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# Smartphone addiction and its associated behaviors among medical and dental students in Pakistan: A cross-sectional survey

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## Abstract:

**INTRODUCTION:** Addiction refers to the irresistible urge to engage in certain actions or dependence on a particular substance despite knowing negative consequences. The current study evaluated the severity of Smartphone addiction and the factors associated with cell phone-like activity.

**MATERIALS AND METHODS:** This cross-sectional study was conducted from July to August 2019 among medical and dental students in Karachi, Pakistan. A pretested self-administered questionnaire was used among 400 students. The mobile phone addiction was assessed using a 20-item, Mobile Phone Addiction Scale. A two-stage cluster analysis was used to assess mobile phone addiction-like behaviours. Chi-square test was used to find associations between categorical variables. Kolmogorov–Smirnov to test normality of data were also used. A  $P < 0.05$  was considered to be statistically significant for all tests.

**RESULTS:** Out of the total 400 students, the majority 316 (79%) comprise female students. The mean age was  $20.54 \pm 1.59$  years. In 184 (48%) students, there was evidence of mobile phone addiction-like behavior. The prevalence was higher in female than male students and among older compared to adolescent students; the differences were statistically nonsignificant. A higher median score  $\geq$  of 4 is found in questions related to components reflected intense desire, impaired control, and tolerance and harmful mobile use.

**CONCLUSION:** This study highlights that a large number of students are addicted to their smartphones. Smartphone addiction continues to be the most problematic addiction aided by the presence of intense desire, impaired control tolerance, and harmful mobile use. The phenomenon must be fully understood to draw deeper and richer inferences about the origins of this addictive behavior, which is becoming more prevalent in our Pakistani society on a daily basis.

## Keywords:

Addiction, dental students, internet, medical students, smartphone

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## Introduction

Smartphone addiction is one of the most common nonsubstance addictions, combined with pessimistic consequences, such as depression, anxiety, and compulsive use of these devices that may interfere with work, education, and relationships.<sup>[1]</sup> Smartphone addiction also referred to as

“nomophobia” (fear of being without a mobile phone) is sometimes exacerbated by an Internet overuse problem or an Internet addiction disorder. In this regard, nomophobia is a related condition that refers to discomfort, anxiety, nervousness, or depression triggered by being out of touch with mobile phones and associated technologies.<sup>[2]</sup> Since the internet becomes

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more accessible through mobile phones, the trend of addiction to mobile phones has become more prevalent, particularly among young people and adolescents in both developed and developing countries.<sup>[3]</sup> Apart from the internet, a lot of activities require smartphone use such as gaming, streaming movies, and posting video on social networking websites like Facebook, Twitter, WhatsApp, Instagram, Tinder, Emo, etc.<sup>[4]</sup>

There has been a rapidly increasing trend particularly in young urban populations, with almost one in three mobile phone users expected to be smartphone users by 2021.<sup>[2]</sup> Many smartphone users have become so attached to their phones that they feel that they cannot work without them, use them much of the time, abuse them, become addicted, neglect their tasks and duties, and affect the individuals economically and mentally and cause health problems.<sup>[1]</sup> Excessive use of smartphones and social networking sites by students can lead to serious stress disorders. Stress is a modern-day disorder, with different signs and manifestations in everyone, that interferes with the ability to concentrate, to make simple choices, trust, self-esteem, and motivation and to trigger a number of physical and behavioural signs and symptoms.<sup>[1,5]</sup> A study conducted by Lebni, *et al.* showed that Excessive Internet use leads to depression, anxiety, and poor mental health, impacting academic performance.<sup>[6]</sup>

Smartphone dependence is on the rise in the form of an epidemic affecting all age groups and ethnic groups. A recent study showed that the smartphone addiction was found to be high among Pakistani adolescents (60%). This is because of lack of awareness among the students and over dependence on these gadgets for study purpose. One cohort study conducted on Pakistani students showed that there are positive effects of awareness session on mobile phone use among adolescents.<sup>[7]</sup>

Most mobile users are between 21 and 30 years of age and are more affected and influenced, as well as up to 77% of smartphone users. Adding to that, the use of smartphones in teens is so enticing that some teens rarely turn off their mobile phones at night. Approximately 27% of young people have been identified, and between the ages of 11 and 14 years agree that they never shut down their mobile phones and spend 10 h on average on device.<sup>[4]</sup> In all these results, mobile phone addiction has the greatest association with its use.

Examining the psychological background and relationships between mobile phone use and adolescents will improve our understanding of the mobile phone addiction development mechanism and the behavior of mobile phone use.<sup>[8]</sup> The Centre for Disease Control reported an increase in both rates over the years 2010–2015

and found that young women were particularly at risk: their suicide rate increased by 65% those 5 years, while the rate of severe depression also increased by 58%.<sup>[4]</sup> Physical and psychological problems have also rapidly increased as a result of mobile phone abuse, such as muscle pain and stiff spine, eye problems reflected as fatigue, dryness, blurred vision, irritation, or redness of the eye, hearing, and tactile illusions.<sup>[4]</sup> The need for time is therefore to combat the consequences, as they have become an integral part of our everyday lifestyle. Previous studies on medical students showed excessive use of mobile phones, ranging from 51% to 98%, depending on the country and year in which the research was conducted.<sup>[9]</sup>

Statistics demonstrate that Internet use and Internet addiction are on the rise. The evolution of the mobile phone dependency scale is very significant given the combined risk of both traditional mobile phones and the internet-based Smartphone applications. Moreover, the high prevalence of stress and burnout in medical students during their period of education is well known, which puts them at risk of developing such addictions.<sup>[2]</sup> Smartphone addiction remains the most troublesome addiction despite any negative consequences to the person's physical, mental and social wellbeing. The phenomenon needs to be fully understood in such a way that deeper and richer conclusions can be drawn as to the origin of this addictive behavior that is growing every day in our Pakistani society. Therefore, the current study looked at the presence and severity of smartphone addiction and the factors associated with cell phone-like activity among medical and dental students.

## Materials and Methods

### Study population and sample

This cross-sectional study was conducted from July 1 to August 30, 2019. Our targeted population was undergraduate medical and dental students aged between 18 and 24 years. Cluster sampling was used to sample the respondents within the target population. Based on a previous study,<sup>[7]</sup> the expected mobile phone addiction in students was 50%. The sample size was calculated using formula:

$$n = (1 - n/N) \times t^2 (p \times q) \div d^2$$

It was found to be 384 at 95% confidence level with 5% margin of error. We assessed the mobile addiction in medical student using a structured online questionnaire. The questionnaires were anonymous to ensure the confidentiality and reliability of data. Finally, 400 students that completed the questionnaires were included in the final analysis (100% response rate).

Ethical approval was issued by the Ethics Committee Hamdard College of Medicine and Dentistry (Ref HCM&D/1046/2020), and all the participants had signed an informed consent before the study was initiated as the individual remained anonymous.

### The questionnaire

The study instrument comprised a structured questionnaire packet that inquired demographic information, including sex, age, year of medical and dental education, and brand of smartphone in use, among others. A self-administered questionnaire based on literature search<sup>[2,3,8,9]</sup> was used to examine trends of cell phone usage by medical students. The questionnaire was pretested on 10 students who were not included in the final survey. Content validity was assessed by a group of professionals, and modifications were made to the questionnaire at this stage. Mobile phone addiction was assessed using a 20-item self-designed Mobile Phone Addiction Scale (MPAS) used in a previous study.<sup>[2]</sup> The questions in the MPAS were designed to evaluate the patterns of mobile phone use that met the ICD-10 criteria for substance dependence syndrome. Responses to each of the MPAS items were stated on a six-point Likert scale with options of one (strongly disagreed), two (disagreed), three (weakly disagreed), four (weakly agreed), five (agreed), and six (strongly agreed). The domains covered against questions in MPAS are listed in Box A.

### Statistical analysis

IBM SPSS Version 25.0 was utilized to perform statistical analysis. The categorical variables were expressed as the frequency (%), while the continuous variables were presented as median with interquartile range (IQR). Single sample Kolmogorov-Smirnov test was used to test whether the data conformed to normal distribution. Chi-square test was used to explore the significant associations between sample characteristics and mobile-phone addiction.

Cronbach’s alpha and the Spearman–Brown split-half reliability coefficient were calculated to assess the reliability of MPAS. A Cronbach’s alpha of 0.90 indicated that the MPAS had a high level of internal consistency. In addition, the Spearman–Brown

split-half reliability coefficient was also found to be adequate (0.799).<sup>[2]</sup> The construct validity of the 20-item questionnaire was assessed using principal component analysis (PCA). In terms of the linear relationship between variables and sample size adequacy, the current dataset met the PCA requirements. A two-stage cluster analysis was used to identify groups of medical students who were homogeneous within themselves but heterogeneous with respect to their mobile phone addiction like behaviors. In the cluster analysis, all 20 MPAS items were used. A cluster of students with higher scores was found to have mobile phone addiction, whereas those with lower scores did not have mobile phone addiction-like behavior. A  $P < 0.05$  was considered to be statistically significant for all tests.

### Results

Of the total 400 students, the majority were female 316 (79%) than male students. The mean (standard deviation) age was  $20.54 \pm 1.59$  years. The overwhelming majority 369 (92.3%) are medical students, with Urdu being the most commonly spoken language by 303 (76%) of the students. The Android operating system was chosen by 318 (80%) of the students, with the iOS (Apple) operating system chosen by 78 (20%). Only 58 (14.5%) of students reported using the internet exclusively for academic purposes, while 256 (64%) use social media (Facebook, WhatsApp, Instagram, etc.) for leisure purposes [Table 1].

According to the two-stage cluster analysis, 184 students (48%) with higher MPAS scores were classified as having mobile phone addiction, while 216 students (54%) with lower MPAS scores were classified into the cluster group as not having mobile phone addiction-like behavior. The prevalence of behavior suggestive of mobile phone addiction was higher in female than male students and among older compared to adolescent students, but the difference was not statistically significant [Table 2].

Table 3 describes the responses of participants to the MPAS items reported as median and IQR. The higher median score indicates a higher risk of dependence on mobile phone use. A median score of 4 or higher is found to be in questions 1–7, 10, 11, and 19 reflecting intense desire, impaired control, and tolerance, while a median score of three was found to be in questions 9, 16, 17, 18 reflecting dangerous and harmful use associated with mobile phone use.

Furthermore, the item agreement is cross-tabulated with sex and age of medical students. Statistically significant differences were identified between

#### Box A: Domains covered in Mobile Phone Addiction Scale

Tested items	Questions
Presence of intense desire	1-6, 9
Impaired control	1, 3-4, 7, 9-10, 13, 19
Withdrawal	14-15
Tolerance to use	10-11, 19
Decrease pleasure in alternate pleasures	8, 19
Harmful use	12-20

males than female students for mobile phone use during group participation ( $P = 0.04$ ), tolerance for decreased mobile phone use ( $P = 0.01$ ), inattentiveness to people around them due to mobile phone use ( $P = 0.02$ ) and impulsive use of their mobile phones in conditions that could potentially threaten their road safety ( $P < 0.001$ ). Likewise, the statistically significant difference between older students and younger students have also been identified for impulsive repeated mobile phone checks ( $P = 0.03$ ) and recorded loss of concentration due to mobile phone use ( $P = 0.03$ ) [Table 3].

**Table 1: Sociodemographic characteristics of the participants**

Variable	n=400, n (%)
Sex	
Male	84 (21.0)
Female	316 (79.0)
Age (years)	
18-19	128 (32.0)
20-22	216 (54.0)
23-24	56 (14.0)
Mean±SD	20.54±1.59
Type of profession	
Medical students	369 (92.3)
Dental students	31 (7.8)
Mother tongue	
Urdu	303 (75.8)
Sindhi	38 (9.5)
Punjabi	24 (6.0)
Pashto	5 (1.3)
Others	30 (7.5)
Type of mobile operating system	
Android	318 (79.5)
iOS (apple)	78 (19.5)
Windows	2 (0.5)
Do not know	2 (0.5)
Preferred choice for internet use	
Social media (Facebook/WhatsApp/Instagram etc.)	256 (64.0)
Academic use	58 (14.5)
Both	86 (21.5)

SD: Standard deviation

**Table 2: Factors associated with mobile phone addictionlike behavior among participants**

Variable	Mobile phone addiction (n=400)		P*
	Present (n=184), n (%)	Absent (n=216), n (%)	
Sex			
Male	42 (22.8)	42 (22.8)	0.40
Female	142 (77.2)	174 (80.6)	
Age (years)			
≤ 19	52 (28.3)	76 (35.2)	0.13
≥ 20	132 (71.7)	140 (64.8)	
Preferred choice for internet use			
Social media	116 (63)	140 (64.8)	0.30
Academic use	23 (12.5)	35 (16.2)	
Both	45 (24.5)	41 (19)	

\*Chi-square as the test of significance

## Discussion

Although smartphones are indispensable in today's world and have made life undeniably simpler and more sophisticated, their excessive use leads to addiction, with negative consequences that outweigh the benefits.<sup>[5]</sup> Numerous studies have linked stress, depression, anxiety, nervousness, restlessness, and other social problems to mental health and illness.<sup>[5,10-12]</sup>

In the present study, 184 (46%) of the total participants self-identified as having a mobile phone addiction. A recent study conducted on medical students in Karachi, Pakistan discovered that 51.5% of smart phone users were addicted; however, a different scale was used to assess addiction.<sup>[13]</sup> Another study on university students in Rawalpindi and Islamabad, Pakistan found that mobile phone addiction has detrimental effects on respondents' relationships with their families due to their inability to tolerate interruptions from parents while using mobile phones.<sup>[14]</sup> According to studies conducted among Indian undergraduate medical students, the prevalence of mobile dependence ranges from 17.62% in Tamil Nadu and Kerala<sup>[15]</sup> to 42.6% in West Bengal<sup>[16]</sup> and 71.39% in Maharashtra.<sup>[17]</sup> Similarly, in 46 Iranian studies, the prevalence of mobile addiction varies from 0.9% to 64.5%.<sup>[5]</sup> These disparities may be due to the various instruments used to assess smartphone addiction; however, all findings have confirmed that mobile phone dependence is widespread among medical students.

In the current study, students aged 21–24 years were more likely to be addicted to mobile phones than adolescents, but no statistically significant relationship between age and mobile addiction was found. This is consistent with the findings of other studies.<sup>[15,18-20]</sup> In contrast, studies have found a significant link between age and mobile dependency.<sup>[5,17,21]</sup> The younger generation is referred to as the "wired generation" because they rely on cell phones to communicate and stay connected with one another, as well as to carry out the majority of their daily tasks with the assistance of smartphones.<sup>[18]</sup> However, it



**Table 3: Distribution of responses and item agreement to the mobile phone addiction scale and association with sex and age among participants (n=400)**

Item	Median (IQR)	Agree**, n (%)	Sex		Age (in years)	
			Male (n=84), n (%)	Female (n=316), n (%)	≤ 19 (n=128), n (%)	≥ 20 (n=272), n (%)
Usually, check your WhatsApp/SMS/Facebook notifications as soon as you receive them during the day?	5 (3)	278 (69.5)	60 (71.4)	218 (69.0)	85 (66.4)	193 (71.0)
Usually, check WhatsApp/SMS/Facebook notifications received even while resting/in light sleep?	4 (3)	220 (55.0)	50 (59.5)	170 (53.8)	68 (53.1)	152 (55.9)
Usually, impulsively check for WhatsApp/SMS/Facebook notifications while attending classes or studying at home?	5 (2)	276 (69.0)	55 (65.5)	221 (69.9)	82 (64.1)	194 (71.3)
Usually, check your mobile phone for messages/gaming/surfing even while attending classes?	4 (3)	234 (58.5)	46 (54.8)	188 (59.5)	69 (53.9)	165 (60.7)
Usually, check your mobile phone for new messages or notifications right after waking up from sleep	5 (2)	320 (80.0)	66 (78.6)	254 (80.4)	96 (75.0)	224 (82.4)
Constantly checking my smartphone so as not to miss conversations between my friends/other people on Twitter/Facebook/WhatsApp	4 (3)	215 (53.8)	45 (53.6)	170 (53.8)	59 (46.1)	156 (57.4)†
Having a hard time concentrating in class, while doing assignments, or while working due to mobile use	4 (3)	208 (52.0)	37 (44.0)	171 (54.1)	67 (52.3)	141 (51.8)†
Preferring talking with my smartphone buddies to hanging out with my real-life friends or with the other members of my family	2 (3)	118 (29.5)	29 (34.5)	89 (28.2)	32 (25.0)	86 (31.6)
Usually, check your mobile phone even while engaged in group participation	3 (2)	160 (40.0)	41 (48.8)	119 (37.7) <sup>‡</sup>	48 (37.5)	112 (41.2)
Using your mobile phone longer than you had intended to	5 (2)	330 (82.5)	67 (79.8)	263 (83.2)	102 (79.7)	228 (83.8)
Always thinking that you should shorten your mobile phone usage time	5 (2)	331 (82.8)	62 (73.8)	269 (85.1) <sup>‡</sup>	109 (85.2)	222 (81.6)
The people around you complain that you do not pay attention to them due to mobile phone use	2 (2)	153 (38.3)	41 (48.8)	112 (35.4) <sup>‡</sup>	48 (37.5)	105 (38.6)
Get annoyed or shout if someone asks you to decrease the use of mobile phone	2 (3)	127 (31.8)	29 (34.5)	98 (31.0)	35 (27.3)	92 (33.8)
Feeling impatient and fretful (irritable) when you are not holding your smartphone	2 (3)	130 (32.5)	26 (31.0)	104 (32.9)	35 (27.3)	95 (34.9)
Experience stress when not using your mobile phone	2 (2)	95 (23.8)	18 (21.4)	77 (24.4)	27 (21.1)	68 (25.0)
Experiencing light-headedness or blurred vision due to excessive smartphone use	3 (3)	169 (42.3)	31 (36.9)	138 (43.7)	60 (46.9)	109 (40.1)
Feeling pain in the wrists or at the back of the neck while using a smartphone	3 (3)	168 (42.0)	31 (36.9)	137 (43.4)	51 (39.8)	117 (43.0)
Feeling tired and lacking adequate sleep due to excessive smartphone use	3 (3)	184 (46.0)	43 (51.2)	141 (44.6)	59 (46.1)	125 (46.0)
Cannot imagine living without my mobile phone	4 (3)	256 (64.0)	45 (53.6)	191 (60.4)	73 (57.0)	163 (59.9)
Do you compulsively respond to calls/messages at places where it is dangerous to do so (driving/crossing the road)?	2 (2)	77 (19.3)	29 (34.5)	48 (15.2) <sup>‡</sup>	20 (15.6)	57 (21.0)

\*\*Weakly agree, agree, and strongly agree have been combined for statistical significance, †P<0.05, ‡P<0.001, Chi-square used as test of significance. IQR: Interquartile range

should be noted that the participants in this study were between 18 and 24 years and predictors of mobile phone overuse cannot be compared to those between the ages 25–45 years.

In our study, the vast majority of females reported a higher prevalence of mobile phone dependence than male students. This was most likely due to the fact that females made up two-thirds of all participants

and agreed to use their phones for longer periods of time than expected. It is in consistent with a Japanese study that reported females using cell phones for longer durations, resulting in fewer sports and social activities<sup>[22]</sup> Many studies have been done to investigated the association between high involvement of smartphone and gender, and female overuse of mobile phone has been reported to be higher than males.<sup>[5,16,20,23]</sup> Women’s mobile phone addiction to action can be attributed to a

variety of factors, including increased social interaction, text messages, music listening, and increased internet use.<sup>[8]</sup> According to Bianchi and Phillips (2005),<sup>[24]</sup> women use mobile phones primarily for social purposes, while men use them for technology and work. In contrast, the prevalence of overuse of mobile phones was found to be higher among male medical students<sup>[21,25,26]</sup> or to have no significant relationship with mobile addiction.<sup>[1,2,5,13,19,27]</sup>

Previous research has shown that mobile phone dependence disrupts sleep patterns and quality of sleep.<sup>[2,17,28,29]</sup> This was also observed in our study, as 184 (46%) of the students admitted to feeling exhausted and having poor sleep habits as a result of excessive smartphone use. Furthermore, the majority of students (55%) agreed that they usually check social media networks in light sleep. According to a study conducted among female medical students in Pakistan's Khyber Pakhtunkhwa province, 56% of students had their sleep disrupted due to excessive mobile phone use.<sup>[30]</sup> Another recent study on medical students in Karachi discovered a positive significant correlation between mobile phone addiction and sleep disturbances.<sup>[13]</sup> These findings from Pakistan were consistent with those from neighboring countries, indicating that compromising usual sleeping time, sleep latency, and subjective quality of sleep due to excessive mobile use may jeopardize students' physical, mental, and academic health.

According to a survey conducted in India,<sup>[31]</sup> a college-going student spent an average of 10 h a day using a mobile phone. An overwhelming majority (83%) of students in the present study consented to spend more time than they expected on their phones. Such addiction-like behavior has been described in another study that explained the need to check the phone right after waking up.<sup>[4]</sup> Furthermore, in the present study and another study,<sup>[32]</sup> social networking, messaging, and texting longer the duration of mobile phone usage is significantly reported to be the most personally important feature for smartphones. In addition, Alavi *et al* (2014) showed another aspect of addiction that that excess of internet use could be linked with defects in some aspects of national and personal identity.<sup>[33]</sup>

The strength of the current study is that it used a self-designed questionnaire that was properly tested for reliability and validity to assess mobile phone addiction-like behavior. In addition, the questionnaire's items were localized and suited to the Asian setting; the results can be compared to those of Indian studies.

One of the limitations of the current study is that because it was conducted in a single medical and dental college, the results cannot be generalized. Also, because the questionnaire was self-administered, the results are

predicated on the assumption that the students provided honest responses. Furthermore, multi-centric research should be carried out in the future in order to elicit a greater number of determinants. It is necessary to identify students who exhibit high levels of participation and dependence that can raise awareness and to arrange educational or treatment interventions that are appropriate for their circumstances.

## Conclusion

This study reveals that a large number of students are addicted to their smartphones. Smartphone addiction continues to be the most problematic addiction, despite the fact that it has negative consequences for a person's physical, mental, and social well-being. Addiction was aided by the presence of intense desire, impaired control tolerance, and harmful mobile use. The phenomenon must be fully understood in order to draw deeper and richer inferences about the origins of this addictive behavior, which is becoming more prevalent in our Pakistani society on a daily basis.

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## Conflicts of interest

There are no conflicts of interest.

## References

1. Gligor S, Mozoş I. Indicators of smartphone addiction and stress score in university students. *Wien Klin Wochenschr* 2019;131:120-5.
2. Basu S, Garg S, Singh MM, Kohli C. Addiction-like behavior associated with mobile phone usage among medical students in Delhi. *Indian J Psychol Med* 2018;40:446-51.
3. Kwon M, Kim DJ, Cho H, Yang S. The smartphone addiction scale: Development and validation of a short version for adolescents. *PloS One* 2013;8:e83558.
4. Tariq FJ, Bin Irfan AR. Cell phone addiction: A rising epidemic. *J Pak Med Assoc* 2019;69:928-9.
5. Amiri M, Dowran B, Salimi H, Zarghami MH. The problematic use of mobile phone and mental health: A review study in Iran. *J Educ Health Promot* 2020;9:290.
6. Lebn JY, Toghrol R, Abbas J, NeJhaddadgar N, Salahshoor MR, Mansourian M, *et al.* A study of internet addiction and its effects on mental health: A study based on Iranian University Students. *J Educ Health Promot* 2020;9:205.
7. Khalily MT, Loona MI, Bhatti MM, Ahmad I, Saleem T. Smartphone addiction and its associated factors among students in twin cities of Pakistan. *J Pak Med Assoc* 2020;70:1357-62.
8. Hong FY, Chiu SI, Huang DH. A model of the relationship between psychological characteristics, mobile phone addiction and use of mobile phones by Taiwanese university female

- students. *Comput Hum Behav* 2012;28:2152-9.
9. E Silva M, de Souza Matos B, da Silva Ezequiel O, Lucchetti A, Lucchetti G. The use of smartphones in different phases of medical school and its relationship to internet addiction and learning approaches. *J Med Syst* 2018;42:106.
  10. Babadi-Akashe Z, Zamani BE, Abedini Y, Akbari H, Hedayati N. The relationship between mental health and addiction to mobile phones among university students of Shahrekord, Iran. *Addict Health* 2014;6:93-9.
  11. Shoukat S. Cell phone addiction and psychological and physiological health in adolescents. *EXCLI J* 2019;18:47-50.
  12. Sahu M, Gandhi S, Sharma MK. Mobile phone addiction among children and adolescents: A systematic review. *J Addict Nurs* 2019;30:261-8.
  13. Mansoor J, Muneer S, Kanwal L. Academic use of smart phone and correlation of its addiction with sleep disturbances among medical students. *Nat J Health Sci* 2020;5:13-8.
  14. Shazad M, Shazad N, Ahmed T, Hussain A, Riaz F. Mobile phones addiction among university students: Evidence from twin cities of Pakistan. *J Soc Sci* 2015;1:416-20.
  15. Kiran D, Subhashini V, Padmini U, Moorthy G, Thangappan R. Mobile phone dependence among medical students – A prospective study. *Indian J Basic Appl Med Res* 2018;8:613-8.
  16. Dasgupta P, Bhattacharjee S, Dasgupta S, Roy JK, Mukherjee A, Biswas R. Nomophobic behaviors among smartphone using medical and engineering students in two colleges of West Bengal. *Indian J Public Health* 2017;61:199-204.
  17. Myakal Vanita V, Vedpathak Vinod L.. Nomophobia – Mobile phone dependence, a study among students of a rural medical college. *Int J Community Med Public Health* 2019;6:2034-40.
  18. Raza SA, Yousufi SQ, Rafi ST, Javaid ST. Impact of smartphone addiction on students' academic achievement in higher education institute of Pakistan. *J Educ Soc Sci* 2020;8:1-14.
  19. Thapa K, Lama S, Pokharei R, Sigdel R, Rimal SP. Mobile phone dependence among undergraduate students of a medical college of eastern Nepal: A descriptive cross-sectional study. *J Nepal Med Assoc* 2020;58:234-9.
  20. Mansourian M, Solhi M, Adab Z, Latifi M. Relationship between dependence to mobile phone with loneliness and social support in university students. *Razi J Med Sci* 2014;21:1-8.
  21. Daei A, Ashrafi-Rizi H, Soleymani MR. Nomophobia and health hazards: Smartphone use and addiction among university students. *Int J Prev Med* 2019;10:202.
  22. Ikeda K, Nakamura K. Association between mobile phone use and depressed mood in Japanese adolescents: A cross-sectional study. *Environ Health Prev Med* 2014;19:187-93.
  23. Tavakolizadeh J, Atarodi A, Ahmadpour S, Pourghesiar A. The prevalence of excessive mobile phone use and its relation with mental health status and demographic factors among the students of Gonabad University of Medical Sciences in 2011-2012. *Razavi Int J Med* 2014;2:e15527.
  24. Bianchi A, Phillips JG. Psychological predictors of problem mobile phone use. *Cyberpsychol Behav* 2005;8:39-51.
  25. Choudhury S, Saha I, Som TK, Ghose G, Patra M, Paul B. Mobile phone involvement and dependence among undergraduate medical students in a medical college of West Bengal, India. *J Educ Health Promot* 2019;8:1-7.
  26. Mazaheri MA, Najarkolaei FR. Cell phone and internet addiction among students in Isfahan university of medical sciences-Iran. *Journal of Health Policy and Sustainable Health*, Vol:1, Issue: 3. COI: JR\_JHPHS-1-3\_002.
  27. Pavithra M, Madhukumar S, Mahadeva M. A study on nomophobia-mobile phone dependence, among students of a medical college in Bangalore. *Nat J Community Med* 2015;6:340-4.
  28. Akbari R, Zarei E, Dormohammadi A, Gholami A. Influence of unsafe and excessive use of mobile phone on the sleep quality. *Sci J Kurdistan Univ Med Sci* 2016;21:81-90.
  29. Mohammadbeigi A, Absari R, Valizadeh F, Saadati M, Sharifimoghadam S, Ahmadi A, et al. Sleep quality in medical students; the impact of over-use of mobile cell-phone and social networks. *J Res Health Sci* 2016;16:46-50.
  30. Aman T, Shah N, Hussain A, Khan A, Asif S, Qazi A. Effects of mobile phone use on the social and academic performance of students of a public sector medical college in khyber pakhtunkhwa Pakistan. *KJMS* 2015;8:99-103.
  31. Rai S, Saroshe S, Khatri A, Sirohi S, Dixit S. A cross sectional study to assess the effects of excessive use of smartphones among professional college going students. *Int J Community Med Public Health* 2016;3:758-63.
  32. Haug S, Castro RP, Kwon M, Filler A, Kowatsch T, Schaub MP. Smartphone use and smartphone addiction among young people in Switzerland. *J Behav Addict* 2015;4:299-307.
  33. Alavi SS, Jannatifard F, Maracy MR, Alaghemandan H, Setare M. Comparison of national and personal identity between person with internet addiction disorder and normal internet users. *J Educ Health Promot* 2014;3:42.