



Evaluating the Relationship Between the Internet Addiction and Academic Performance of Medical and Pharmacy Students

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Abstract

Background: The internet is essential for social interaction, information acquisition, and entertainment. However, indiscriminate use of the internet by individuals, especially students, has harmed their social and psychological well-being as well as their education.

Objectives: This study aimed to evaluate the relationship between internet addiction and academic performance of medical and pharmacy students of Kermanshah University of Medical Sciences, Iran, in 2019 - 2020.

Methods: This cross-sectional study was conducted on 149 medical and pharmacy students, who were selected by convenience sampling method. The samples were examined using two questionnaires, including the Internet Addiction Test (IAT) and Educational Performance Test (EPT). The collected data were analyzed using Pearson correlation and regression analysis.

Results: There was a significant positive correlation between the IAT and some subscales of the EPT. In addition, more than 81.20% of the sample had mild (51.00%), moderate (29.53%), and severe (0.67%) dependence on the internet.

Conclusions: According to the results, the internet addiction negatively affected students' academic performance. Failure to take critical steps to control internet addiction may significantly affect the future.

Keywords: Internet, Behavior, Addictive, Academic Performance, Medical, Pharmacy, Students

1. Background

The internet is a remarkable instrument for social interactions, information, and entertainment. The internet has enabled countless users to take advantage of its benefits (1-3). Today, internet use includes personal, social, clerical, and academic tasks without seeming impossible (4). One of the most significant achievements of the internet is providing unlimited temporal and regional access to various sources of information for various sects of people (5). Students across many nations are using the internet excessively, depending on their educational or occupational situation.

A systematic review and meta-analysis indicated that the overall prevalence of internet addiction among Iranian students was 31.51% (6). The high potential of the internet for rapid search for accommodating social and mental needs, its limitlessness in terms of time, and its engagement with engaging content are all factors contributing to internet overuse by students, which could lead to inter-

net addiction (7-9). Some studies have highlighted the importance of studying internet addiction among university students because students are more vulnerable to internet addiction than the general population (10). According to some studies, medical students are approximately five times more likely to be addicted to the internet than the general public (11). Social media addiction has both positive and negative effects on academic, social, and health outcomes (12). Although some studies (11, 13-18) showed a negative and significant relationship between internet addiction and academic performance, a study found no significant association between internet addiction and academic performance (19). Studies have shown that excessive internet usage may interfere with students' ability to complete homework assignments, study, and get enough sleep to meet their academic responsibilities (20-22). Virtual education as a result of the COVID-19 pandemic led to the excessive use of the internet by students for a variety of reasons.

2. Objectives

Given the high prevalence of internet addiction in students, mainly medical students, this study aimed to evaluate the status of internet addiction among students of Kermanshah University of Medical Sciences (KUMS) and its relationship with academic performance.

3. Methods

3.1. Study Design, Sample, and Sampling Method

This cross-sectional study included all medical and pharmacy students of KUMS, Iran, in 2019 - 2020 who were selected using the Morgan table and convenience sampling. Initially, 175 students completed the questionnaires, 20 of whom were excluded due to incomplete answers to the questions and 6 were excluded because of biased and random answers to the questionnaires. Finally, data on 149 students were analyzed. The inclusion criteria were being a pharmacy/medical student during the investigation, access to the internet and devices for getting connected, and informed consent for participating in the study. The exclusion criteria included incomplete answers to the questionnaires and unwillingness to participate.

3.2. Procedure of Study

Due to the unusual conditions of the study, most activities and movements were restricted, and person-to-person contact was limited to a minimum out of fear of COVID-19. As a result, the link related to the questionnaire was uploaded to the Digit system after receiving the code of ethics from the relevant committee. This intelligent system can be used to create qualitative and quantitative questionnaires to store the information obtained from the questionnaire. Then, the students responded to the questionnaire online through the mentioned link. Each student was allowed to fill out the questionnaire only once. Finally, the data output was received through the Digit system as an Excel file.

3.3. Data Collection Tool

3.3.1. Demographic Information Questionnaire

This researcher-made scale is used to collect data regarding major, grade, academic average point, gender, age, residence, marital status, and academic probation history.

3.3.2. Young's Internet Addiction Test (IAT)

This test was created by Kimberly Young in 1988 as cited in Hayat et al. with a 20-item measurement based on a five-point Likert scale from 1 (rarely) to 5 (always) (15). The total scores vary between 0 to 100 ranging from 0 to 30 points as indications of non-addictive internet usage, while scores between 31 to 49, 50 to 79, and 80 to 100 reflect mild, moderate, and severe internet addiction, respectively. The validity and reliability of IAT have been reported at an acceptable level in Iran (15, 23, 24). In this study, the questionnaire's face and content validities were approved by a panel of experts. In addition, the reliability was measured using Cronbach's alpha and composite reliability as much as 0.88 and 0.86, respectively.

3.3.3. Educational Performance Test (EPT)

The EPT was designed by Pham and Taylor in 1999 as cited in Ghorbani et al. to examine the different aspects of academic performance. This test consists of 48 items in 5 areas, including self-efficiency, emotional effects, planning, lack of consequence control, and motivation. Scoring each item was based on a 5-point Likert scale ranging from not at all (score 1) to very much (score 5) (25). The total scores range from 48 to 240. Several studies have confirmed the validity and reliability of the EPT among Iranian students (25-28). In this study, the questionnaire's face and content validities were approved by a panel of experts. In addition, the Pearson correlation coefficient was calculated to examine the EPT reliability. The results showed that test-retest reliability for the EPT as much as 0.86. Therefore, the EPT has high validity and reliability that can be used for its intended purpose.

3.4. Data Analysis

The data were analyzed using SPSS-19, descriptive statistics indicators (frequency, percentage, mean and standard deviation, χ^2 and Fisher), Pearson correlation coefficient to investigate the relationship between research variables, and multivariate regression to examine the multiple relationships between research variables. In the present study, a significance level of < 0.05 is considered.

3.5. Ethical Considerations

This study was approved by the ethics committee of KUMS (IR.KUMS.REC.1400.348). The ethical principles of confidentiality and informed consent (verbal) of the participants were observed. First, the participants got the information of coding and study objectives in the upper part of the online form of the questionnaires, and then the students who had informed consent to participate in the research answered the questions.

4. Results

A total of 149 students from KUMS participated in this research, 96 of whom were medical students (64.40%), and the rest ($n = 53$, 35.60%) were students of pharmacy. The mean \pm standard deviation of the age of medical and pharmacy students was 21.04 ± 1.62 and 21.49 ± 1.86 , respectively. Moreover, the mean \pm standard deviation of the educational grade point average of medical and pharmacy students was 16.57 ± 1.06 and 15.65 ± 1.16 , respectively. Medical students had a significantly higher educational grade point average than pharmacy students based on the independent *t*-test results ($P < 0.001$). In addition, the chi-square test results showed no significant difference between the demographic characteristics of medical and pharmacy students (Table 1).

The results showed that the mean score of IAT for the medical and pharmacy students were $M = 42.23$, $SD = 13.17$, $M = 44.28$, and $SD = 12.53$, respectively. Moreover, the total scores of the EPT variable among medical and pharmacy students was reported ($M = 142.06$, $SD = 14.47$, $M = 144.85$, and $SD = 11.86$). In addition, the *t*-test results showed no significant differences in the IAT and EPT scores among medical and pharmacy students. The prevalence of internet addiction among the study sample is presented (Table 2). The overall prevalence of internet addiction in the study sample was 81.20%. In other words, only 18.80% of the whole sample ($n = 149$) were not addicted to the internet. The prevalence of internet addiction among pharmacy students (84.90%) was higher than the medical students (79.16%). However, the results of the *t*-test showed no significant differences in the IAT scores among medical and pharmacy students.

The statistical Pearson correlation coefficient was used to investigate the relationship between IAT and EPT in the study sample (Table 3). As shown in Table 3, the IAT scores of medical and pharmacy students were positively and significantly correlated with their scores in some subscales (emotional effects and lack of outcome control) of EPT ($P < 0.05$), while their correlations with two subscales of the EPT (planning and motivation) were negative and significant ($P < 0.05$). A step-by-step regression statistical method was used to investigate whose variables were better predictors of students' internet addiction. Considering that Durbin-Watson Test results range from 1.5 to two and 2.5, this method is appropriate. According to the regression results, the subscales of emotion effects ($\beta = 0.28$) and planning ($\beta = -0.47$) can significantly predict internet addiction positively and negatively in the study sample among the EPT subscales ($P < 0.01$). The EPT could predict 31.00% and 20.00% of internet addiction variance in medical and pharmacy students, respectively.

5. Discussion

This study aimed to assess the effects of internet addiction on the academic performance of medical and pharmacy students at KUMS in 2019 - 2020. The results indicated that more than 81.00% of the sample (79.00% of medical students and 84.00% of pharmacy students) suffered from mild (51.00%), moderate (29.53%), and severe (0.67%) internet dependence, respectively. Therefore, only 18.79% of our sample used the internet normally. Internet addiction was not significantly different between the students of the two majors. These results are consistent with those of Khazaie et al., Mohammadikarkani et al., and Jafari et al. (16, 27, 29). The reported prevalence of internet dependence in the present study is inconsistent with several studies, including Hamza et al., Ebrahimi et al., and Zhang et al. (19, 30, 31). The high prevalence of internet dependence among medical students was studied in the present study and other types of research from universities of medical sciences. There is a need to pay attention to this sensitive issue since medical students make up the workforce responsible for ensuring the improvement of health and determining the future of their nations in terms of well-being. Therefore, any damage undergone by this population could threaten the country and society health-wise.

Even though the findings in the present study are in line with Vahabi et al., the reported internet dependence among Kurdistan University of Medical Sciences students is significantly higher than that of KUMS students (85.00%) (32). According to Vahabi et al., more than 95.00% of Kurdistan University of Medical Sciences students were mildly to severely addicted to the internet (32). A possible explanation for this inconsistency could be related to the samples. Unlike the present research, the population ($n = 165$) consisted of Bachelor students (first, third, and fifth academic terms) who had more spare time for surfing on the internet considering their younger age, less challenging lessons, and obligation to stay at hospitals like medical students. Internet dependence among university students has been reported with widely different intensities across nations, including 13.50% in China (33), 31.50% in Iran (6), and 6.70% in Malaysia (10). In the previously mentioned studies, Young's questionnaire (1999) as cited in Khazaie et al. had been used to examine internet addiction severity in students (16). The incompatibility between the findings could be due to the demographic characteristics, sample sizes, or time of the study, or the political, social, and economic circumstances of the target societies. In line with previous research, no significant correlation was found in this study between internet addiction and academic major or gender (16, 29).

The results also revealed that the medical and phar-

Table 1. Demographic Characteristics of Study Subjects (n = 149)

Variable	Medical Students	Pharmacy Students	Situation of Homogeneity χ^2	P-Value
	No. (%)	No. (%)		
Gender			2.71	0.121 ^a
Male	46 (47.9)	18 (34.0)		
Female	50 (52.1)	35 (66.0)		
Residence			3.67	0.074 ^a
Native	77 (80.2)	35 (66.0)		
Non-native	19 (19.8)	18 (34.0)		
Marital status			1.45	0.422 ^a
Single	90 (93.8)	52 (98.1)		
Married	6 (6.2)	1 (1.9)		
Conditional educational background			4.96	0.092 ^b
None	94 (97.7)	48 (90.6)		
Yes	2 (2.1)	5 (9.4)		

^a Chi-square test^b Fisher's exact test**Table 2.** Prevalence of Internet Addiction in the Sample Based on the Internet Addiction Test (n = 149)^a

Internet Addiction	Medical Students	Pharmacy Students	Total	P-Value
No addiction (0 - 30)	20 (20.83)	8 (15.09)	28	
Mild (31 - 49)	48 (50.00)	28 (52.83)	76	
Medium (50 - 79)	27 (28.12)	17 (32.08)	44	0.798
Severe (80 and up)	1 (1.05)	0 (0.00)	1	
Total	96 (100)	53 (100)	149	

^a Values are expressed as No. (%).

macy students' scores on the IAT and EPT were positively (emotion effects and lack of outcome control) and negatively (planning and motivation) related to some subscales ($P < 0.05$). In other words, the intensity of negative emotions, excessive stress, anxiety, and worry among students is significantly and positively related to the internet addiction. On the other hand, following a precise schedule, time management skills, and high motivation levels in academic performance have negative relationship with the internet addiction. According to previous research, the academic performance subscales could predict 31.00% and 20.00% of the internet addiction variance among medical and pharmacy students, respectively (34). The high prevalence of internet addiction among university students could result from high stress in medical students, which has been confirmed in other studies (19). Increased levels of negative emotions such as stress, anxiety, worry, and depression cause students to utilize the internet as a tool for worry and tension relief. Since parents are absent

from dormitories and students have easy access to the internet, they are more likely to become addicted. Moreover, since internet addiction is a new concept in psychiatry, few studies have been conducted regarding its prevalence and treatment.

5.1. Limitations

Since this cross-sectional study was conducted during the pandemic, and the data were virtually collected using self-report questionnaires, the findings may not be representative of the actual internet dependence among students. Therefore, the generalizability of the results could be limited.

5.2. Conclusions

The prevalence of internet addiction was high among medical students. This study provided essential insights regarding the relationship between Young's IAT and academic performance among medical students. Higher ed-

Table 3. The Correlation Matrix Results between Internet Addiction Test and Educational Performance Test Scores in the Study Sample (n = 149)

Variable	1	2	3	4	5
Medical Students					
1. Internet Addiction Test	1				
Educational Performance Test					
2. Self-efficacy	-0.10	1			
3. Emotional effects	0.35 ^a	-0.03	1		
4. Planning	-0.45 ^a	0.41 ^a	-0.09	1	
5. Lack of outcome control	0.36 ^a	0.04	0.34 ^a	-0.39 ^a	1
6. Motivation	-0.25 ^b	0.35 ^a	-0.06	0.69	-0.09
Pharmacy students					
1. Internet Addiction Test	1				
Educational Performance Test					
2. Self-efficacy	-0.22	1			
3. Emotional effects	0.36 ^a	-0.26	1		
4. Planning	-0.27	0.14	-0.34 ^b	1	
5. Lack of outcome control	0.31 ^b	-0.02	0.47 ^a	-0.48 ^a	1
6. Motivation	-0.29 ^b	0.22	-0.32 ^b	0.70 ^a	-0.22

^a P < 0.05^b Not significant

ucation providers should be aware of these internet addiction issues among their students and introduce interventions to address this problem. Future studies are recommended to examine the extent of internet addiction in different universities and populations and examine the effect of this social problem on different aspects of students' lives in different fields.

Footnotes

Authors' Contribution: Study concept and design: P. A., M. S., and N. M.; analysis and interpretation of data: P. A., and M. S., and H. A.; drafting of the manuscript: M. S., H. A., S. M., M. K., and N. M.; critical revision of the manuscript for important intellectual content: P. A., M. S., and N. M.; statistical analysis: M. S., H. A., S. M., M. K., and N. M.

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Informed Consent: The participants got the information of coding and study objectives in the upper part of the on-

line form of the questionnaires, and then the students who had informed consent to participate in the research answered the questions.

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