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Original Research Article

Characteristics of medical students with problematic smartphone use: a cross-sectional study

Arman Mehrzadeh[1]*, Ramin Shiraly[2], Seyedeh Niko Hashemi[1], Kayvon S. Dehghanian[1]

[1]School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran
[2]Department of Community Medicine, School of Medicine, Health Behavior Science Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

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***Correspondence:**
Dr. Arman Mehrzadeh,
E-mail: arman.mehrzadeh@gmail.com

ABSTRACT

Background: Excessive smartphone use is common among university students and can negatively affect students' mental health, but data from Middle-East countries is scarce. Objective of the study was to determine the characteristics of medical students affected by and the prevalence of problematic smartphone use in a sample of Iranian medical students.
Methods: This cross-sectional study was conducted in a large Iranian medical university. A convenience sample of 356 students of different years of medical training were recruited. Data on socio-demographic characteristics, daily estimated average time using a smartphone, and main motivations to use a smartphone were collected through a self-reported questionnaire. Problematic smartphone use (PSU) was evaluated using the smartphone addiction scale – short version (SAS-SV) questionnaire. Backward logistic regression analysis was used to understand independent factors associated with PSU.
Results: Overall, two-thirds of Iranian medical students were affected by PSU, including 68.5% of male and 64% of female students. Students who lived alone had significantly higher SAS-SV scores than those who lived with their families (p=0.007). Additionally, students with daily smartphone use >4 hours were 3.2 times more likely to be diagnosed with PSU (p<0.001). Social media use was the main motivation that strongly predicted the presence of PSU among medical students (adjusted OR: 2.87, 95% CI: 1.68-4.89).
Conclusions: Main motivation to use and duration of phone use are the most important factors predicting problematic smartphone use among medical students.

Keywords: Problematic smartphone use, Smartphone addiction, Medical students, Social media use

INTRODUCTION

Smartphone users are currently estimated to be 6.6 billion people, which could represent 85% of the world's population and this number is expected to rise in the coming years.[1] Smartphone use has affected individuals' lives both positively and negatively; it has changed the way people think, behave, work, and communicate with each other (text, call, video chat), and spend their leisure time.[2] Smartphone Apps and online social networking sites have changed many aspects of everyday life such as shopping, paying, making appointments, transportation, education, and lifestyle factors including dietary habits and physical fitness.[3,4] They may contribute to people with special needs such as those with chronic disabling diseases to conduct their activities of daily living and gain more independence.[5] This doesn't mean that smartphones come without any downsides; excessive usage of smartphones can be problematic and problematic smartphone use (PSU) can affect people's mental health and function. Indeed, there is some concern that such problematic use of

smartphones might be a real form of behavioral addiction; given the fact that PSU can be accompanied by signs and symptoms such as preoccupation, decreased concentration, cravings, poor sleep quality, and lack of self-control, all of which may at least partly mimic substance and non-substance addictive behaviors.[6,7] However, some studies suggest that the behaviors associated with excessive smartphone use would be better defined as "problematic" since it is not quite similar to addiction in terms of severity and usually doesn't fulfill the necessary criteria.[8,9] The consequences of problematic smartphone use are currently of big concern worldwide as it threatens both physical and psychological health.[10] Decreased bone density, cardiovascular problems such as increased heart rate and high blood pressure (due to high arousal state), eating disorders, overweight, obesity and its consequences, neurological problems, and visual disorders are some of the physical health outcomes that may be associated with PSU.[11-14] Depression, anxiety, procrastination behavior, decreased focus, ADHD-related behavior, poor sleep quality, declining academic performance, and low communication skills are some of the mental health problems that might be the consequences of problematic smartphone use.[12,13,15-19] Numerous studies have reported the prevalence of PSU and its associated factors among university students, most of them from Western countries. To the best of the present authors' knowledge, the related literature from Middle-East (mostly Muslim) countries is scarce.[20,21]

This study aimed to assess the prevalence and socio-demographic factors associated with PSU among a sample of Iranian Medical students who could represent the young population of Middle-East Muslim countries.

METHODS

Participants and procedure

A convenience sample of 400 undergraduate students from the Shiraz Medical School and related teaching hospitals were invited to participate in the study. Before administering the surveys, participants were given a verbal explanation about the objectives of the study, and they provided written informed consent. Participants were asked to complete a data collecting form, including the short version of the smartphone addiction scale (SAS-SV), to evaluate the presence and severity of problematic smartphone use. The survey was anonymous, and the questionnaires were collected immediately after completion. The present study was reviewed and approved by the research ethics committee. This cross-sectional study was carried out between May 2019 to February 2020.

Measurements

Basic demographic information included age, gender, marital status, and stage of medical training.

Living condition was classified as: living in a dormitory, living with family, and living alone in their own home.

Smoking history

To evaluate the cigarette smoking status of participants, smoking habits were classified as current smoker, ex-smoker, and non-smoker. A current smoker was defined as a person who had regularly smoked in the past month. An ex-smoker was defined as a person who had regularly smoked but had not smoked in the past month. A non-smoker was defined as someone who has never smoked cigarettes.

Alcohol use status

To evaluate the alcohol use status of participants, drinking habits were classified as current user, ex-user, and non-user. A current alcohol user was defined as a person who had regularly used alcohol in the past month. An ex-user was defined as a person who had regularly used alcohol but had not used it in the past month. A non-user was defined as someone who had never drank alcohol before.

The estimated average time spent on a smartphone was measured by asking participants how much time they spent with their smartphone for different purposes on a typical day. Four response categories included: 0 to 60 minutes, 61 to 120 minutes, 121 to 240 minutes and >240 minutes.

Problematic smartphone use

We used the Persian version of the smartphone addiction scale –short version (SAS-SV).[21] SAS-SV is commonly regarded as one of the most valid self-report means of evaluating problematic smartphone use.[20] It was originally developed and validated for use with South Korean young adults and was then translated and validated into a lot of languages throughout the world. SAS-SV is a 10-item self-report tool with a 6-point Likert response from 1=strongly disagree, 6=strongly agree. Total scores typically range from 10–60, with higher scores indicating problematic smartphone usage. To screen for smartphone addiction, the suggested cut-off values include 31 for boys (sensitivity: 0.87, specificity: 0.89) and 33 for girls (sensitivity: 0.88, specificity: 0.88).[20] Cronbach's alpha in the present study was 0.885.

Statistical analysis

Descriptive statistics were used to calculate the main sample characteristics of the study participants. Demographic factors were calculated as frequencies and percentages for categorical variables and means and standard deviations for numerical variables. Chi-square tests and the independent sample t-tests were used to calculate statistical differences between those with or without problematic smartphone use. Multivariable logistic regression was utilized to determine independent

variables associated with increased risk of PSU. When building the multivariate models, each of the variables listed above was evaluated in univariate models, and those with p values <0.10 were considered for inclusion in the backward stepwise logistic regression. Statistical package for the social sciences (SPSS) version 28 (IBM, United States) was used for all statistical analysis and the significance level was set at p<0.05.

RESULTS

Of the 400 students who were invited to participate in the study, 356 students completed the survey (response rate: 89%). The mean age of the participants was 22.6 years (SD±2.6) including 181 male students (50.8%) and 175 female students (49.2%). The majority of the participants were single (91%). Approximately half (49%) of the participants were spending clinical rotations of their medical curriculum. The majority (83%) of the students lived in dormitories or with their family, however, 17% of students reported living alone out of the university campus and without their family. Over 10% of students reported having a part-time job concurrent with studying medicine. Over 9% and 7% of the participants reported using cigarettes and alcohol, respectively. The most common motivations for using smartphones were social media use (67%), call and texting (18%), web reviewing to seek general information (12%), and academic purposes (3%), respectively. In just 3% of the students, the estimated average daily time of smartphone usage was less than one hour, and over 37% reported using it more than 4 hours per day.

Table 1 shows the distribution of SAS-SV scores according to the study variables. The resultant SAS-SV scores ranged from 10-60 (mean=35.6 SD±10.3). There was no statistically significant difference between participants' SAS-SV scores and their gender (p=0.475), marital status (p=0.902), educational level (p=0.209), and cigarette and alcohol use (0.274 and 0.118). However, SAS-SV scores were statistically different based on the living conditions (p=0.007), the main motivation for smartphone use (p<0.001), and the average time spent using a smartphone per day (p<0.001). More specifically, students with mean SAS-SV scores of more than 40 were more likely to be engaged in more than 4 hours of use of smartphones per day.

Overall, 236 (66.3%) of the participant students were identified as problematic smartphone users by the SAS-SV scale. The highest prevalence rate was seen among those using smartphones more than 4 hours per day (83%) (Table 2).

Table 3 describes the univariate and multivariable logistic regression analysis of associations between the study variables and problematic smartphone use among medical students of Shiraz Medical School. The univariate logistic regression analyses found no significant associations between gender, marital status, stage of clinical education (pre-clinical versus clinical), having a part-time job, and cigarette smoking with problematic smartphone use as the outcome variable. However, those students with problematic smartphone use were more likely to have a higher age, to be in the clinical stage of medical training, to live alone, to currently use alcohol, to use a smartphone more than 4 hours per day, and to use social media as the main motivation of smartphone use. According to the multivariable backward stepwise binary logistic regression analysis, students who reported using a smartphone more than 4 hours per day were 3.23 times (95% CI: 1.81–5.75) and those whose main motivation for using a smartphone was social media use were 2.87 times (95% CI: 1.68–4.89) more likely to be a problematic user of smartphone (p<0.001).

Table 1: Distribution of SAS-SV scores representing problematic smartphone use among medical students based on the study variables.

Characteristic	N (%)	SAS-SV scores, mean (±SD)	SAS-SV scores, median	P value
Gender				
Male	181 (50.8)	35.2 (9.6)	36	0.475
Female	175 (49.2)	36.0 (10.9)	37	
Marital status				
Married	32 (9.0)	35.4 (10.6)	35	0.902
Single	324 (91.0)	35.7 (10.1)	36	
Stage of education				
Basic sciences	143 (40)	34.5 (11.5)	34.5	0.209
Pathophysiology	39 (11)	35.1 (8.2)	36	
Clinical	174 (49)	36.6 (9.7)	37	
Living condition				
Live alone	60 (17)	39.2 (10.2)	39.5	0.007*
Live in dormitory	148 (41.5)	35.2 (10.5)	36	
Live with family	148 (41.5)	34.3 (9.8)	36	
Having a part-time job				
Yes	33 (9.4)	33.7 (9.2)	34	0.289

Continued.

Characteristic	N (%)	SAS-SV scores, mean (±SD)	SAS-SV scores, median	P value
No	323 (90.6)	35.6 (10.3)	36	
Cigarette smoking status				
Current smoker	32 (9)	38.4 (10.1)	40	0.274
Ex-smoker	23 (6.5)	35.4 (9.3)	37	
Never smoker	301 (84.5)	35.4 (10.3)	36	
Cigarette using status				
Current or ex-user	56 (16.6)	37.2 (9.8)	39	0.235
Never user	300 (84.4)	35.4 (10.3)	36	
Alcohol using status				
Current or ex-user	69 (19.5)	37.7 (9.3)	36	0.05
Never user	287 (80.5)	35.2 (10.4)	39	
Estimated daily average time using smartphone (minutes)				
0-60	10 (2.8)	25.9 (17.2)	18	<0.001*
61-120	51 (14.2)	30.5 (9.6)	29	
121-240	164 (46.2)	33.8 (8.9)	35	
>240	131 (36.8)	40.6 (9.2)	41	
Main uses of smartphone				
Social media use	238 (67)	37.7 (9.3)	38	<0.001*
Other uses (call/texting/ seeking information)	118 (33)	31.5 (10.3)	31	

*Statistically significant.

Table 2: Prevalence of problematic smartphone use among participant medical students.

Subgroups	Prevalence of problematic smartphone use (%)	P value
Gender		
Male	69	0.373
Female	64	
Marital status		
Single	67	0.553
Married	61	
Stage of training		
Preclinical	61	0.033
Clinical	72	
Living condition		
Alone	77	0.035
Dorm or with family	64	
Average time spent using smartphone (hours per day)		
≤4	56	<0.001
>4	83	
Main motivation of using smartphone		
Social media use	75	<0.001
Other reasons	49	
Total	66	

Table 3: Factors associated with problematic smartphone use among a sample of Iranian medical students.

Factors	Univariate model		Multivariate model	
	OR (95% CI)	P value	OR (95% CI)	P value
Age in years	1.11 (1.01–1.22)	0.028*	1.10 (0.94–1.29)	0.243
Male gender	1.22 (0.78–1.90)	0.369	-	-
Single marital status	1.25 (0.59–2.70)	0.555	-	-
Clinical stage of medical training	1.60 (1.04–2.55)	0.031*	1.23 (0.52–2.92)	0.633
Living alone	2.16 (1.09–4.29)	0.027*	1.48 (0.70–3.11)	0.303
Having a part-time job	0.90 (0.43–1.89)	0.782	-	-

Continued.

Factors	Univariate model		Multivariate model	
	OR (95% CI)	P value	OR (95% CI)	P value
Cigarette use	1.28 (0.68–2.42)	0.431	-	-
Alcohol use	1.89 (1.03–3.47)	0.041*	1.37 (0.51–3.69)	0.537
Using smartphone >4 hours per day	3.77 (2.22–6.40)	<0.001*	3.23 (1.81–5.75)	<0.001*
Social media use as the main motivation	4.56 (2.49–8.35)	<0.001*	2.87 (1.68–4.89)	<0.001*

*Statistically significant.

DISCUSSION

The current study presents an estimation of the prevalence and related sociodemographic factors associated with problematic smartphone use among a sample of Iranian medical students. The study findings suggest that the motivation and duration of use are the most important determinants of problematic/non-problematic usage of smartphones among medical students. Different motivations for smartphone use were assessed and, interestingly, academic purposes were the least common motivation to use cellphones by the study participants.

The prevalence of PSU found in this study (66%) is considerably higher than similar studies conducted in Western countries; for example, 24.32% reported by Forster et al in the United States, 16.9% in Switzerland reported by Haug, and 12.5% in a study conducted by Lopez-Fernandez in Spain.[22-24] This might be the result of cultural or environmental factors especially since the prevalence rates get closer to our measure as we move to Eastern countries and specifically in the neighboring countries; for instance, a study by Luk in China reported prevalence rates of 38.5%, and another study by Khalily in Pakistan reported a prevalence rate of 55.7%.[25,26] It could be due to a lack of other entertainment or economic factors restricting access to other activities. Also, this could be the reflection of more fundamental contextual factors such as psychosocial milieu, educational environment, and baseline stress in different aspects of the students' lives. A study conducted by Boumosleh et al suggested that psychological distress including depression and anxiety could strongly predict PSU.[27] It seems that further studies are needed to clarify interactions between environmental, psychosocial, and personal factors associated with PSU and to elucidate effective strategies for reducing its prevalence among university students. Similar to the findings of the present study, results of the study conducted by Haug et al in Switzerland, showed that the strongest factors associated with PSU are the purpose of smartphone use and the total time spent using smartphones in a typical day. According to the mentioned study, students who used their smartphones for longer hours and mainly for social media were more likely to be affected by PSU.[23] Our study findings revealed that students who used smartphones for more than 4 hours per day were 3.32 times more likely to suffer from PSU and those whose main motivation was using social media were 2.87 times more likely to be affected by PSU.

We did not find any significant association between gender and PSU which is in contrast to some studies showing higher rates of smartphone overuse in females but other studies found the same results as we did.[28,29] There was also no significant association between tobacco and alcohol consumption and PSU; this again is similar to some previous studies.[23,27] Our study showed that the students who were living alone were more likely to be problematic smartphone users; this finding suggests that loneliness could act as a predicting factor for PSU but this is not in accordance with the study by Jeong et al which suggested that loneliness is not a predictor of PSU.[30] In summary, students who were living alone, who used their phones for longer periods, and who used them mostly for social media usage are more prone to PSU.

Some limitations to this study should be noted. This research was a cross-sectional study based on students' self-reports and does not provide strong evidence about associations. The study participants were recruited from a single medical school and might not be representative of all Iranian medical students. We did not evaluate some factors which have been suggested as contributing factors to the development of PSU such as anxiety and depression.

CONCLUSION

The very high prevalence of PSU among Iranian medical students raises serious concern about the long-term adverse consequences of excessive smartphone use among this young population. Longitudinal studies are necessary to identify high-risk groups and to define strategies for preventive and health-promoting interventions.

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