








Investigating the Relationship between the Use of Mobile Phones and the Level of Anxiety, Depression, and Stress of First-secondary School Students

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Abstract:

Introduction: Today, mobile phones as a means of communication play an important role in people's lives and affect different aspects of life, so this study was conducted to investigate the relationship between the use of mobile phones and the level of stress of first-secondary students in Jiroft city.

Materials and Methods: The present study is a cross-sectional study [descriptive-analytical] that was conducted to investigate the relationship between the use of mobile phones and the level of stress among students of the first secondary school in Jiroft city. The data collection tool was a questionnaire, and data analysis were performed using SPSS version 20 software. Descriptive statistics were used to calculate the mean, median, and frequency percentage, and chi-square and independent t-tests were to calculate the analytical statistics.

Results: This study showed the relationship between the daily use of mobile phones and the intensity of subscales. There was a statistically significant relationship between anxiety, stress, and depression and the use of mobile phones at the 5% level.

Conclusion: According to the results of the research, the use of mobile phones among secondary school students can have a destructive effect on their psyche therefore, the amount of mobile phone use among students is directly related to their stress and anxiety.

Keywords: Mobile phones, Anxiety, Depression, Stress, First-secondary school students.

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1. INTRODUCTION

Currently, with recent advances in technology, mobile phones have taken an important part of people's lives and have found an important place in their lives [1, 2]. With the advancement of science and technology, many

capabilities such as sound recording, photography, video recording, and Internet connection have been added to this small object, which has made its position more valuable and stronger among people [3].

Currently, the mobile phone has found an important

place among teenagers which has many uses, but the negative aspects and harmful effects on their lives cannot be ignored. The use of the mobile phone causes people to stay awake at night and communicate with others. It creates emotional dependence so that people think they are no longer able to live without using mobile phones, and this can have negative effects on the physical and mental health of users [4-6].

Excessive use of this small object can be associated with many psychological and physical injuries. It causes physical damage such as eye pain, headache, skin diseases, vision impairment, sleep impairment, and other problems. Furthermore, using a cell phone while performing other activities, such as driving, can have irreparable consequences [7]. Many schools have banned the use of mobile phones in the school environment, however, schools around the world have not been able to prevent the use of mobile phones in the school environment. School policies banning the use of cell phones in the school affect the amount of cell phone use at school, but not on the level of interest in cell phones [8]. Therefore, it is necessary to take comprehensive measures to reduce the dependence on mobile phones in teenagers and prevent its negative effects. Mobile phone addiction shows a distinct user profile that differentiates it from internet addiction, and also, problematic use of cell phones is associated with personality variables such as extroversion, neuroticism, self-esteem, impulsivity, self-identity, and self-concept. Similarly, sleep disturbance, anxiety, stress, and, to some extent, depression, which are also associated with internet abuse, are associated with problematic cell phone use [9]. In addition, there is a symbiotic relationship between problematic cell phone use and substance use, such as tobacco, alcohol, and drug use [10].

Separation from a mobile phone induces behavioral and physiological stress, proximity-seeking behavior, and attentional bias to separation-related stimuli for individuals with higher mobile phone dependence [11]. On the other hand, there is a negative relationship between the excessive use of mobile phones with academic performance and students' motivation to improve [12].

Unfortunately, there is limited information about the use of mobile phones and the stress caused by them in the student age group. Various studies have investigated the relationship between the use of mobile phones and addiction and the use of mobile phones in the age group of students and its consequences. Furthermore, due to the importance of this issue, no study has been conducted on the relationship between using mobile phones and causing stress, anxiety, and depression in students, so this study was conducted to investigate the relationship between the use of mobile phones and the level of stress of first-secondary students in Jiroft City, of Iran in 2022.

2. METHODS

The present study is a cross-sectional study (descriptive-analytical) that was conducted to investigate the relationship between the use of mobile phones and the

level of anxiety, depression, and stress among students of the first secondary level of Jiroft City in 2022. The Sampling was performed using the random cluster method. After gathering the information on the number of girls' and boys' schools from education, the required number of clusters from different areas of the city were randomly selected, and before filling out the questionnaire, the objectives of the study were explained to the student's parents (father or mother) to comply with ethical considerations, and they could also participate voluntarily and were assured that this information would remain confidential with the researcher.

The inclusion criteria were informed consent and having a mobile phone with an internet connection, and the exclusion criteria included not agreeing to participate in the study and not completing the questionnaire. A questionnaire was prepared for Depression Anxiety Stress Scales (DASS-21). It included demographic characteristics and 21 questions, and its validity and reliability were also measured. The questionnaire in this research has 2 sections, the first section includes demographic information (age, gender, place of residence, housing status, economic status of the family, father's occupation, mother's occupation, and sleeping hours) and the second section includes the standard DASS questionnaire to investigate anxiety, stress, and depression in students. The standard questionnaire, DASS, has 21 questions, which are divided into three subscales of 7 questions for anxiety, stress, and depression. This questionnaire is also according to the Likert scale and has the options of not at all, low, medium, and high, where the lowest score for each question is "0," and the highest score is "3," with scores of 21 and above in the depression subscale, 15 and above in the subscale anxiety and 26 and above in the stress subscale are considered more than normal. In Iran, the reliability of this scale in a population sample of 400 people has been reported as 0.7 for depression, 0.66 for anxiety, and 0.76 for stress. They also reported the internal consistency of the scale through Cronbach's alpha, which is 0.94 for depression, 0.76 for anxiety, and 0.89 for stress [13].

The questionnaire that was given to the individuals was anonymous, and they were assured that the information would remain confidential. The results of the research will be presented to the participants if they wish to review them. The questionnaire was given with the consent and coordination of the students' families. Finally, the researcher tried not to cause any disturbance or damage to the students' lessons and health respectively. The questionnaire was given to the students voluntarily with their consent. Before giving the questionnaire to the students, a summary of the research, objectives, and necessity of the study was explained to them. This study was approved with the ethical code IR.JMU.REC.1400.071 in Jiroft university of medical sciences. Considering the confidence factor of 95% and the test accuracy of 0.05, the sample volume was calculated using the sample volume calculation formula with a probability of about 10% drop. The data analysis were performed using SPSS version 20

software. The descriptive statistics were used to calculate the mean, median, and frequency percentages, and for comparing frequencies or proportions in different groups, the chi-square Test and independent sample T-tests were used for comparing the means of two independent groups to determine if there is a significant difference between them.

3. RESULTS

Table 1 provides a summary of demographic characteristics for the 124 participants in the study. The age of the participating students in this research ranges from 12 to 16 years, with a mean of 14.45 and a standard deviation of 1.04 years.

According to the gathered data, 29 individuals (23.4%) did not own a personal mobile phone, while 91 students (73.4%) had their mobile phones. The ownership status of

mobile phones for 4 students remained unspecified. Based on reports, students use mobile phones approximately between 0 to 15 hours during the day and night. The mean approximate duration of mobile phone usage among students is 3.97 ± 1.55 hours, with a median of 4 hours. This duration is 5.65 ± 3.89 hours for individuals who own a mobile phone and 2.74 ± 2.78 hours for students who do not own a mobile phone.

Tables 2 and 3 present a summary of scores obtained from the DASS questionnaire for 124 respondent students. Each subscale can yield a score between 0 and 42 points. Considering the variation in concentration values across subscales and using the Kolmogorov-Smirnov test, it can be stated that students's scores in the depression, anxiety, and stress subscales do not follow a normal distribution.

Table 3 also reports the frequency and percentage frequency of severity in each subscale.

Table 1. Statistical summaries of demographic characteristics of study participants.

Variable	Group	Frequency (%)
Age (years)	12	3 (2.4)
	13	21 (16.9)
	14	34 (27.4)
	15	42 (33.9)
	16	19 (15.3)
	Missing	5 (4)
Gender	Female	88 (71)
	Male	33 (26.6)
	Missing	3 (2.4)
Father's Education	Under diploma	47 (37.9)
	Diploma	39 (31.5)
	Bachelor's degree	21 (16.9)
	Master's or Doctoral degree	11 (8.9)
	Missing	6 (4.8)
Mother's Education	Under diploma	26 (21)
	Diploma	40 (32.3)
	Bachelor's degree	42 (33.9)
	Master's or Doctoral degree	10 (8.1)
	Missing	6 (4.8)
Father's Job	Unemployment	4 (3.2)
	Self-Employment	41 (33.1)
	Employee	25 (20.2)
	Farmer	41 (33.1)
	Other	8 (6.5)
	Missing	5 (4)
Mother's Job	Housewife	94 (75.8)
	Employee	23(18.5)
	Other	2 (1.6)
	Missing	5 (4)
Monthly Income (US Dollar)	100 <	34 (27.4)
	100-200	51 (41.1)
	200-250	14 (11.3)
	250 <	20 (16.1)
	Missing	5 (4)

Table 2. Summary statistics of scores obtained from the DASS questionnaire.

Subscale	Mean ± SD	Median	Maximum	Minimum
Depression	11.87 ± 11.89	8	42	0
Anxiety	9.23 ± 9.69	6	38	0
Stress	13.68 ± 11.77	10	42	0
Total	34.77 ± 31.57	22	112	0

Table 3. Frequency and percentage of intensity in DASS questionnaire subscales.

Subscale	Normal	Mild	Moderate	Severe	Very Severe	Total
Depression	73[58.9%]	12[9.7%]	14[11.3%]	5[4%]	20[16.1%]	124[100%]
Anxiety	65[52.4%]	12[9.7%]	20[16.1%]	10[8.1%]	17[13.7%]	124[100%]
Stress	82[66.1%]	10[8.1%]	10[8.1%]	9[7.3%]	13[10.5%]	124[100%]

The mean daily mobile phone usage in male and female students were 4.83[4.051] and 5.55 (3.227), respectively, but the difference was not significant, and the Mean daily mobile phone usage scores of students show no statistically significant differences across age groups, Father's Education, Mother's Education, Father's job, Mother's job (in all cases $p > 0.05$) and regarding Income

and Personal mobile phone were significant (P -value < 0.001) (Table 4).

Table 5 displays the relationship between daily mobile phone usage and the intensity of subscales. It is observed that there is a statistically significant relationship at the 5% level between anxiety, stress, and the level of mobile phone usage.

Table 4. Investigation of the relationship between daily mobile phone usage and demographic variables.

Variable	Group	N	Daily Mobile Phone usage Mean (SD)	P-value
Sex	Female	88	(4.051)4.83	0.81
	Male	33	5.55 (3.227)	
Age	12	3	4.67 (2.309)	0.056
	13	21	5 (4.135)	
	14	34	4.74 (3.403)	
	15	42	4.19 (3.129)	
Father's Education	16	19	8.5 3 (5.389)	0.169
	Under diploma	47	6.05 (4.470)	
	Diploma	39	4.21 (3.960)	
	Bachelor's degree	21	4.40 (2.601)	
Mother's Education	Master's or Doctoral degree	11	4.36 (1.120)	0.436
	Under diploma	26	4.37 (2.152)	
	Diploma	40	5.25(5.365)	
	Bachelor	42	5.18(3.425)	
Father's job	Master or Doctoral	10	4.80 (1.398)	0.533
	Unemployment	4	3.25 (2.217)	
	Self-Employment	41	4.60 (3.947)	
	Employee	25	4.28 (2.504)	
	Farmer	41	5.91 (4.658)	
Mother's job	Other	8	5.13 (2.167)	0.988
	Housewife	94	4.98 (3.94)	
	Employee	23	5.04 (3.74)	
Income	Other	2	4 (1.414)	0.004
	Less than 5 million	34	3.18 (2.620)	
	Between 5 and 10 million	51	6.23 (4.239)	
	Between 10 and 15 million	14	4 (1.468)	
Ownership of mobile phone	More than 5 million	20	5.53 (4.549)	< 0.001
	Yes	91	5.65 (3.890)	
	No	29	2.74 (2.776)	

Table 5. Investigation of the relationship between daily mobile phone (based on hours per day) usage and intensity of DASS subscales.

Intensity Subscale		Normal	Mild	Moderate	Severe	Very Severe	p-value
Depression	< 4 (hours per day)	39 (53.4%)	5 (41.7%)	3 (21.4%)	0 (0%)	7 (35%)	0.064
	4 - 9	28 (38.4%)	5 (41.7%)	8 (57.1%)	4 (80%)	8 (40%)	
	> 9 (hours per day)	6 (8.2%)	2 (16.7%)	3 (21.4%)	1 (20%)	5 (25%)	
	Total	73 (100%)	12 (100%)	14 (100%)	5 (100%)	20 (100%)	
Anxiety	< 4 (hours per day)	33 (50.8%)	5 (41.7%)	6 (30%)	7 (70%)	3 (17.6%)	0.021
	4 - 9 (hours per day)	28 (43.1%)	4 (33.3%)	9 (45%)	3 (30%)	9 (52.9%)	
	> 9 (hours per day)	4 (6.2%)	3 (25%)	5 (25%)	0 (0%)	5 (29.4%)	
	Total	65 (100%)	12 (100%)	20 (100%)	10 (100%)	17 (100%)	
Stress	< 4 (hours per day)	43 (52.4%)	4 (40%)	1 (10%)	3 (33.3%)	3 (23.1%)	0.008
	4 - 9 (hours per day)	28 (34.1%)	5 (50%)	9 (90%)	6 (66.7)	5 (38.5%)	
	> 9 (hours per day)	11 (13.4%)	1 (10%)	0 (0%)	0 (0%)	5 (38.5%)	
	Total	82 (100%)	10 (100%)	10 (10%)	9 (100%)	13 (100%)	

4. DISCUSSION

The purpose of this study was to determine the relationship between the use of mobile phones and the level of anxiety, depression, and stress of secondary school students, which statistically showed a significant relationship between anxiety and stress and the level of mobile phone use, as well as the occupation and education of the mother and the economic status of the family. Moreover, a statistically significant relationship was shown between students' anxiety, depression, and stress.

The findings of the study showed that the duration of using mobile phones for students who owned phones was almost twice as long as those who did not own them. In the study by Nikhita *et al.*, students who had a smartphone had a statistically significant dependence on mobile phones, and they used mobile phones for a longer period compared to students who did not have a smartphone [14]. The percentage of depression, anxiety, and very severe stress among students was 20 [16.1%], 17 [13.7%] and 13 [10.5%], respectively. This rate of severe depression among students is much higher than normal. The results of Bano *et al.* in Saudi Arabia were also the same as our study [15]. There was the highest frequency of depression among students, and this finding was not consistent with other studies, perhaps because a study has not been carried out exactly on this age, the findings of other studies showed the highest prevalence of anxiety [16, 17].

In Gao *et al.*'s (2018) study, alexithymia not only had a direct positive effect on cell phone addiction but also had an indirect effect on cell phone addiction through depression, anxiety, or stress [18]. Alexithymia is an important correlate of cell phone addiction, and depression, anxiety, or stress are important mediators of this relationship [18, 19]. Alexithymia is associated with depression, anxiety, stress, life dissatisfaction, self-reported health complaints, worrying/ruminating thoughts, suicidality, and aggression [20-23].

In the present study, there was a significant difference between the amount of mobile phone use among students that, mostly in high-income families, the use of mobile

phones in children was more. In the study of Kılıç *et al.* (2019), it was shown that there was an inverse relationship between the frequency of tablet use and family income [24]. These results can be related to cultural factors that need more research.

Furthermore, our study showed that there are no statistically significant differences across age groups, Father's Education, Mother's Education, Father's job, and Mother's job, which is consistent with the study of Paudel *et al.* and colleagues [25].

This study showed a relation between the ownership of mobile phones and use of mobile phones, which had a significant relationship that was consistent with the study of Pratama, Ahmad R, and colleagues [26], which showed that logical results can be affected by available mobile phones.

The relationship between the amount of daily use of mobile phones and the intensity of subscales of the DASS questionnaire showed that there is a statistically significant relationship between anxiety and stress and the amount of use of mobile phones. This means that as the amount of mobile phone usage increases among students, the stress and anxiety of the students also increase, so with a relatively simple solution, planning and using mobile phones according to the plan, stress and anxiety can be reduced to a large extent. This is in line with other studies as the results of Gökçearsan *et al.*'s study showed the use of smartphones and stress among students [27], and the results of Kim *et al.*'s study on students were also in line with our study [28]. However, about students' depression, no statistically significant relationship was observed with the amount of students' use of mobile phones. This finding was not consistent with the results of some studies. Li *et al.*'s study showed a significant relationship between the amount of mobile phone use and depression among teenagers [29].

CONCLUSION

According to the results of the research, it can be concluded that the use of mobile phones among high school students can have a destructive effect on their

psyche, so the amount of mobile phone use among students is directly related to their stress and anxiety. However, for these students, other factors such as the family's economic status, the mother's education, and the mother's job can aggravate this problem. There is a direct or, in some cases, indirect relationship between the high amount of cell phone use and adverse physical, mental, and social health effects, especially stress, anxiety, depression, drug addiction, smoking and alcohol, withdrawal, alexithymia, and mood disorders, and it is necessary to implement strategies such as educating parents and students, making policies and implementing policies in schools, and creating healthy entertainment for students to prevent the effects of excessive use of mobile phones. It is suggested to carry out interventional studies to measure the effect of training on the correct use of mobile phones and the implementation of policies.

AUTHORS' CONTRIBUTION

It is hereby acknowledged that all authors have accepted responsibility for the manuscript's content and consented to its submission. They have meticulously reviewed all results and unanimously approved the final version of the manuscript.

LIST OF ABBREVIATION

DASS = Depression Anxiety Stress Scales

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved with the ethical code IR.JMU.REC.1400.071 in Jiroft University of Medical Sciences, Jiroft Iran.

HUMAN AND ANIMAL RIGHTS

All procedures performed in studies involving human participants were in accordance with the ethical standards of institutional and/or research committees and with the 1975 Declaration of Helsinki, as revised in 2013.

CONSENT FOR PUBLICATION

Informed consent was obtained from all participants of this study.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The data and supportive information are available within the article.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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