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Original Research Article

Prevalence of smartphone addiction and its association with depression, anxiety among university students, Baghdad 2023

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ABSTRACT

Background: Smartphones have simplified our lives and become essential, yet excessive usage may lead to "smartphone addiction". Global youth smartphone addiction is a growing public health concern. Research examines smartphone addiction, depression, anxiety, and depression among university of Baghdad medical and non-medical students. Compare 2 student groups' smartphone addiction rates. Correlate smartphone addiction, anxiety, and depression.
Methods: Comparative cross-sectional research included 383 university of Baghdad students from four colleges. The research included undergraduate university students for a random sampling. From March to June 2023, the smartphone addiction scale-short version (SAS-SV), Beck's depression inventory (BDI), Beck's anxiety inventory (BAI), and sociodemographic were self-reported.
Results: This survey comprised 383 students, 188 (49.1%) from medical institutions and 195 (50.9%) from non-medical colleges. Their ages varied from 18-25, with a mean of 20.8±1.8 years. Most were 20-21 (37.9%) and 260 (67.9%) females. According to SAS-SV cutoffs, 45.17% of medical students and 39.5% of non-medical students were smartphone addicts. Depression affected 38.37% of individuals, ranging from mild (10.7%) to moderate (17.75%) to severe-very severe (9.92%). Survey revealed 50.65% had little anxiety, 31.07 moderate anxiety, and 18.28% severe anxiety. Smartphone addiction significantly correlated with anxiety (p=0.0001) and sadness (p=0.008). Smartphone addiction, anxiety (r=0.29), and depression (r=0.25), among research participants, were positively correlated.
Conclusions: Smartphone addiction was common among study participants, with medical college students being more hooked than non-medical students. Smartphone addiction is correlated with anxiety and despair. Smartphone addiction predicted anxiety and despair.

Keywords: Prevalence, Smartphone, Addiction, Depression, Anxiety, University students

INTRODUCTION

In 2007, the advent of smartphone technology significantly reshaped interactions between people and the outside world. Today, smartphones are integral to communication, socializing, entertainment, financial management, shopping, employment, and education. By 2019, over 3 billion people globally were using smartphones.[1] Smartphone addiction, also known as "pathological smartphone use" or "smartphone dependence," is characterized by uncontrollable use that negatively impacts work, learning, and daily life. This addiction, similar to internet addiction, is marked by compulsive behaviors, tolerance, withdrawal, and functional impairment.[2,3] Unlike mobile phones, smartphones have constant internet access, making them more susceptible to addiction.[2] Smartphone addiction has become a public health issue requiring immediate prevention and

intervention. Research, mostly on college students, indicates rising smartphone use among university students, with millennials (ages 18-34) being the most prevalent users.[4,5] A survey of over 51,000 participants from 32 countries found that 93% of those aged 18-24 owned a smartphone and spent the most time on it.[6] Medical students, in particular, face higher academic and clinical pressures, contributing to smartphone addiction.[4] Kwon et al developed the SAS-SV to measure smartphone addiction through six components: daily-life disturbance, positive anticipation, withdrawal, cyberspace-oriented relationship, overuse, and tolerance.[7] The smartphone addiction proneness scale (SAPS) identifies four symptoms: disruption of adaptive functions, virtual life orientation, withdrawal, and tolerance.[8] The smartphone addiction inventory scale (SPAI) assesses addiction via disregard for negative consequences, preoccupation, inability to control craving, productivity loss, and feelings of anxiety and loss.[9] Research links smartphone addiction to negative emotions, particularly anxiety and depression.[10] Studies show that excessive smartphone users exhibit higher levels of state anxiety, trait anxiety, and depression compared to normal users.[11] Depression, a mood disorder marked by persistent sadness and loss of interest, significantly impairs an individual's ability to function.[12] BDI and EQ-5D commonly used tools for assessing depressive symptoms and health-related quality of life, respectively.[13] Patient health questionnaire is another self-report tool for screening depressive symptoms.[14] Anxiety disorders involve excessive fear and anxiety with behavioral disturbances, including panic attacks.[15] Several instruments, like Hamilton anxiety scale, Goldberg anxiety scale, state-trait anxiety inventory, and BAI, assess anxiety symptoms.[16] Study aims to measure the prevalence of smartphone addiction and depression among students at university of Baghdad, assess association between smartphone addiction and anxiety/ depression, compare addiction rates between medical and non-medical students, and evaluate correlation between smartphone addiction, anxiety, and depression.

METHODS

A comparative cross-sectional study was conducted at the university of Baghdad from March 2023 to June 2023. The study took place in two medical colleges (college of medicine and college of dentistry) and two non-medical colleges (college of languages and college of arts). The study included all students aged 18-26 years enrolled at the university of Baghdad during the academic year 2022-2023. A random sampling of 383 students from the four colleges participated in the study. All participants completed a self-reported questionnaire. Data were collected using a self-reported questionnaire divided into four sections: socio-demographics, SAS-SV, BDI, and BAI.[7,17,18] Participants received a brief explanation on how to complete the questionnaire. Information collected included age, gender, college, academic year, marital status, place of residence, living situation, family size, family income, parents' status, parental education level, parental occupation, purpose of smartphone use, social media preferences, daily hours of smartphone usage, and social habits (smoking, alcohol). Due to poor responses, questions on family income, parental education level, parental occupation, and certain living situations were excluded. Developed by Kwon et al the SAS-SV assesses smartphone addiction through six subscales: overuse, tolerance, positive anticipation, withdrawal, daily life disturbance, and cyberspace-oriented relationships.[7]

The Arabic version of the SAS-SV, validated with a Cronbach's alpha of 0.94, was used. Items are rated on a six-point Likert scale, and scores range from 10 to 60, with cut-off values of 33 for girls and 31 for boys. The BDI is a 21-item self-report measure for depression severity, covering somatic, cognitive, impulsive, and emotional symptoms. Each item is rated on a 0-3 scale, with total scores ranging from 0 to 63. Scores indicate the severity of depression: normal (1-10), mild mood disturbance (11-16), borderline clinical depression (17-20), moderate depression (21-30), severe depression (31-40), and extreme depression (>40). The Arabic version of the BDI, validated for reliability, was used. The BAI is a 21-item Likert-type self-report scale measuring anxiety severity. Items are scored from 0 to 3, with total scores interpreted as low anxiety (0-21), moderate anxiety (22-35), and potentially concerning levels of anxiety (≥36). The Arabic version of the BAI, validated with a Cronbach's alpha of 0.83-0.90, was used. Data were coded and entered into Microsoft Excel and analyzed using SPSS version 26. Categorical data were presented as frequencies and relative frequencies, and continuous data as means±standard deviations (SD). Associations between qualitative data were assessed using chi-square, t tests, ANOVA, or Fisher's exact test as appropriate. Pearson's correlation coefficient measured the strength of relationships between variables. Statistical significance was considered at $p \leq 0.05$. Official approval was obtained from the scientific committee at the department of family and community medicine, college of medicine, university of Baghdad, and Iraqi board for medical specializations. Verbal consent was obtained from students after explaining the study's aims and ensuring confidentiality. Participant anonymity and confidentiality are paramount in research to protect individuals' privacy and personal information. Anonymity ensures that participants' identities remain unknown, even to the researchers, while confidentiality guarantees that any data collected is securely stored and only accessible to authorized personnel. Both measures are essential for maintaining trust and ethical standards in research practices.

RESULTS

In current study, a total of 383 students were included. 188 (49.1%) were from medical colleges, and 195 (50.9%) from non-medical colleges. Their ages ranged between 18 and 25 years, with a mean age of 20.8±1.8 years. The highest percentage was observed in those aged 20-21 years old (37.9%), followed by 260 (67.9%) individuals who

were enrolled in the academic year (1-3). Approximately 68% of them had used their smartphones for >5 hours daily. Additionally, 63 individuals have engaged in smoking/alcohol consumption habits, while 356 participants reside in Baghdad (Table 1).

According to the SAS, 96 (51.1%) of medical students have a significant smartphone addiction, compared to 77 (39.5%) of non-medical students. Students under age of 20 have a significantly higher addiction rate than older students (p=0.011), and students in academic year (1-3) are significantly addicted to smartphones (p=0.048). It was discovered that there were statistically significant associations between smartphone addiction and daily smartphone usage for >5 hours (p=0.0001). Smoking had a statistically significant association with smartphone addiction in this study (p=0.039). There is no significant association between gender, marital status, residency, living situation, family members, or parental status and smartphone addiction (Table 2).

Table 1: Distribution of participants according to sociodemographic data.

Variables		N	Percentage (%)
Gender	Female	260	67.9
	Male	123	32.1
College	Medical	188	49.1
	Non-medical	195	50.9
Marital status	Ever married	20	5.2
	Single	363	94.8
Academic years	1-3	261	68.2
	4-6	122	31.8
Living condition	Dormitory	20	5.2
	Lives with family	363	94.8
Family members	<5	175	45.7
	≥5	208	54.3
Status of parents	Both parents alive	342	89.3
	One of the parents dead	41	10.7
Hours of smartphone use daily	<5	151	39.4
		232	60.6
Smoking	No	320	83.6
	Yes	63	16.4
Alcohol	No	370	96.6
	Yes	13	3.4
Residency	Baghdad	356	93
	Other governorate	27	7

Table 2: Association between SAS and sociodemographic characteristics of participants.

Variables		SAS, N (%) Normal	Addict	P value
Colleges	Medical	92 (48.9)	96 (51.1)	0.024*
	Non-medical	118 (60.5)	77 (39.5)	
Gender	Female	151 (58.1)	109 (41.9)	0.08
	Male	59 (48)	64 (52)	
Marital status	Ever married	14 (70)	6 (30)	0.17
	Single	196 (54)	167 (46)	
Residency	Baghdad	191 (53.7)	165 (46.3)	0.11
	Other governorate	19 (70.4)	8 (29.6)	
Academic years	1-3	134 (51.3)	127 (48.7)	0.048*
	4-6	76 (62.3)	46 (37.7)	
Living status	Dormitory	12 (60)	8 (40)	0.8
	Lives with family	198 (54.5)	165 (45.5)	
Family members	<5	97 (55.4)	78 (44.6)	0.8
	≥5	113 (54.3)	95 (45.7)	
Status of parents	Both parents alive	25 (61)	16 (39)	0.7

Continued.

Variables		SAS, N (%) Normal	Addict	P value
	One of the parents dead	185 (54.1)	157 (45.9)	
Hours of smartphone use daily	<5	102 (67.5)	49 (32.5)	0.0001*
	≥5	108 (46.6)	124 (53.4)	
Smoking	No	183 (57.2)	137 (42.8)	0.039*
	Yes	27 (42.9)	36 (57.1)	
Alcohol	No	202 (54.6)	168 (45.4)	0.8
	Yes	8 (61.5)	5 (38.5)	
Age (in years); (Mean±SD)	Normal	21.04±1.7		0.011**
	Addict	20.58±1.7		

*Statically significant association (x^2 test, df=1, p<0.05). **Statistically significant difference (Students' t test, df=361.7, p<0.05).

Table 3: Association between BAI and sociodemographic characteristics of participants.

Variables		BAI, N (%) Low	Moderate	Severe	P value
Colleges	Medical	101 (53.7)	52 (27.7)	35 (18.6)	0.35
	Non-medical	93 (47.7)	67 (34.4)	35 (17.9)	
Gender	Female	119 (45.8)	81 (31.2)	60 (23.0)	0.001*
	Male	75 (61)	38 (30.9)	10 (8.1)	
Marital status	Ever married	6 (30)	11 (55)	3 (15)	0.05
	Single	188 (51.8)	108 (29.8)	67 (18.5)	
Residency	Baghdad	180 (50.5)	111 (31.2)	65 (18.3)	0.9
	Other governorate	14 (51.9)	8 (29.6)	5 (18.5)	
Academic years	1-3	125 (47.9)	81 (31)	55 (21.1)	0.09
	4-6	69 (56.6)	38 (31.1)	15 (12.3)	
Living status	Dormitory	11(55)	6 (30)	3 (15)	0.9
	Lives with family	183 (50.4)	113 (31.1)	67 (18.5)	
Family members	<5	97 (55.4)	49 (28)	29 (16.6)	0.23
	≥5	97 (46.6)	70 (33.7)	41 (19.7)	
Status of parents	Both parents alive	20 (48.8)	15 (36.6)	6 (14.6)	0.66
	One of the parents dead	174 (50.9)	104 (30.4)	64 (18.7)	
Hours of smartphone use daily	<5	87 (57.6)	41 (27.2)	23 (15.2)	0.08
	≥5	107 (46.1)	78 (33.6)	47 (20.3)	
Smoking	No	155 (48.4)	100 (31.3)	65 (20.3)	0.043*
	Yes	39 (61.9)	19 (30.2)	5 (7.9)	
Alcohol	No	191 (51.6)	110 (29.7)	69 (18.6)	0.01*
	Yes	3 (23.1)	9 (69.2)	1 (7.7)	

*Statically significant association (x^2 test, df=2, p<0.05).

Table 4: Difference in mean age (in years) among participants with different severity of anxiety.

Age (in years); (Mean±SD)	BAI Low	Moderate	Severe	P value
	20.97±1.7	20.95±1.9	20.24±1.5	0.008*

*Statically significant association (ANOVA test, DF=2, p<0.05).

Table 5: Association between BDI and sociodemographic characteristics of participants.

Variables		BDI, N (%) Normal	Mild	Moderate	Severe-very severe	P value
Colleges	Medical	23 (12.2)	38 (20.3)	111 (59)	16 (8.5)	0.4
	Non-medical	18 (9.2)	30 (15.4)	125 (64.1)	22 (11.3)	

Continued.

Variables		BDI, N (%)				P value
		Normal	Mild	Moderate	Severe-very severe	
Gender	Female	29 (11.0)	54 (20.8)	155 (59.7)	22 (8.5)	0.09
	Male	12 (9.8)	14 (11.3)	81 (65.9)	16 (13)	
Marital status	Ever married	1 (5)	0 (0)	14 (70)	5 (25)	0.024*
	Single	40 (11)	68 (18.7)	222 (61.2)	33 (9.1)	
Residency	Baghdad	39 (11)	63 (17.7)	217 (61)	37 (10.3)	0.6
	Other governorate	2 (7.4)	5 (18.5)	19 (70.4)	1 (3.7)	
Academic years	1-3	25 (9.6)	50 (19.2)	161 (61.6)	25 (9.6)	0.6
	4-6	16 (13.0)	18 (14.8)	75 (61.5)	13 (10.7)	
Living status	Dormitory	3 (15)	4 (20)	12 (60)	1 (5)	0.9
	Lives with family	38 (10.5)	64 (17.6)	224 (61.7)	37 (10.2)	
Family members	<5	20 (11.4)	31 (17.7)	108 (61.7)	16 (9.2)	0.9
	≥5	21 (10.1)	37 (17.8)	128 (61.5)	22 (10.6)	
Status of parents	Both parents alive	3 (7.3)	8 (19.5)	30 (73.2)	0 (0)	0.1
	One of the parents dead	38 (11.1)	60 (17.6)	206 (60.2)	38 (11.1)	
Hours of smartphone use daily	<5	11 (7.3)	23 (15.2)	105 (69.6)	12 (7.9)	0.07
	>5	30 (12.9)	45 (19.4)	131 (56.5)	26 (11.2)	
Smoking	No	37 (11.6)	58 (18.1)	199 (62.2)	26 (8.1)	0.048*
	Yes	4 (6.3)	10 (15.9)	37 (58.7)	12 (19)	
Alcohol	No	41 (11.1)	64 (17.3)	233 (63)	32 (8.3)	0.0001*
	Yes	0 (0)	4 (30.8)	3 (23.1)	6 (46.1)	

*Statically significant association (x^2 test, df=3, p<0.05).

Table 6: Difference in mean age (in years) among participants with different severity of depression.

Age (in years); (Mean±SD)	BDI				P value
	Normal	Low	Moderate	Severe-very severe	
	20.87±1.7	20.85±1.6	20.54±1.8	21.05±2	0.5

Table 3: Association between SAS-SV and BDI, BAI.

Variables		SAS, N (%)		P value
		Normal	Addict	
BDI	Moderate normal mild	26 (38.2)	42 (61.8)	0.0001*
		150 (63.6)	86 (36.4)	
	severe-very severe	20 (48.8)	21 (51.2)	
		14 (36.8)	24 (63.2)	
BAI	Low	120 (61.9)	74 (38.1)	0.008**
	moderate	61 (51.3)	58 (48.7)	
	severe	29 (41.4)	41 (58.6)	

*Statically significant association (x^2 test, df=3, p<0.05). **Statically significant association (x^2 test, df=2, p<0.05).

According to BAI there was significant association between anxiety and gender; 81 (31.2%) of female students have moderate anxiety, compared to 38 (39.9%) of male students, with p=0.001. In addition to significant association of anxiety with smoking and alcohol consumption, 19 (30.2%) of students who smoke have significantly moderate anxiety (p=0.043), 9 (69.2%) of students who consume alcohol have moderate anxiety (p=0.01). There was no significant association between (type of college, marital status, residency, academic years, living status, family members, parents' status, and hours of smartphone use daily) and anxiety (Table 3).

Table 4 highlighted that the anxiety was lower among younger students compared to older ones (p=0.008).

Table 5 displayed that there was a significant association between marital status and depression (p=0.024). The 222

(61.2%) of single students have significantly moderate depression, and 14 (70%) of ever-married students have significantly moderate depression. There was a statistically significant association between depression, smoking, and alcohol consumption; 37 (58.7%) of students who smoked had moderate depression (p=0.048), while 6 (46.1%) of students who consumed alcohol experienced severe or very severe depression (p=0.0001). Depression was not significantly associated with any of the following variables: gender, place of residence, academic years, living arrangement, family members, parental status, or amount of time spent using a smartphone each day.

Table 6 showed that there was no association between age and depression according to BDI.

Finally, there is a significant association between smartphone addiction and depression (p=0.0001) and anxiety (p=0.008). The 24 (63.2%) of students have severe-very severe depression associated with smartphone addiction, while 21 (51.2%) have mild depression associated with smartphone addiction. Additionally, 41 (58.6%) of students have severe anxiety associated with smartphone addiction, while 58 (48.7%) have moderate anxiety associated with smartphone addiction (Table 7)

DISCUSSION

Globally, the internet and smartphones have become incredibly popular, profoundly altering culture and society in both positive and negative ways. Young people have become a more vulnerable group as they spend the majority of their time on smartphones.[19] This study was an important step in understanding the association between smartphone addiction and the sociodemographic and psychological effects of smartphone addiction on university students in Iraq. The study results revealed that smartphone addiction affects 45.17% of the participants. This is in line with the findings of many studies across different countries, such as Lebanon (44.6%), Egypt (44.7%).[20,21] A higher prevalence of smartphone addiction was found in Jordan (56.7%) and Saudi Arabia (67%).[22,23] The high prevalence of smartphone addiction among these studies' participants may be explained by the data collection technique, which was through Facebook, WhatsApp, and other social media platforms, as well as student email addresses, which were used to contact and invite university students to participate in these studies. The prevalence of addiction was 51.1% among medical students, which is consistent with a study conducted at Mansoura university's faculty of medicine in Egypt (53.6%) and another study in Sharjah, United Arab Emirates (56.2%).[24,25] A study was performed in Duhok City, Kurdistan region, Iraq, in five medical science colleges (Medicine, nursing, dentistry, pharmacy, and health sciences), which revealed a higher rate of addiction (78.3%).[26] This could be explained by the fact that their study was done during the COVID-19 pandemic, given the abundance of educational material available on the internet and remote learning during the COVID-19 pandemic. In the current study, students under the age of 20 have significantly higher addiction rates than older students. In a meta-analysis of 108 studies, 78% of the studies examined adolescents and young adults, consistently reporting higher prevalence rates of smartphone addiction among this age group than among older adults. The developmental stage of younger people is an important factor that contributes to their susceptibility to smartphone addiction. Adolescence and young adulthood are important periods for identity formation and social interaction. At this point, young people are more likely to seek social validation, peer acceptance, and a sense of belonging. Smartphones provide a way to meet these needs by providing constant access to social media and online communities.[27] The current study indicated that 53.4% of students who use their smartphones for five hours or more per day were significantly addicted; similarly, another study suggested that smartphone-addicted participants were more likely to use their smartphones for more than six hours.[23] The study discovered that 57.1% of students who smoked were addicted to smartphones; this is consistent with a study conducted among a sample of Arabic students from different countries (Saudi Arabia, Jordan, Egypt, Kuwait, Algeria, Bahrain, Iraq, Lebanon, Afghanistan, Ethiopia, Fiji, Cyprus, Australia, England, the United States and Canada) that revealed that 41.5% of the smokers in this study were addicted to their smartphones.[28] This study found no association between gender and smartphone addiction (41.9% in females, 52% in males, p>0.05). This is similar to the findings of some previous studies.[23,29] Some studies discovered that female students were more likely to be smartphone-addicted than male students.[30] However, other studies discovered that male students were at high risk of smartphone addiction.[31] There was a statistically significant association between depression, anxiety, and smartphone addiction (p<0.05). This is consistent with another study conducted in Saudi Arabia.[32] A systematic review of 23 peer-reviewed papers reported that depression was consistently associated with problematic smartphone use.[33] A study among college students in Turkey found significant relationship between smartphone use and depression and anxiety, indicating that higher levels of phone use were correlated with increased symptoms of depression and anxiety.[34] Similar findings were observed in a study conducted among students in Lebanon, where a positive association was identified between smartphone addiction, anxiety, and depression. Both anxiety and depression were found to be independent positive predictors of smartphone addiction.[5]

Limitations

Common limitations of all studies include potential biases in data collection/analysis, limited generalizability of findings due to sample size/demographic restrictions, and possibility of uncontrolled variables influencing results. Additionally, studies may face constraints related to time, resources, and ethical considerations, impacting the depth and scope of research.

CONCLUSION

The study found a high prevalence of smartphone addiction among participants, with medical students more affected than non-medical students. Key risk factors included younger age, over 5 hours of daily use, and smoking. There was a significant association and positive correlation between smartphone addiction and anxiety and depression.

Recommendations

Encouraging student participation in social activities helps develop communication, emotional regulation, and social adjustment skills through games and social skills training. Raising awareness about the long-term health effects of smartphone addiction in young adults is crucial. Family, school, and society are vital domains for students, and coordinated interventions among them are essential for holistic development.

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