Original Article

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Quick Response Code:

Website:
www.jehp.net

DOI:
10.4103/jehp.jehp_297_23

Explanation of the internet addiction model based on academic performance, academic experience, and clinical self-efficacy in nursing students: A path analysis

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Received: 02-03-2023
Accepted: 24-06-2023
Published: 22-01-2024

Abstract:

BACKGROUND: Internet addiction is a common disorder in nursing students, and this calls for a deeper investigation into this phenomenon and its dimensions. The aim of this study was to explain the internet addiction model based on academic performance, academic experience, and clinical self-efficacy in nursing students.

MATERIALS AND METHODS: This study is a correlational and path analysis study that was conducted on 340 nursing students. Data collection tools included Yang's internet addiction questionnaire and self-efficacy in clinical performance scale. In this study, the academic grade point average was the measure of academic performance and the academic term was the measure of academic performance. Data were analyzed using SPSS-16 and AMOS-22 software, descriptive and analytical statistics, and structural equations.

RESULTS: There was a significant negative correlation between clinical self-efficacy ($r = -0.950$, $P \leq 0.01$), academic experience ($r = -0.872$, $P \leq 0.01$), and academic performance ($r = -0.654$, $P \leq 0.01$) with internet addiction. A negative and significant relationship was found between the internet addiction and variables of clinical self-efficacy (total effect = −0.743, $P < 0.001$). Model fit indices were good and acceptable.

CONCLUSIONS: There was a negative and significant relationship between the variables of clinical self-efficacy, academic experience and academic performance, and the internet addiction. Meanwhile, the academic experience had a negative and significant effect on the internet addiction. This finding highlights the need to implement advisory and psychological interventions to reduce internet addiction, especially in students with less academic experiences.

Keywords:

Academic performance, internet addiction disorder, nursing, self-efficacy, students

Introduction

The use of internet in the last decade has grown by six times, so that 96% of Korean, 78% of British, and about 60% of American (USA) internet users have access to high-speed internet.[1] Having access to the internet in Iran has also grown dramatically. According to the Internet World Stats, the number of internet users in Iran is about 56,700,000 people, which is equivalent to 69.1% of the country's population.[2] In addition to the beneficial role of the internet in today's life, widespread use of this phenomenon can lead to a disease-like condition called

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How to cite this article: Khatony A, Azizi SM, Janatolmakan M, Jafari F, Mohammadi MM. Explanation of the internet addiction model based on academic performance, academic experience, and clinical self-efficacy in nursing students: A path analysis. J Edu Health Promot 2023;12:459.

"internet addiction".[3,4] The American Psychological Association believes that internet addiction is the cause of dysfunction in people.[5] The global estimate of internet addiction prevalence is different and can vary from 1.6% to 38% and even more; meanwhile, a large proportion of internet addicts are students.[6] In this regard, the results of a review of 33 studies in Iran indicated that internet addiction encompasses a considerable number of Iranian students, that is, 5.7–67.1%,[7] while medical students are more likely to suffer from internet addiction compared to other students. Results of a study conducted in Iran showed that the occurrence of internet addiction in medical students is about 78.3%, while nonmedical students only account for 21.7% of the internet addiction cases.[6] Nursing is one of the major disciplines in the field of medical sciences, which plays a fundamental role in human life. Therefore, paying attention to nursing education is very important.[8,9] By improving the academic and educational aspects of nursing education, a higher quality of clinical services can be expected from nurses.[9,10] However, some nursing graduates do not consider their clinical skills to be adequate.[11,12] The Bandura's self-efficacy theory is among theories that can be used to measure the level of student's confidence in clinical skills, as it defines self-efficacy as a person's belief in the ability to have desired performance.[13] Students who are confident about their academic and clinical success show greater willingness, effort, and perseverance in doing their educational homeworks. Bandura states that beliefs such as self-efficacy, specific behavior, performance, and position are desired by people.[13-15] In other words, self-efficacy in the clinical field, which is referred to as "clinical self-efficacy," particularly addresses the individual's belief in the ability to perform clinical skills.[14,16] Bandura's social cognitive theory emphasizes the importance of self-efficacy in predicting behavior and performance. Previous research has suggested that there may be a relationship between clinical performance and clinical self-efficacy.[17,18] However, it is unclear whether there is a direct relationship between performance and clinical self-efficacy in nursing students and the strength and nature of this relationship remains unclear and requires further investigation. The high prevalence of internet addiction in nursing students and the importance of each educational and clinical aspect in these students call for extensive study on the relationship between internet addiction and academic performance, academic experience, and clinical self-efficacy of nursing students.[19,20] In this regard, several studies have investigated the relationship between addiction to internet and academic performance. Some studies have found a significant and negative relationship between the internet addiction and academic performance, implying that as the intensity of internet addiction increases, students' academic performance decreases.[21-23] In relation to the relationship between the internet addiction and clinical self-efficacy, most of the studies have examined the relationship between internet addiction and social self-efficacy which cannot be a reliable indicator of clinical performance in nursing students.[14] Internet addiction is a complex phenomenon that has been studied in relation to various factors. While some studies have explored the relationship between academic performance, academic experience, clinical self-efficacy, and internet addiction, there is still no consensus on the underlying pattern. Furthermore, although there are some existing studies on this topic, none has presented a comprehensive model that accounts for all variables and relationships. This study proposes a novel model that integrates these variables and explores their potential interactions in contributing to the development of internet addiction. Therefore, to address this gap and provide a more complete understanding of internet addiction, this study aimed to determine and explain the internet addiction model based on academic performance, academic experience, and clinical self-efficacy of nursing students.

Materials and Methods

Study design and setting

This study is a correlational and path analysis study that was conducted during April–June 2020 in a population of nursing students in Kermanshah.

This study tried to find answer to the questions below: (1) What is the level of internet addiction in nursing students? (2) What is the status of academic performance in nursing students? (3) What is the status of academic experience in nursing students? (4) What is the level of clinical self-efficacy in nursing students? (5) What is the relationship between internet addiction and variables of academic performance, academic experience, and clinical self-efficacy in nursing students? (6) To what extent does each of the variables of "academic performance," "academic experience," and "clinical self-efficacy" predict internet addiction?

Study participants and sampling

The samples included 340 nursing students studying at Kermanshah Nursing and Midwifery Faculty in 2020 who were entered into the study by census method. Criteria for entering the study included giving a written and informed consent for participation in the study and having past at least one academic semester. Partial completion of the questionnaires was considered as an exclusion criterion.

Data collection tool and technique

Data collection tools consisted of personal information form, self-efficacy in clinical performance scale, and

Yang's internet addiction questionnaire. The personal information form included four questions about age, gender, grade point average of previous academic term(s), and academic term. The students' academic grade point average and academic term were regarded as criteria for assessing academic performance and academic experience of the students, respectively. We operationally defined academic experience as the number of academic terms completed by the participants in their nursing program. This definition is based on previous research in the field that has used academic term as a proxy for academic experience.[15] While there are other possible ways to operationalize academic experience, we chose this method as it allowed us to capture a quantitative measure of the participants' progression in their nursing program. Self-Efficacy in Clinical Performance Scale was first designed and validated by Cheraghi *et al*. The validity of this tool has been verified and validated in two ways: content validity and concurrent validity (r = 0.73).[14] The reliability of this tool has also been confirmed by Cronbach's alpha coefficient (alpha = 0.92) and test–retest methods (r = 0.73).[14] This tool has 37 items in the 11-point Likert scale (0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, and 90%). The number 100 represents a complete assurance about doing the task, and the zero indicates a complete assurance about not being able to perform the task. In this tool, clinical self-efficacy is examined in four areas of "assessment," "diagnosis and planning," "implementation," and "evaluation." In each of these areas, closer score to 100 indicates higher clinical self-efficacy in that area.[14] Score of 0–44 indicates lower level of clinical self-efficacy, 45–65 indicates moderate level of clinical self-efficacy, and score of more than 65 represents the desirable level of clinical self-efficacy.[24]

Yang's internet addiction questionnaire, developed by Kimberly Young, is one of the most valid questionnaires in the field of internet addiction.[25] Validity and reliability of this questionnaire in Iran have been confirmed by Alavi.[26] The validity of this tool has also been verified and validated by content validity method. To examine the reliability of this tool, the test–retest (r = 0.82), Cronbach's alpha coefficient (0.88), and the split-half (r = 0.72) methods have been used. The questionnaire consists of 20 items in the 5-point Likert scale, including never, rarely, sometimes, often, and always, which are scored from one to five, respectively. The overall score of the questionnaire is between 20 and 100, with the higher score pointing to a higher level of addiction and lower score pointing to lower level of addiction to internet. The samples are then classified in one of the subsequent categories considering their scores: "No addiction (score of ≤20)," "mild addiction (score of 21–49)," "medium addiction (score of 50–79)," and "sever addiction (score of 80–100)."[27]

First, we obtained the study permission from the University's Ethics Committee. Then, the students' list and class schedules were obtained from the Department of Education. In the next step, students were contacted and the study objectives were explained to them, and if they were willing to take part in the study, the questionnaires were provided for them to complete. The questionnaires were provided to the nursing students in person during their classes. The research team approached each student individually and explained the purpose of the study. After obtaining their written and informed consent, the questionnaires were handed out, and the students were instructed to complete them. When the questionnaires were collected from the students in person, the research team carefully checked that each student had answered all questions. If a student had missed a question, the questionnaire was returned to them at that moment for completion.

Ethical considerations

This study was approved by the Ethics Committee of the University with the code: KUMS.REC.1396.183. The researcher ensured the participants that their specifications would remain confidential and they were assured that participation in the study is voluntarily. Samples were provided with the explanation on the study aims and all participants signed a written informed consent.

Data analysis

Data were analyzed by SPSS (version 16.0; SPSS Inc., Chicago, IL, USA) and AMOS (version 22.0, Smallwaters Corporation, Chicago, IL, USA) using descriptive statistics (frequency, percentage, mean, and standard deviation) and analytical statistics (the Pearson product–moment correlation coefficient and path analysis using structural equation modeling). For this purpose, first the distribution of data was assessed by Kolmogorov–Smirnov test. Then, in order to investigate the correlation between the internet addiction and each of the variables, the Pearson correlation coefficient was used. The AMOS software was used for path analysis. Significance level was set at <0.05. To evaluate the fitness of the model, the goodness of fit index, adjusted goodness of fit index, and comparative fit index were used.

Results

Of the 340 participants who enrolled in the study, all provided complete responses to the questionnaire without any missing data. We set criteria for participant withdrawal in the case of incomplete questionnaires, but none of the participants were excluded due to incomplete data. Out of 340 nursing students, 189 (55.6%) were female. The mean age of students was 23.4 ± 2.0 years and the mean of their educational grade point average

was 15.7 ± 1.5. The mean of overall internet addiction was 60.60% ± 11.21 out of 100, indicating a moderate level of internet addiction. The mean of overall self-efficacy in clinical performance was 48.7 ± 7.4 out of 100, indicating a moderate level of clinical self-efficacy in nursing students. The mean of areas of clinical self-efficacy was as follow: the area of assessment (46.2 ± 11.1), diagnosis and planning (41.3 ± 7.1), implementation (48.7 ± 10.0), and evaluation (47.0 ± 11.2). Regarding the academic experience, the results showed that 75 (22.1%) students were freshman, 84 (24.7%) were sophomore, 83 (24.5%) were junior, and 98 (28.7%) were senior. A significant negative relationship was found between the internet addiction and variables of academic performance ($r = -0.654$, $P \leq 0.01$), academic experience ($r = -0.872$, $P \leq 0.01$), and clinical self-efficacy ($r = -0.950$, $P \leq 0.01$). With increasing levels of clinical self-efficacy, academic performance, and clinical experience, the level of students' internet addiction significantly reduced [Table 1].

In this study, fit indexes reported the fitness of the model and they were in the ideal range [Table 2]. In the path analysis model, variables of academic experience, academic performance, and different areas of clinical self-efficacy were the significant determents of internet addiction. In this regard, each of the direct, indirect, and total effects is shown in Table 3. Accordingly, the variable of "academic experience" was a better determinant and explainer of internet addiction than other variables (total effect = −0.743, $P < 0.001$).

The standard path coefficients with respect to internet addiction and its relationship with academic experience, academic performance, and various areas of clinical self-efficacy are shown in Figure 1. The results indicated that all paths were considered to be significant at the 0.05 level.

Table 1: Correlations of internet addiction with academic performance, academic experience, and various aspects of clinical self-efficacy

Variables	Correlation coefficient (*r*)	*P*
Clinical self-efficacy		
Assessment	−0.972	<0.001
Diagnosis and planning	−0.899	<0.001
Implementation	−0.902	<0.001
Evaluation	−0.960	<0.001
Total score	−0.950	<0.001
Academic performance	−0.654	<0.001
Academic experience	−0.872	<0.001

Table 2: Model fit indices summary

Fit indices	Acceptable range	Present study
GFI[a]	>0.90	0.999
AGFI[b]	>0.80	0.998
CFI[c]	>0.90	0.999

[a]Goodness of fit index. [b]Adjusted goodness of fit index. [c]Comparative fit index

Discussion

In this study, the status of internet addiction among nursing students was found to be at moderate level, which is consistent with the study of Kazemi-Naeini.[28] However, the results of studies conducted in nursing students in Italy and Poland suggested a low prevalence of addiction to internet.[29,30] It seems that differences in the cultural and social context are the cause of contradiction between the results of our study with the above studies. In our study, the status of self-efficacy of nursing students in clinical performance was found to be at moderate level, and among the different areas of clinical self-efficacy, the highest and lowest scores were related to the areas of "implementation" and "diagnosis and planning," respectively. In terms of clinical self-efficacy, this study results are in agreement with the results of Sadeghi *et al*.[24], Van Horn *et al*. (2017), and Abdal *et al*. (2015) studies.[13,24,31,32] However, in the study of Sadeghi *et al*.,[24] unlike this study, the highest score was related to the area of assessment. This difference could be due to the differences in social, cultural, and psychological contexts that can alter the effectiveness of self-efficacy in clinical performance of nursing students. The results of this study showed that among the variables of the model, the variable of "academic experience" had the greatest effect on internet addiction. The academic experience of nursing students in addition to affecting the three areas of clinical self-efficacy (including diagnosis and planning, implementation, and assessment) indirectly affects the

Table 3: Direct, indirect, and total standardized effect of predictive variables on internet addiction

Variables	Effect type					
	Direct effect		Indirect effect		Total effect	
	Estimate	*P*	Estimate	*P*	Estimate	*P*
Assessment	−0.505	<0.001	–	–	−0.505	<0.001
Diagnosis and planning	−0.154	<0.001	−0.374	<0.001	−0.528	<0.001
Implementation	−0.092	<0.001	−0.252	<0.001	−0.344	<0.001
Evaluation	−0.150	<0.001	−0.366	<0.001	−0.516	<0.001
Academic performance	−0.049	<0.001	−0.174	<0.001	−0.223	<0.001
Academic experience	−0.081	<0.001	−0.661	<0.001	−0.742	<0.001

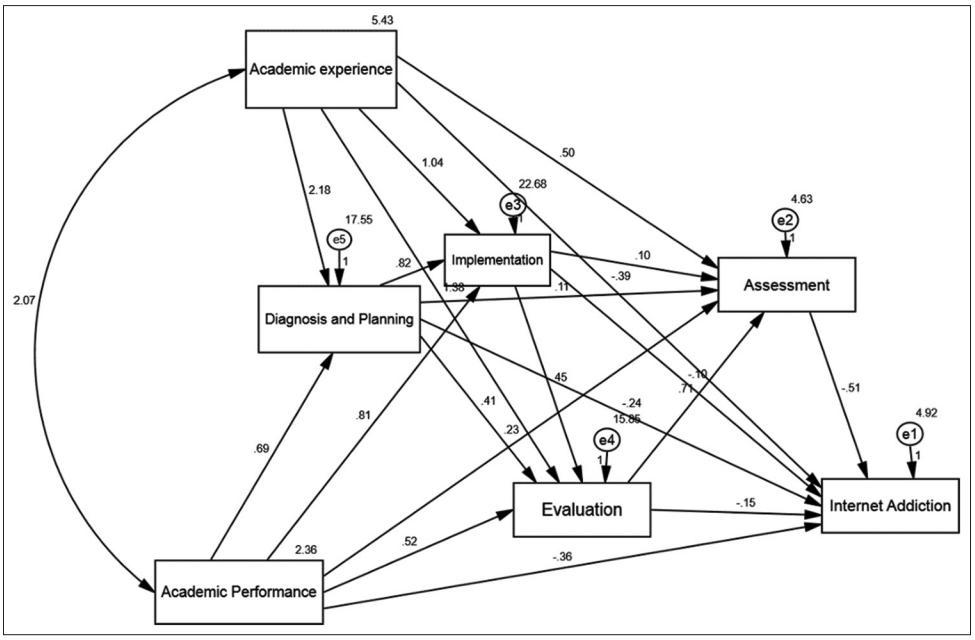

Figure 1: Internet addiction model based on clinical self-efficacy, academic performance, and academic experience in nursing students

internet addiction. It also directly and negatively affects the internet addiction. In other words, by increasing experience and academic term, clinical self-efficacy increases in three areas of "diagnosis and planning," "implementation," and "assessment," and increasing self-efficacy leads to a decrease in internet addiction. In this regard, in the study of Dai in China, internet addiction was higher in first-year and fourth-year students who were in the middle of their study.[33] The contradiction of our results with this study can be explained by the fact that Dai's study has been conducted on Chinese students who are culturally different from Iranian students. Also, there is a real difference in the culture and personality of the two countries for instance, in terms of different dimensions of internet usage. In another study, Borzone Valdebenito (2017) showed a significant positive correlation between the academic experience and self-efficacy.[20] However, unlike this study, the self-efficacy measured by Borzone Valdebenito was a general self-efficacy that is different from clinical self-efficacy in our study. In other words, in Borzone Valdebenito's study, the general self-efficacy was measured, which is different from clinical self-efficacy in our study, which was specifically related to the clinical performance of nursing students. In our study, all aspects of clinical self-efficacy were negatively and significantly determining and explaining internet addiction. This relationship, either directly or indirectly, was affecting internet addiction in nursing students. The measured aspects of clinical self-efficacy were found to be similar to those presented in nursing process.[34] In the current study, clinical self-efficacy in each of these areas was investigated so that the clinical self-efficacy in nursing diagnosis and planning directly or indirectly affected the four variables of "implementation," "evaluation," "internet addiction," and "assessment." In this regard, self-efficacy in "diagnosis and planning" can lead to increased self-efficacy in the "implementation" and self-efficacy in "implementation" can affect the "addiction to internet." In other words, self-efficacy in implementation first affects the two variables of evaluation and assessment and then each of these two variables affects the internet addiction separately.

Since in the nursing process, each component (assessment, diagnosis, etc.) is connected to others, self-efficacy in these components is related to each other. Thus, in the nursing process, proper implementation of each stage of the process can reversibly lead to the consolidation of other stages. For example, if the stage of diagnosis and planning is done ideally, other stages will also be affected so that with the help of nursing diagnosis, the implementation stage will be strengthened, and with a coherent implementation, a better evaluation can be achieved. In the evaluation stage and all stages of nursing process, it is sometimes necessary to carry out further evaluations and return to the assessment stage.[34] These steps are dynamic and each stage of the nursing process can be considered as a result of previous stages, with the ability to reflect on previous stages in order to make necessary corrections.[34,35] In this study, which clinical self-efficacy was measured based on nursing process, we saw that each aspects of nursing process logically followed its main pattern. In our study, the total effect of academic performance on internet addiction included both direct and indirect effects (with aspects of self-efficacy being the mediators). Thus, better academic performance explained better clinical self-efficacy,

and better clinical self-efficacy explained less internet addiction. Also, better academic performance could directly explain less internet addiction. In this regard, Türel and Toraman[36] (2015) reported that there was a significant negative relationship between internet addiction and academic success of high school students in Turkey. In another study, Öksüz *et al*.[2] (2018) found a negative and significant correlation between problematic internet use and time management. Also Azizi *et al*.[21] (2019) in a study of Iranian medical sciences students showed that social network addiction had a negative and significant correlation with academic performance.

Limitation and recommendation

Our study was confronted with some limitations. The mental-psychological state of the samples when completing the questionnaires had a potential to affect their responses, which was beyond our control. The study sample was restricted to nursing students. Therefore, the findings cannot be generalized to students of other disciplines. It is suggested that future studies of students from other disciplines be also considered. We also suggest that in future studies using qualitative method (exploratory interviews with students), the factors that will cause internet addiction in students in the process of studying at university will be identified. One limitation of this study was the use of an operational definition for academic experience based solely on academic term. While this definition was chosen based on practical considerations and had been used in previous studies, it may not have fully captured the complexity of academic experience and its various components. Future studies could consider incorporating additional measures of academic experience, such as cumulative GPA or number of clinical hours completed, to more comprehensively assess the impact of this variable on internet addiction in nursing students.

Conclusion

In this study, academic experience and academic performance had direct and indirect effects on internet addiction, through the mediators of self-efficacy. Meanwhile, academic experience had the greatest effect on the internet addiction. Also, low academic performance explained the high level of addiction to internet. Considering the educational risks of internet addiction, it is necessary to provide counseling and psychological interventions to reduce internet addiction, especially in students with less academic experience and lower academic performance. On the other hand, by focusing on the promotion of clinical self-efficacy in nursing students, it is possible to reduce the level of internet addiction among them. In order to further explore the causal correlation between the variables of internet addiction, academic performance, academic experience, and clinical self-efficacy, the design of the empirical study is suggested to be used in future studies to examine the effect of clinical self-efficacy promoting educational strategies on the level of internet addiction in nursing students.

Acknowledgments

This work was supported by the deputy of research and technology of KUMS (Grant number: 96254). We would like to express our sincere gratitude to all the students who participated in this research. We highly appreciate the Clinical Research Development Center of Imam Reza Hospital for their wise advice.

Financial support and sponsorship

This study was funded by the Kermanshah University of Medical Sciences (Grant number: 96254). The budget was spent on sampling and data collection.

Conflicts of interest

There are no conflicts of interest.

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