.8)	19(10.2)
24	Constantly checking my smartphone so as not to miss conversations between other people on Twitter or Facebook	40(21.4)	31(16.6)	34(18.2)	25(13.4)	36(19.3)	21(11.2)
25	Checking SNS (Social Networking Service) sites like Twitter or Facebook right after waking up	37(19.8)	36(19.3)	21(11.2)	22(11.8)	36(19.3)	35(18.7)
26	Preferring talking with my smartphone buddies to hanging out with my real-life friends or with the other members of my family	34(18.2)	38(20.3)	40(21.4)	34(18.2)	34(18.2)	7(3.7)
27	Preferring searching from my smartphone to asking other people	16(8.6)	27(14.4)	34(18.2)	35(18.7)	43(23.0)	32(17.1)
28	My fully charged battery does not last for one whole day	30(16.0)	36(19.3)	20(10.7)	26(13.9)	34(18.2)	41(21.9)
29	Percentage of using my smartphone longer than I had intended	13(7.0)	31(16.6)	32(17.1)	48(25.7)	41(21.9)	22(11.8)
30	Feeling the urge to use my smartphone again right after I stopped using it	19(10.2)	31(16.6)	29(15.5)	43(23.0)	40(21.4)	25(13.4)
31	Having tried time and again to shorten my smartphone use time, but failing all the time	13(7.0)	39(20.9)	33(17.6)	40(21.4)	42(22.5)	20(10.7)
32	Always thinking that I should shorten my smartphone use time	11(5.9)	21(11.2)	29(15.5)	35(18.7)	49(26.2)	42(22.5)
33	The people around me tell me that I use my smartphone too much	31(16.6)	38(20.3)	20(10.7)	33(17.6)	35(18.7)	30(16.0)

Table 3 indicates that students with moderate reliance on smartphones show a trend of decreasing use as their CGPA increases. In the 3.01-3.50 CGPA range, 36.9% have moderate use, dropping to 21.4% for CGPA 3.51-4.00. For severe use, percentages stay the same or slightly decrease as CGPA rises**.** The P-value of 0.28 suggests significant variations among CGPA categories for students with smartphone euse. Data suggests a possible association between students' CGPA and usage severity, with a higher CGPA associated with less severe usage.

Table 4: The ANOVA test result shows no significant difference between the group averages (F = 0.674, P = 0.419). The average scores for "Good," "Very Good," and "Excellent" categories are similar, with similar variability in standard deviations and ranges.

Table 3. Cross tabulation of Smartphone usage categories (mild +moderate + severe) with academic performance (CGPA) (N=187)

Category	Good 2.51- 3.00CGPA	Very Good 3.01-3.5CGPA	Excellent 3.51-4.00CGPA	Total	P-Value
Mild Use	3 (1.6%)	12 (6.4 %)	11 (5.9%)	26(13.9%)	0.28
ModerateUse	23 (12.3%)	69 (36.9%)	40 (21.4%)	132(70.6%)	
SevereUse	9 (4.8%)	12 (6.4%)	8 (4.3%)	29(15.5%)	
Total	35(18.7%)	93(49.7%)	59(31.6%)	187(100%)	

Chi squared test applied and P-value of 0.05 considered to be significant.

Figure 1. Levels of Smartphone Usage among Participants

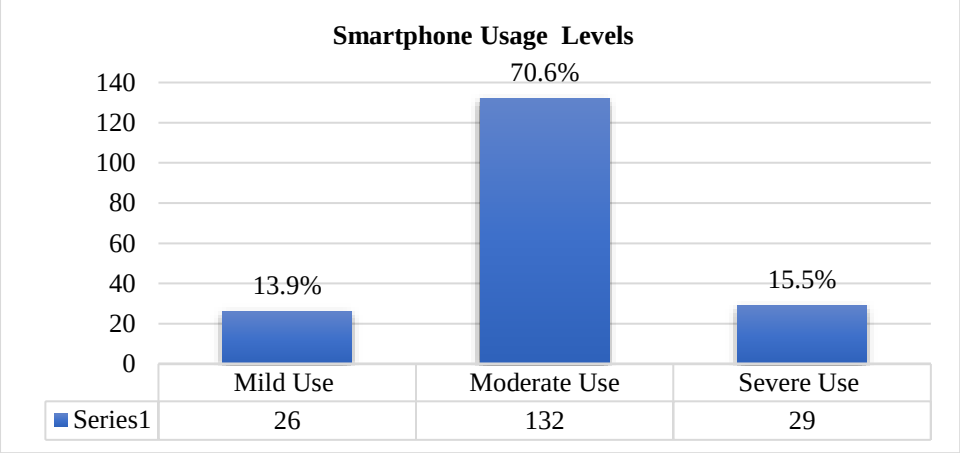

Figure 1 indicates that the majority of the students (70.6 %) have moderate level of smartphone use, followed by severe use (15.5%), and mild use (13.9%)

Table 4. Comparison of student's academic performance and total score of smartphone use

Variables	Mean±SD	Minimum-Maximum	Range	F	P-value
Good 2.51- 3.00	120.03±24.983	61-165	104	0.674	0.419
Very Good 3.01-3.5	113.89±26.848	37-175	138		
Excellent 3.51-4.00	113.00±26.713	51-168	117		

Discussion

The entire globe is significantly impacted by the rapid advancement of smartphone technology, but this advancement comes at a high price: the risk of social life disturbances and virtual world addiction. Twenty-first-century youth spend a great deal of time having virtual social interactions. The current study was set out to examine the impact of smartphone use on undergraduate student nurses' academic performance. All 187 participants (100%) in the study owned smartphones. The findings of the current study contradicted the widely held notion that excessive use of smartphones negatively affects academic performance. However, the participants identified real problems result in using the smartphone such as missing planned work, experiencing lightheadedness and blurred vision. According to the study's findings, academic achievement among undergraduate nursing students in a particular study setting is not significantly correlated with the degree of smartphone addiction, independent of the demographics of the research participants.

The present study findings are different from some existing research, such as one of the recent studies conducted by Karki *et al*.,[20] which demonstrated addiction in 36.8 medical students. The results are different, but in both studies, moderate usage was found among students. These facts warrant strategies to be used to mitigate the use of smartphones among students.

There are other studies with similar findings to this study, but they are in the minority. Raza *et al.*[21] carried out a similar study at the Higher Education Institute of Pakistan to determine the effect of smartphone addiction on students' academic success.[21] Their findings also revealed that the degree of smartphone addiction does not significantly affect students' academic performance. A comparable study was conducted by Boumosleh & Jaalouk at Notre Dame University in Lebanon to ascertain a correlation between the cumulative grade point average (CGPA) and smartphone addiction among undergraduate students.[22] The findings of the study showed no discernible relationship between academic accomplishment (CGPA) and smartphone addiction score. Similarly, Imran et al. conducted a comprehensive cross-sectional study among undergraduate students at Islamabad Medical and Dental College.[23] According to their study's findings, students' excessive smartphone use had no impact on their CGPA (p=0.25). Hassan et al. also found results that were comparable to ours, indicating that there is no evident association between different academic performance categories and the degree of smartphone addiction.[24]

However, the majority of studies have found a significant negative correlation between academic achievement and smartphone addiction, which stands contrary to the findings of the current study.[25,26,27] Likewise, Venkatapathy & Bhargavan[28] surveyed medical students in Chennai, India, and found that 90% of the participants reported that using a smartphone excessively had a negative impact on their grades. The findings of our study did not find significant association on grades. This difference may arise, because student nurses use smartphone mainly for academic purposed.

Strengths and weaknesses

The findings of the study are vitally important for young population of Pakistan, especially student nurses as the study has highlighted problems caused by the use of smartphones, such as missing planned work, lightheadedness, blurred vision, and lack of adequate sleep. Determining impact or relationship may be more difficult when cross-sectional data is used. The study only included participants from two nursing institutes, which may limit how broadly the findings may be applied. Sample size was also smaller which might be a limitation for the study's generalizability. This research may have limited its findings because it only includes undergraduate student nurses, suggesting that these results are only generalizable only to the student nurses.

Conclusion

The results of the study indicate that academic performance among undergraduate student nurses is not considerably impacted by smartphone use. The study schedule may have

allowed them to balance the usage of smartphones. It is apparent that smartphones can result in negative behaviors given that the majority of the study's participants have moderate to severe use of smartphones. Still, more studies are needed to study the problems highlighted by the student nurses, the ethical implications of smartphone use, how to measure the level of smartphone use those results in negative implications, and determining the point of addiction clinically.

References

1. Ke Y, Liu X, Xu X, He B, Wang J, Zuo L, et al. Self-esteem mediates the relationship between physical activity and smartphone addiction of Chinese college students: a cross-sectional study. Front Psychol. 2023;14(January):1–9. https://doi.org/10.3389/fpsyg.2023.1256743
2. Su P, He M. The mediating role of loneliness in the relationship between smartphone addiction and subjective well-being. Sci Rep. 2024;14(1):1–7. https://doi.org/10.1038/s41598-024-54546-3
3. Liu H, Zhou Z, Huang L, Zhu E, Yu L, Zhang M. Prevalence of smartphone addiction and its effects on subhealth and insomnia: a cross-sectional study among medical students. BMC Psychiatry. 2022;22(1):1–7. https://doi.org/10.1186/s12888-022-03956-6
4. Nikolic A, Bukurov B, Kocic I, Vukovic M, Ladjevic N, Vrhovac M, et al. Smartphone addiction, sleep quality, depression, anxiety, and stress among medical students. Front Public Heal. 2023;11(September):1–10. https://doi.org/10.3389/fpubh.2023.1252371
5. Elamin NO, Almasaad JM, Busaeed RB, Aljafari DA, Khan MA. Smartphone addiction, stress, and depression among university students. Clin Epidemiol Glob Heal. 2024;25(October 2023):101487. https://doi.org/10.1016/j.cegh.2023.101487
6. Arif W, Rasheed A, Hassan H. Effects of Smart Phone Addiction on Family Communication. J Media Stud. 2022;37(2). https://doi.org/10.1177/2055207623118607
7. Said AH, Mohd FN, Yusof MZ, Win NANM, Mazlan AN, Shaharudin AS. Prevalence of smartphone addiction and its associated factors among pre-clinical medical and dental students in a public university in Malaysia. Malaysian Fam Physician. 2022;17(3):64–73. https://doi.org/10.51866/oa.75
8. Beauregard P, Arnaert A, Ponzoni N. Nursing students' perceptions of using smartphones in the community practicum: A qualitative study. Nurse Educ Today. 2017;53:1–6. http://dx.doi.org/10.1016/j.nedt.2017.03.002
9. Gökçearslan Ş, Mumcu FK, Haşlaman T, Çevik YD. Modelling smartphone addiction: The role of smartphone usage, self-regulation, general self-efficacy and cyberloafing in university students. Comput Human Behav. 2016;63:639–49. https://doi.org/10.1016/j.chb.2016.05.091
10. Mendez ML, Padrón I, Fumero A, Marrero RJ. Effects of internet and smartphone addiction on cognitive control in adolescents and young adults: A systematic review of fMRI studies. Neurosci Biobehav Rev. 2024;159(February):105572. https://doi.org/10.1016/j.neubiorev.2024.105572
11. Rathakrishnan B, Singh SSB, Kamaluddin MR, Yahaya A, Nasir MAM, Ibrahim F, et al. Smartphone addiction and sleep quality on academic performance of university students: An exploratory research. Int J Environ Res Public Health. 2021;18(16):8291. https://doi.org/10.3390/ijerph18168291
12. Shakoor F, Fakhar A, Abbas J. Impact of Smartphones Usage on the Learning Behaviour and Academic Performance of Students: Empirical Evidence from Pakistan. Int J Acad Res Bus Soc Sci. 2021;11(2):862–81. http://dx.doi.org/10.6007/IJARBSS/v11-i2/8902
13. Lobo LM das GA, Évora YDM, Santos AMR dos, Gouveia MT de O, Andrade EMLR. Factors Associated with Smartphone Addiction Risk in Nursing Students. Texto Context Enferm. 2022;31:e20210045. https://doi.org/10.1590/1980-265X-TCE-2021-0045
14. Samaha M, Hawi NS. Corrigendum to "Relationships among smartphone addiction, stress, academic performance, and satisfaction with life". Comput Human Behav. 2017;75:321–5. http://dx.doi.org/10.1016/j.chb.2016.12.001
15. Baert S, Vujić S, Amez S, Claeskens M, Daman T, Maeckelberghe A, et al. Smartphone Use and Academic Performance: Correlation or Causal Relationship? Kyklos. 2020;73(1):22–46. https://doi.org/10.1111/kykl.12214
16. Han S, Yi YJ. How does the smartphone usage of college students affect academic performance? J Comput Assist Learn. 2019;35(1):13–22. https://doi.org/10.1111/jcal.12306
17. Khan A, Azam ;, Khalid A;, Iqbal R, Khan AA, Khalid A, et al. Revealing the Relationship between Smartphone Addiction and Academic Performance of Students: Evidences from Higher Educational Institutes of Pakistan. Pakistan Adm Rev. 2019;3(2):74–83. https://nbn-resolving.org/urn:nbn:de:0168-ssoar-63203-4
18. Alhazmi AA, Alzahrani SH, Baig M, Salawati EM, Alkatheri A. Prevalence and factors associated with smartphone addiction among medical students at King Abdulaziz University, Jeddah. Pakistan J Med Sci. 2018;34(4):984–8.

doi: 10.12669/pjms.344.15294

19. Kwon M, Lee JY, Won WY, Park JW, Min JA, Hahn C, et al. Development and Validation of a Smartphone Addiction Scale (SAS). PLoS One. 2013;8(2):e56936. https://doi.org/10.1371/journal.pone.0056936
20. Karki S, Singh JP, Paudel G, Khatiwada S, Timilsina S. How addicted are newly admitted undergraduate medical students to smartphones?: A cross-sectional study from Chitwan medical college, Nepal. BMC Psychiatry. 2020;20(1):1–7. https://doi.org/10.1186/s12888-020-02507-1
21. Raza SA, Qamar Yousufi S, M. Tariq Rafi S, Tuba Javaid S. Impact of Smartphone Addiction on Students' Academic Achievement in Higher Education Institute of Pakistan. J Educ Soc Sci. 2020;8(1):1–14. https://doi.org/10.20547/jess0812008101
22. Boumosleh J, Jaalouk D. Smartphone Addiction among University Students and Its Relationship with Academic Performance. Glob J Health Sci. 2017;10(1):48. https://doi.org/10.5539/gjhs.v10n1p48
23. Imran A, Fazal A, Tanvir S, Zafar S, Tariq N, Tariq S. Effects of Smartphone on Physical Activity and Academic Performance of Medical Undergraduates of Islamabad: A cross-sectional Study. J Univ Med Dent Coll. 2023;14(2):606–11. https://doi.org/10.37723/jumdc.v14i2.765
24. Hasan MR, Rahman MS, Islam MT, Hasan MF. Smartphone and Our Students: Is It Being Good for Their Study? J Inf Eng Appl. 2017;7(3):32–42. https://www.iiste.org/Journals/index.php/JIEA/article/view/36140/37134
25. Kibona L, Mgaya G. Smartphones' Effects on Academic Performance of Higher Learning Students. J Multidiscip Eng Sci Technol. 2015;2(4):777–84.
26. Ng SL, Phelan S, Leonard M, Galster J. A qualitative case study of smartphone-connected hearing AIDS: Influences on patients, clinicians, and patient-clinician interactions. J Am Acad Audiol. 2017;28(6):506–21. https://doi.org/10.3766/jaaa.15153
27. Sapci O, Elhai JD, Amialchuk A, Montag C. The relationship between smartphone use and students` academic performance. Learn Individ Differ. 2021;89(June):102035. https://doi.org/10.1016/j.lindif.2021.102035
28. Venkatapathy S, Bhargavan R. Impact of Smartphone Usage on the Academic Performance among Medical Students. J Evol Med Dent Sci. 2020;9(02):105–10. 10.14260/jemds/2020/23