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Prevalence of mobile phone addiction and poor mental health, and factors associated with mental health among medical students in Southeast Iran

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Abstract

Background Mobile phone addiction is on the rise among various populations, particularly among the younger generations. This phenomenon can significantly impact various aspects of life, particularly mental health. This study aimed to examine the prevalence of mobile phone addiction and mental health, as well as the associated factors of mental health among medical students in southeast Iran in 2023.

Methods Using stratified sampling, 365 students from the Kerman University of Medical Sciences were included from May to June 2023. The data collection tool comprised a questionnaire assessing general health (GHQ-28), mobile phone addiction, and social support. Logistic regression was used to examine the associated factors of mental health.

Results The prevalence of mobile phone addiction and poor mental health among students was 46.6% (95% Confidence Intervals [CI]: 41.4; 51.7) and 52.9% (95% CI: 47.7; 57.9), respectively. The results of the multivariable logistic regression analysis indicated that individuals with mobile phone addiction had higher odds of experiencing a poor mental health situation (Adjusted Odds Ratio [aOR] = 2.01; 95% CI: 1.30, 3.09). Conversely, participants with higher social support scores were less likely to have poor health (aOR = 0.95; 95% CI: 0.94, 0.97).

Conclusion We found a high prevalence of mobile phone addiction. Considering the association between mobile phone addiction and mental health, it is necessary to prevent the complications and risks caused by mobile phone addiction; it requires educational planning, counseling, and behavior among vulnerable students.

Keywords Prevalence, Mobile phone addiction, Mental health, Medical student, Iran

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Introduction

Mobile phones have become an essential element of modern life. Every age group directly uses mobile phones, and they now offer available features. It has also proven its effectiveness in the lives of teenagers and youths. However, this tool has also brought many problems [1, 2]. Mobile phones are a double-edged sword that facilitates our modern life and may cause a series of worrying problems due to overuse or even addiction to mobile phones [3]. Mobile phone addiction (MPA) is defined as the inability to regulate mobile phone use, which ultimately leads to negative consequences in daily life [4].

Research suggests that college students are particularly susceptible to MPA. The prevalence of MPA among this demographic has exhibited significant variation across previous studies, primarily due to differences in measurement instruments and the composition of study populations [5]. A meta-analysis in China estimated that the average prevalence of MPA among Chinese students was approximately 23% [6]. In Iran, the MPA prevalence among students has been reported to be relatively high. For example, the prevalence of MPA among university students in Tehran was 10%, and 18% in Birjand [7, 8]. In some studies, it has been reported that MPA leads to various mental disorders [9–11].

The incidence of mental health problems has increased worldwide [12]. According to the World Health Organization (WHO), mental health is a state in which people know their abilities. They can cope with the everyday stresses of life, be fruitful for society, make decisions, and participate collectively. Therefore, mental health is the basis for the well-being and health of individuals and society [13]. Among the most important mental health problems that people face are depression, social anxiety, and sleep disorders. The depressive disorder involves a depressed mood or loss of pleasure or interest in activities for a long time. This disorder can affect all aspects of life, including relationships with family, friends, and society. This can result from or lead to problems at school and work. Depression includes many symptoms in cognitive and emotional domains that start from mild levels and progress to severe levels [2, 14]. Social anxiety disorder means fear of social interactions, especially with unfamiliar people, so its prevalence in young people is reported to be 19–33% [15].

MPA could be one of the factors associated with mental health disorders. Studies have revealed that individuals experiencing depression are more inclined to spend their leisure time engaged with their mobile phones. For those who are depressed, mobile phones serve as an avenue for escaping from problems, feelings of boredom, guilt, loneliness, anxiety, or depression. Individuals experiencing high social anxiety and struggling to establish real-world social connections often seek solace in virtual

social networks. By turning to mobile phones and participating in virtual social platforms, they endeavor to compensate for the limitations in their offline relationships. Consequently, their reliance on and addiction to mobile phones tend to intensify [16].

Several studies have shown that students who excessively use mobile phones exhibit symptoms such as headache, fatigue, anxiety, insomnia, restlessness, anger and irritability, lack of concentration, and efforts to maintain academic performance. Additionally, excessive cell phone use, coupled with a negative attitude and dependence on this device, may increase the risk of anxiety and depression [17, 18]. During the COVID-19 pandemic, a significant portion of the population increased their mobile phone usage hours due to access to various pandemic-related information and the demand for online studying and remote work. This rise in mobile phone usage has contributed to the rise in MPA among different populations, particularly youth. There are a few studies that assessed the prevalence of MPA and mental health and associated factors of mental health among Iranian students. All studies were conducted before the COVID-19 pandemic, and there is no comprehensive study in this area after the pandemic in Iran. So, this study aimed to investigate the prevalence of MPA and mental health. Moreover, we assessed the associated mental health factors in an academic sample in Kerman, southeast Iran.

Methods

Study design and setting

This cross-sectional study was conducted among 365 Kerman University of Medical Sciences students from May to June 2023. The eligibility criteria were being students at the Kerman University of Medical Sciences. With nine schools, Kerman University of Medical Sciences, is the largest medical university in southeast Iran. The university hosts more than 5,000 students in various medical science majors and employs around 600 academic staff. The exclusion criteria included lack of consent to participate in the study and failure to complete the questionnaires.

Sampling methods

A sample size of 365 out of 5,391 students was selected using stratified sampling across all academic levels. The sample size was calculated using the below formula to detect the prevalence of mobile addiction. Where n =sample size, Z = Z statistic for a level of confidence (1.96 for 95%CI), S =standard deviation (15.34), d =precision (1.5) [19].

$$n = \frac{z_{1-\frac{\alpha}{2}}^2 s^2}{d^2}$$

The students were randomly selected after dividing the total samples among different grades. After the explanation and the consent form had been obtained, the participants were given the questionnaires. The total duration of completing each questionnaire was around 20 (± 5) minutes.

Data collection

Data were collected through three questionnaires: the mobile phone addiction questionnaire, the General Health Questionnaire-28 (GHQ-28), and the social support questionnaire. The mobile phone addiction questionnaire consists of 13 questions that use a five-point Likert scale ranging from “never” to “most of the time.” It was designed based on the riding study questionnaire, which aimed to construct and validate the mobile phone addiction questionnaire [20]. The validity of the Persian version was assessed in the Savari study (Cronbach's alpha=0.85) [21]. The total score for this questionnaire falls between 13 and 65, with a higher score indicating a greater addiction to mobile phones. This study's average score obtained from the questionnaires was conventionally considered a cutoff point. In this way, the scores above the average were considered mobile phone addiction.

The GHQ-28 questionnaire can be used for mental health examinations as well as a screening tool for mental disorders. This questionnaire contains 28 questions, which are divided into four subscales: physical symptoms, symptoms of anxiety and sleep disorder, social functioning disorder, and depression. The answer to each question is based on four Likert scales (0 to 3). The score ranges from 0 to 84. The questionnaire has a cutoff point of 23, which means a score higher than 23 indicates a mental health disorder [22]. The validity of the Persian version of the questionnaire was assessed previously in the Taghavi study (Cronbach's alpha=0.90) [23].

Table 1 Characteristics of students of medical sciences who participated in the study ($n=365$)

Variable		Mean	SD
Age		23.45	4.97
		Frequency	Percent
Sex	Male	141	38.6
	Female	224	61.4
Educational level	Bachelor of Sciences	222	60.8
	Master's or above	143	39.2
Marital status	Single	319	87.4
	Married	46	12.6
The economic situation	Moderate or lower	220	60.3
	Good or above	145	39.7
Residence in a dormitory	Yes	262	71.8
	No	103	28.2

The social support questionnaire has 12 questions with a seven-point Likert scale (from completely disagree to completely agree). This questionnaire contains three subscales (family, friends, and important people), each with four questions. The subscales aim to provide practical help, emotional support, and assistance in decision-making. The score range is between 12 and 84, with higher scores indicating greater levels of social support [24]. The validity of the Persian version of the questionnaire was assessed in Besharat (Cronbach's alpha for the whole questionnaire=0.91) [25].

Statistical analysis

We used descriptive statistics (mean and standard deviation [SD]) to describe the continuous variables and the percentage and frequency of categorical variables. Logistic regression was used to assess the associated factors of mental health. The independent variables were mobile phone addiction (yes/no), social support (score between 12 and 84), age (year), sex (female/male), marital status (single/married), residing in a dormitory (yes/no), and educational level (Bachelor of Sciences/Master's or above). Variables with a P value < 0.2 in the bivariable analysis were entered into the multivariable model [26]. The final model was fitted using the backward elimination method. Statistical analysis was performed using Stata 14.

Results

Characteristics of the participants

Of the 385 approached students, 365 (response rate: 94.8%) completed the questionnaires. The majority of the students were female ($n=224$, 61.4%), and bachelors (undergraduate) ($n=222$, 60.8%), were single ($n=319$, 87.4%), reported low to moderate socioeconomic status ($n=220$, 60.3%), and lived in a dormitory ($n=262$, 71.8%). The mean (SD) age of the participants was 23.45 (4.97) years (Table 1).

Prevalence of MPA and mental health

The prevalence of MPA was 46.6% (95% Confidence Intervals (CI): 41.4; 51.7), and it was 52.9% (95% CI: 47.7; 57.9) for poor mental health. The average social support score was also 63.2 ± 12.6 out of 84. The prevalence of MPA in females was 53.1% (95% CI: 40.3; 53.4), and in males was 53.9% (95% CI: 37.9; 54.4). The prevalence of poor mental health among women was 55.4% (95% CI: 48.7; 61.7), and in males was 48.9% (95% CI: 40.7; 57.1) (Fig. 1).

Factors associated with mental health

In bivariable analysis, variables associated with mental health were socioeconomic status (P -value=0.06), mobile addiction (P -value=0.002), and social support

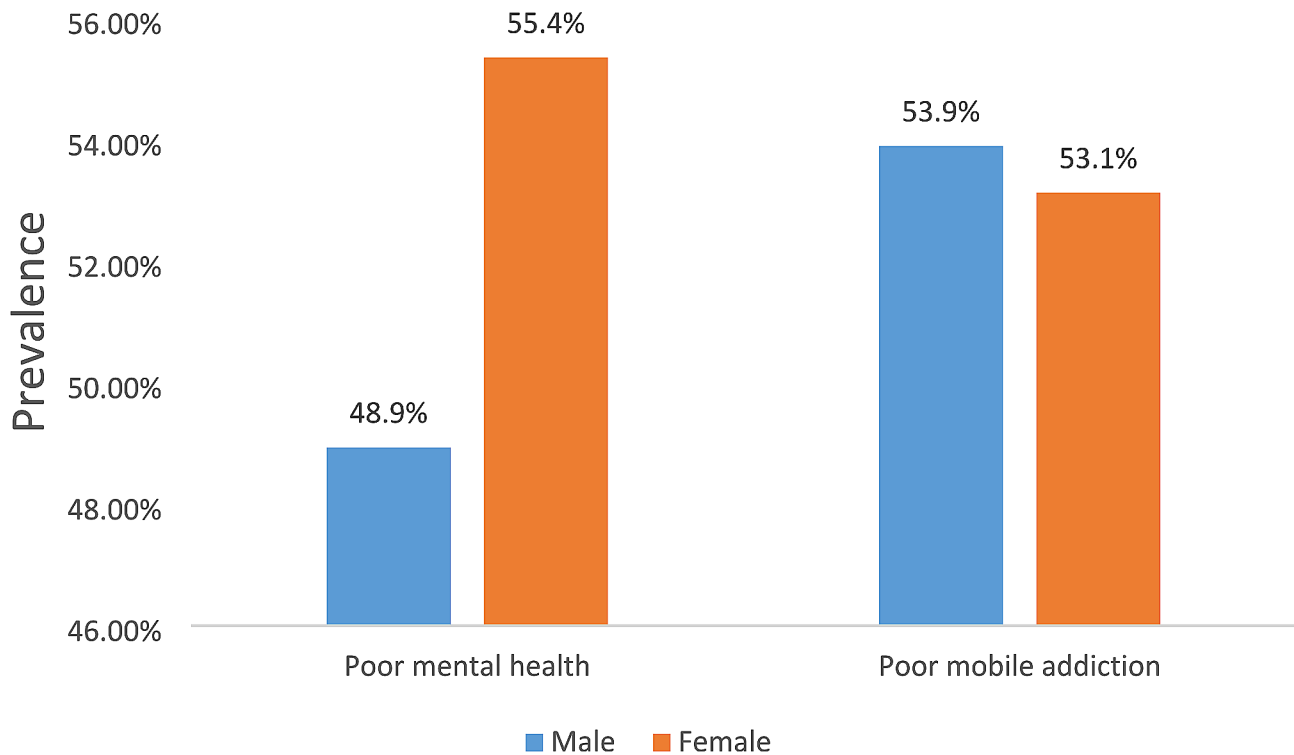


Fig. 1 The prevalence of mental health and mobile addiction by gender among students of medical sciences participating in the study

Table 2 The results of bivariable logistic regression of associated factors of poor mental health among students of medical sciences participating in the study

Variable		Odds Ratio	95% Confidence Intervals	P-value
Age		1.00	(0.95; 1.04)	0.98
Gender	Male	1	--	--
	Female	1.29	(0.84; 1.97)	0.23
Educational level	Bachelor	1	--	--
	Master's or above	1.16	(0.76; 1.78)	0.46
Marital status	Single	1	--	--
	Married	0.87	(0.47; 1.62)	0.67
Self-reported of the economic situation	Moderate or lower	1	--	--
	Good or above	0.67	(0.44; 1.02)	0.06
Residence in a dormitory	Yes	1	--	--
	No	1.14	(0.72; 1.82)	0.55
Mobile Addiction	No	1	--	--
	yes	1.96	(1.29; 2.96)	0.002
Social support		0.95	(0.94; 0.97)	< 0.001

Table 3 The results of multivariable logistic regression of associated factors of poor mental health among students of medical sciences participating in the study

Variable		Odds Ratio	95% Confidence Intervals	P-value
Mobile Addiction	No	1	--	--
	Yes	2.01	(1.30; 3.09)	0.002
Social support		0.95	(0.94; 0.97)	< 0.001

(P -value < 0.001) (Table 2). The results of the multivariable logistic regression analysis demonstrated that individuals with MPA had higher odds of experiencing poor mental health compared to those without mobile addiction (Adjusted Odds Ratio [aOR]=2.01; 95% CI: 1.30, 3.09; P -value=0.002). Conversely, participants with higher social support scores had lower odds of having poor mental health (aOR=0.95; 95% CI: 0.94, 0.97; P -value < 0.001) (Table 3).

Discussion

In this study, we found that around half of the students had MPA, and more than half of them suffered from poor mental health disorders. We also found that MPA and social support were factors affecting mental health. In this regard, those with MPA had higher odds of poor mental health, and those with higher social support had lower odds of poor mental health.

Our study discovered that approximately half of the students had MPA. The high prevalence of smartphone usage may stem from the COVID-19 pandemic, during which individuals initially confined themselves to their homes, leading to heightened feelings of isolation. Consequently, there has been a significant increase in the reliance on smartphones for communication and entertainment. With the shift to online learning, smartphones have become indispensable, further contributing to increased usage. This lifestyle change brought about by the pandemic might have rendered students more vulnerable to smartphone addiction [27]. Another possible factor contributing to the prevalence of smartphone addiction among participants could be the escalating rate of smartphone utilization among young people, including students. This rise is attributed to widespread internet accessibility, facilitating activities such as watching movies and listening to music. Additionally, the proliferation of various social media platforms could be another contributing factor [28]. It is noteworthy that the prevalence of MPA in our study was relatively higher compared to the previous studies conducted in China (36.6%) and the United Arab Emirates (29%) [29, 30]. However, the prevalence in this study was lower than in other studies in Birjand (72%), Kermanshah (71.3%), Yazd (85.8%), and Maharashtra (52%) [27, 31–33].

We found that more than half of the students suffered from poor mental health disorders. This prevalence was higher than the studies conducted in Hamadan (19.4%), but it was lower than the studies conducted in Tabriz (56%), Shiraz (54.4%), Poland (76.96%), and Palestine (69.4%) [34–38]. Because the mental health of students as active forces of society is of great importance, paying attention to the mental health of these people is an important and necessary platform. Therefore, there is a need for a significant increase to improve access to counseling for students in all periods, especially during the post-COVID-19 pandemic. Recommendations for early psychosocial intervention among students and monitoring of their mental health status over time will be important. University counseling centers can do this if they exist. Otherwise, the results presented here should be considered, especially by university management [38]. According to the programs made in this direction, the participation of students is still low, so the counseling

centers should plan to increase participation and gain the students' trust so that the counseling is effective.

Studies have shown that people who are addicted to mobile phones tend to have poorer mental health. The present study's results are consistent with those of studies conducted in Malaysia, China, Saudi Arabia, and Brazil [39–42]. The literature shows that excessive use of social media, instant messaging, and email communication in place of face-to-face interactions leads to social isolation, which causes stress, anxiety, and depression in young people. Fear of loss may also be one of the underlying causes of depression and anxiety associated with MPA. Smartphone addiction or overuse involves a tendency to check notifications, and such behaviors constantly can lead to a fear of missing out [43–46]. Smartphones have changed the way we communicate, learn, and have fun. However, their ubiquitous presence can lead to compulsive use and feelings of dependence. The constant stream of notifications and updates can create a sense of urgency and fear of missing out, leading to increased anxiety and stress. In addition, excessive use of smartphones can disrupt sleep, which is very important for mental health [47].

We also found a positive association between social support and mental health. These results align with the studies conducted in Tehran, Mazandaran, and China [48–50]. A meta-analysis study also confirmed our findings [51]. It can be said that positive social communication with family members and friends reduces anxiety and creates a sense of security. People with more positive social relationships and higher social support have more effective communication skills that keep them away from depression and other mental health problems. In addition, social support has been identified as a protective factor against stress in ways that greatly affect health and social functioning. Social support gives people a sense of being loved, cared for, respected, and part of a communication network [52]. When people lack social support and weak social cohesion, their health is at risk [51]. Social support has an indirect effect on mental health outcomes. So, social support reduces perceived stress and leads to the reduction of anxiety and depression [53].

This study has four limitations. First, this study was conducted among the students of one university of this impact on the generalizability of the findings. It is better to conduct this study in several universities and cities. Second, Self-reporting may lead to an underestimation of results, potentially resulting in the underreporting of the prevalence of these behaviors. To control this problem, we anonymously provided the questionnaires to enhance participants' confidence in providing accurate information. Third, since this study was cross-sectional, it cannot prove causality. In this regard, reverse causation could be a significant issue. Some mental health problems lead to

mobile addiction, while others receive more social support with good mental health. Conducting longitudinal research that considers intervening variables and controls intervening variables is the most appropriate choice to obtain better results.

Conclusion

The study reveals a significant prevalence of MPA and poor mental health among participants, highlighting shared challenges. Comparable rates of MPA indicate a shared susceptibility, emphasizing the need for holistic interventions addressing both issues. The findings offer insights into the interplay between social support, MPA, and mental health, enabling the identification and reduction of risk factors through counseling education. Counseling centers can promote mental health, prevent issues, and address behavioral disorders by imparting practical ways to obtain social support. Efforts should be made to maintain students' mental health and reduce addiction to digital media, recognizing mobile phone addiction as a mental health factor.

Developing recreational programs for students' free time is essential, and universities and colleges must formulate educational programs to preserve students' physical and mental well-being. The prevalence of mental health issues is exacerbated by MPA, which contributes to stress and challenges. Acknowledging the correlation between excessive phone use and mental well-being is crucial for targeted interventions. Addressing the dual challenges of mental health and MPA in navigating the digital age becomes imperative for fostering a healthier and more balanced society.

Abbreviations

MPA	Mobile phone addiction
CI	Confidence Intervals
aOR	Adjusted Odds Ratio
WHO	World Health Organization
GHQ-28	The General Health Questionnaire-28

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Author contributions

Neda Malek Mohammadi: Analyzing data and writing the manuscript. Fatemeh Rezaeisharif: Gathering data, analyzing data, and drafting the manuscript. Nahid Bagheri: Drafting the manuscript. Hamideh Taheri Olyayie: Gathering Data Mohammad Sharifi: Drafting and editing the manuscript. Hamid Sharifi: Supervising the research methodology and editing the manuscript.

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Data availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participats

Ethical considerations were adhered to in accordance with the Declaration of Helsinki. The study proposal was approved by the Ethical Committee of Kerman University of Medical Sciences (Code number: IR.KMU.REC.1402.009). Informed consent was obtained from all participants. The participants were informed about the aim of the research, the confidentiality of their information, and their right to withdraw from the study at any time.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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