

Effect of Educational Program about Internet Addiction on Knowledge, Beliefs and Level of Addiction among Nursing Students at Minia University

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Abstract

Background: Internet addiction (IA) has been defined as an impulse-control disorder of the Internet which causes psychological and interpersonal troubles and disturbance in daily life functioning. **Aim:** The study aimed to evaluate the effect of an educational program about IA on knowledge, beliefs, and level of addiction among nursing students at Minia University. **Methods:** A quasi-experimental design (pre/post-test and follow-up) was used in the study. Three hundred and seventy students were included using a stratified random sample. Data collected using two tools, the 1st tool was a self-administered questionnaire based on Health Belief Model (HBM) to assess the students' knowledge and beliefs about IA and the 2nd tool was the Arabic version of the Internet Addiction Test (IAT) to assess the level of IA among students. **Results:** After the implementation of the educational program there were improvements in the participants' knowledge about IA where 48.3% had good knowledge and 44.1% had very good knowledge also, there was an increase in the mean score of all the scales of HBM regarding IA among the participants except for perceived barriers. The study revealed that there was statistically significant difference between the pre, post, and follow-up tests regarding the participants' level of IA where the p-value was 0.0003*. **Conclusion:** The findings of the study support the effectiveness of the educational program based on the HBM in increasing knowledge, changing beliefs, and decreasing the level of IA among nursing students. **Recommendation:** Further studies include the participants' families to manage IA is recommended especially for students with severe IA.

Key words: Educational program, Internet Addiction, knowledge, Beliefs, Level of addiction

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I. Introduction

An integrated feature of daily life currently, is the internet. The size of internet users, in addition to accessing hours, has increased dramatically among the educated population as the internet is the main suitable way for global contact, source of knowledge, and enjoyment. The foremost one to establish the concept of internet addiction (IA) was Kimberly Young in 1996 (Hassan et al., 2020). Internet addiction is characterized by continual and excessive use of the Internet despite imposed limitations and has been defined as an impulse-control disorder of the Internet (Çelik, 2016).

There is evidence that IA has negative implications on academic performance, family relations, physical and mental health as well as financial state (Hamzaa, 2017). It might also be accompanied by sleep disorders, malnourishment, low physical activity, impaired interpersonal relationships, depression, anxiety, and other psychiatric and somatic problems which may further lead to a long list of health problems such as underweight & obesity, osteoporosis with subsequent underlying poor health status (Naffise et al., 2013).

The identified important IA risk factors comprise family troubles, decrease in self-esteem, social loneliness, impulsivity, accessibility of the internet, and other risky behaviors (Wang et al., 2016). The prevalence of IA varies greatly across countries; it is ranged from 0.7 to 20.0%, based on the time of the study, methodology, locality, measurement, and/or the studied population. Besides, the addictive use of smartphones and other Internet-enabled devices may not be restricted only to adolescents, but seems to affect all age groups due to the fast increase of smartphones and other information technologies across all ages (Lee et al., 2019).

Significant of the study

Globally, the internet utilization has been approximately increased by six-folds, with reported differences in IA occurrence rates estimated to be 7.9 to 25.2% amongst adolescents in the United States (USA)

and Europe, while it had rates of 17.3 to 23.6% in the Middle East and Africa. Research studies in Asia have revealed a much more difference in IA occurrence rate among the youthful population and adolescents which range from 8.1 to 50.9% (Hassan et al., 2020).

The Internet World Stats revealed that Egypt has the second-highest number of internet users in Africa after Nigeria. The Egyptian Ministry of Communication and Information technology (MCIT) and the Central Agency for Public Mobilization and Statistics (CAPMAS) in the year of 2017/2018 revealed that 75.8 percent of families mainly access the internet to use social networking sites like Facebook and Twitter. An even higher portion, seventy-nine (79%) percent, uses the internet to send emails according to the same report (Eltigani, 2019).

University students as a cluster are more susceptible to suffer dependence on the Internet than any other section of the community, possibly as university students have powerful drives to develop a strong sense of personality and to form important and close relationships (John & Kavitarati, 2018). Most of the Egyptian studies focus on describing IA and its consequences, but there is still a lack of studies focusing on the prevention of this problem. therefore, given the high prevalence of IA among students and the numerous complications attributable and concerning the importance of implementing interventions such as educational interventions for the prevention and reduction of IA among university students, this study aimed not just to assess IA among nursing students at Minia University, but also intervening by implementing an educational program to affect their knowledge, belief, and level of IA.

Aim of The study:

The current study aimed to evaluate the effect of an educational program about internet addiction on knowledge, beliefs and level of addiction among nursing students at Minia University

Research questions:

No 1: Does Implementation of an educational program about IA among nursing students increase their level of knowledge regarding IA?

No 2: Does Implementation of an educational program about IA among nursing students affect their health beliefs regarding IA?

No 3: Does Implementation of an educational program about IA among nursing students decrease their level of IA?

Theoretical Framework

One of the most commonly applied models in explaining and adopting healthy behaviors such as the protective behavior of addiction is the Health Belief Model (HBM) (Zadeh et al., 2014). The HBM was created in the united states (US) in 1950 by the Department of Public Health Service to understand the reasons for the ineffectiveness of public health services directed toward the prevention of health problems. The application of the model after that extended for comprehending the adherence with clinical remedy (Orji et al., 2012). Health Belief Model explains that health-related behaviors of people are based on their perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and perceived self-efficacy (Zadeh et al., 2014).

II. Materials and methods

Research Design:

To answer these research questions, a quasi-experimental study design (pre/posttest and follow up) was used in the current study

Setting:

The study conducted at faculty of nursing at Minia University

Sample size:

Sample size was calculated based on Cochran formula, (1963) while $n = t^2 \times p(1-p) / m^2$ considering 41.5% prevalence rate of internet addiction according to Abdelghani, M et al., (2018).

Cochrane formula: $n = t^2 \times p(1-p) / m^2$ Where: n = calculated sample size, t = confidence level at 95% (standard value of 1.96), p = estimated prevalence in the target group, and m = margin of error at 5% (standard value of 0.05)

Therefore, $n = (1.96)^2 \times 0.405(1-0.405) / (0.05)^2 = 370$, so 370 students were included in the study.

Inclusion criteria for the study sample:

1. Undergraduate students at faculty of nursing at Minia University
2. Currently using the internet for at least 3 hours/day and in the past 6 months
3. Both sexes

Study Tools:

Tool 1: A self-administered questionnaire developed by the researcher based on HBM and consisted of 4 parts as following:

Part I: assess the socioemographic data of the students such as: Age, sex, faculty grade, residence, parents' education, family income, quality of relation with parents and friends, residence during studying, smoking status and academic average.

Part II: assessed the students' pattern of internet use such as daily hours of internet use, purposes, time of using, electronic devices used, electronic accounts and monthly cost for accessing the internet.

Part III: assessed student's knowledge about IA such as definition, signs of IA, causes, types, physical, psychological and social effects, daily allowed screen time and management of IA.

Scoring system

The scores for knowledge part of the questionnaire were calculated based on one point (1) for the correct answer and zero (0) for the wrong answer or don't know respectively. Therefore the participants were considered to have a very good level of knowledge if the total score >75 %, good if the total score ranged from 60-75% and poor if the total score < 60%.

Part IV: A five-point Likert scale based on HBM to assess students' beliefs toward IA. The scale consisted of six subscales as following: Perceived susceptibility (one question) and perceived severity (5 questions), perceived barriers (9 questions), perceived benefits (6 question), cues to action (2 questions) and perceived self-efficacy (5 questions).

Scoring system

The statements of this part were scored on a five-point likert-type scale as following: strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5). The entire score for each subscale was calculated by summing up of all of its statements. With summed scores > 60% indicates a higher level of the HBM subscale/construct while a summed score ≤ 60% indicates a lower level of the subscale for each one.

Tool 2: The Arabic version of Internet Addiction test (IAT): It is a self-rated scale originally developed by Young (1998) to assess the existence and severity of IA in a North American population sample, this tool consists of 20 items; each was derived from earlier clinical studies on obsessive online users and their attributes. These 20 items involve distraction, compulsivity, and dependency. The items also assess conflicts in personal, social, or occupational life that may arise from the addictive use of the internet. The Arabic version of IAT has been validated in a study conducted in Lebanon by Hawi (2013).

Scoring system:

The statements of the IA test were scored on a five-point Likert-type scale, rarely (1), occasionally (2), frequently (3), often (4), always (5). Sum of the scores that ranged from 0 to 30 points indicated a normal level of internet usage; scores of 31 to 49 reflected a mild level of IA; scores of 50 to 79 indicated a moderate level, and scores of 80 to 100 indicated severe internet dependence.

Content Validity of the Tools:

The content validity of the study tools was tested by five experts in community health nursing. The tools were examined for content coverage, sequence of items, clarity, relevance, applicability, words length, format, and overall appearance. Based on experts' comments, recommendations and modifications were made.

Reliability of the Tools:

Reliability of the study questionnaire was calculated using Cronbach's alpha. Based on data analysis, coefficient alpha for the knowledge part was 0.78, perceived severity was 0.81, perceived barriers was 0.826, perceived benefits was 0.76, cues to action was 0.68, self-efficacy was 0.92 and for the entire questionnaire was 0.70. As regard to the reliability of the IAT, it was 0.93.

Procedure:

Before conducting the study an official permission was taken from the dean of the faculty of nursing to conduct the study; the study was conducted through three phases: Assessment phase, intervention phase and post-intervention phase (immediately and after 3 months of the posttest). The study lasted for 8 months while started by the med of February 2019 and ended by the end of October 2019.

Pilot study:

It was applied on 10% of the calculated sample to assess the validity of the questionnaire and to assess acceptability of the students to the topic of the research. The results of pilot study were included in the final results of the study as there were no major modifications in the tools of the study

Description of the Educational program regarding IA:

The educational program was developed based on The HBM constructs and conducted through five sessions; the time of the session ranged from 60-90 minutes. The selected students of each grade were divided into 3 groups;

each group included about 30 students to ensure that all students understand the program content. At the beginning of each session, the objectives of the session were explained. Each session followed by a summary of its essential points at its end.

Teaching methods: Sessions were held using teaching methods such as lectures, small group discussions, and question and answers. Data show presentations, videos, and educational brochures were used to make the sessions interesting. An illustrative structured colored booklet that was prepared in the Arabic language and supported by illustrative a picture was given to the students at the end of the sessions.

The 1st session: This session provided an overview of the educational program while aimed at increasing knowledge about IA definition, the addictive nature of the internet, and the magnitude of internet use nationally and globally.

The 2nd session: This session implemented based on the construct of perceived susceptibility of the HBM while included knowledge about the causes of IA, high-risk people, signs, types of IA, and some examples of severe IA cases. In addition to increasing the students' knowledge about these aspects of IA, this session aimed at making the students recognize their susceptibility to IA.

The 3rd session: This session implemented based on the construct of perceived severity of HBM while included Physical, Psychological, Social, and academic effects of IA and aimed at increasing the level of IA severity among students.

The 4th session: This session implemented based on the constructs of perceived benefits, perceived barriers, and perceived self-efficacy of the HBM. This session included the treatment of IA, the importance of time management, the advantages of controlled use of the internet, and how to prevent IA. The session aimed at making the students express their perceived barriers to reducing internet time in addition to teaching them how to control these barriers to decrease their online time.

The 5th session: This session included teaching about the management and prevention physical health effect of IA and the role of the nurse toward IA.

Statistical Analysis

Data entry and statistical analysis were done using SPSS 24.0 statistical software package. Data presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations for quantitative variables. The non-parametric Friedman test was used to detect the level of significance between quantitative data in the pre, post, and follow up tests while Cochran's Q test was used to detect the level of significance between qualitative data. All results were considered statistically significant when the significant probability was less than 5% ($p < 0.05$).

Ethical considerations

A written approval obtained from the ethics and research committee of the Faculty of Nursing, Minia University. Oral consent obtained from students after explaining the nature & objectives of the study to gain their cooperation. Each assessment sheet was coded for privacy and confidentiality. Participants were free to withdraw from the study at any time

III. Results

Table (1) Frequency Distribution of the studied Minia university nursing students according to their socioemographic characteristics in the academic year of 2018/2019

	No (n=370)	Percent%
Age		
18-21	244	65.9
22-24	126	34.1
Mean ± SD 20.78 ± 1.30		
Gender		
Male	150	40.5
Female	220	59.5

Faculty grade		
1st year	89	24.1
2nd year	85	23.0
3rd year	111	30.0
4th year	85	23.0
Residence		
Rural	278	75.1
Urban	92	24.9
Quality of relation with parents		
Good	358	96.8
Poor	12	3.2
Residence during study		
with family	231	62.4
away from family	139	37.6
Smoking		
Smoker	20	5.4
Non smoker	350	94.6
Academic performance		
Excellent	75	20.3
Very good	156	42.2
Good	105	28.4
Pass or weak	34	9.2
Father education		
Does not read or write	52	14.1
Primary	47	12.7
Preparatory	35	9.5
Secondary	128	34.6
University	83	22.4
Post university studies	25	6.8
Mother education		
Does not read or write	116	31.4
Primary	44	11.9
Preparatory	41	11.1
Secondary	109	29.5
University	48	13.0
Post university studies	12	3.2
Family income/month		
less than 2000 L.E	166	44.9
2000-3000 L.E	158	42.7
More than 3000 L.E	46	12.4

Table (1) shows that 65.9% of the participants are in the age group 18 – 21 yrs with a mean score \pm SD20.78 \pm 1.30. Regarding gender, 59.5% of the participants are females; besides 75.1% of the participants live in rural areas. The same table shows that 96.8% of the participants have a good relationship with their parents. Regarding residence during the study, 62.4% of the participants are residents with their parents during the study. As regards the smoking status and academic performance, 5.4% of the participants are smokers, while 42.2% of them their academic performance is very good. The same table shows that 34.6% of the participants their fathers' education is a secondary education. Concerning their mothers' level of education, 31.4% of them their mothers don't read or write. The same table also shows that 44.9% of the participants their monthly family income is less than 2000 L.E.

Table (2) Comparison of studied Minia university nursing students' pattern of internet use in the pre, post and follow up tests using Cochran's Q test (N=370)

Item	Pretest (n=370)		Posttest I (n=370)		Follow up (n=370)		Cochran's Q test	P-value
	No	%	No	%	No	%		
Daily hours of use								
▪ 3-4 hrs	211	57.0	257	69.5	236	63.8	98.11	0.0001*
▪ 4-5 hrs	42	11.4	50	13.5	63	17		
▪ 5-6 hrs	44	11.9	21	5.7	23	6.2		
▪ > 6hrs	73	19.7	42	11.4	48	13		

Purposes of use^a									
▪ Entertainment	218	58.9	215	58.1	225	60.8	5.097	0.078	
▪ Social connection	368	99.5	363	98.1	363	98.1	7.14	0.028*	
▪ Gaming	66	17.8	59	15.9	63	17.0	1.37	0.504	
▪ Education /	228	61.6	218	58.9	245	66.2	22.36	0.0001*	
research	23	6.2	21	5.7%	20	5.4	0.824	0.662	
▪ Electronic shopping									
Usual time for use^a									
▪ In the morning	53	14.4	46	12.5	47	12.8	5.059	0.080	
▪ Afternoon \	303	82.3	300	81.7	307	83.4	4.62	0.099	
Evening	111	30.2	102	27.8	103	28.0	6.95	0.031*	
▪ At midnight and late night									
Accessing devices^a									
▪ Mobile phone	357	96.5	355	96.2	356	96.2	2.0	0.368	
▪ PC \laptop	85	23.0	84	22.8	87	23.5	1.0	0.607	
▪ Phone table	35	9.5	31	8.4	31	8.4	4.0	0.135	
Electronic accounts^a									
▪ Face book	342	92.7	342	92.7	342	92.7	.000	1.000	
▪ Whats-app	338	91.6	337	91.3	339	91.9	1.20	0.549	
▪ Instgrame	138	37.4	134	36.3	132	35.8	2.94	0.229	
▪ Ask.fm	60	16.3	61	16.3	60	16.3	.133	0.936	
▪ Twitter	106	28.7	97	26.3	97	26.3	8.10	0.017*	
Monthly cost									
▪ less than 50 L.E	174	47.0	177	74.8	166	44.9	31.000	0.0001*	
▪ 50-100L.E	123	33.2	122	33.0	120	32.4			
▪ >100 L.E	73	19.7	71	19.2	84	22.7			

^aMutual exclusive more than one answer

*Statistical significant difference

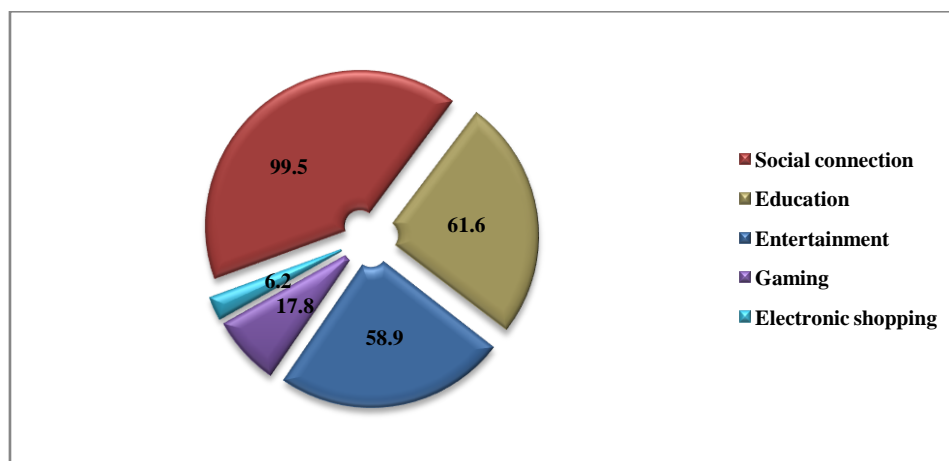


Figure (1) Frequency distribution of the studied Minia university nursing students according to their purposes of internet use in the pretest

Table (2) shows that there are significant statistical differences between the pre, post, and follow up tests regarding the number of daily hours of internet use among the participants while the P-value is 0.0001. Also, there are significant statistical differences between the pre, post, and follow up tests among the participants regarding using the internet for purpose of social connection and education and research while the P-value is 0.028,0.0001 respectively. Besides, significant statistical differences are found between the pre, post, and follow up tests regarding the time of using the internet at midnight and later on among the participants while the P-value is 0.031. The same table shows that there are significant statistical differences between the pre, post, and follow up tests regarding the number of participants who had a twitter electronic account while the P-value is 0.017. Moreover, a significant statistical difference is found between the pre, post, and follow up tests in terms of the monthly cost of internet use among the participants while the P-value is 0.0001.

Table (3) Comparison of the studied Minia University nursing students' total level of knowledge about IA in the pre, pos and follow up tests

Total level of knowledge	Pretest (n=370)		Posttest I (n=370)		Follow-up (n=370)		χ^2 F ^a	P	Conversion rate
	No	%	No	%	No	%			
Very good	11	3.0	163	44.1	131	35.4	702.7	0.0001*	32.4%
Good	22	5.9	179	48.3	193	52.2			46.3%
Poor	337	91.1	28	7.6	46	12.4			-87.7%
Mean ± SD	14.47±7.26		32.05±5.0		30.22±5.21		595.4	0.0001*	15.75

*Statistical significant difference, ^aFriedman test, Chi-squared test.

Table (3) shows that before the implementation of the educational program, 91.1% of the participants have a poor level of knowledge about IA with a mean score ± SD 14.47±7.26 while there is an improvement in their level of knowledge after implementation of the educational program where 48.3% have a good level of knowledge and 44.1% have a very good level with a mean score ± SD32.05±5.0. Also, it has been noticed that the conversion rate for the percent of participants with a good level of knowledge about IA after the follow up test is 46.3% while the conversion rate for the percent participants with a poor level of knowledge is - 87.7%. The same table shows there are significant statistical differences between the pre, post, and follow up tests regarding the total level of knowledge about IA among the participants while the P-value is 0.0001.

Table (4) Comparison of the studied Minia University nursing students according to their level of health beliefs toward IA in the pre, pos and follow up tests (N=370)

ITEMS	Pretest (n=370)				Posttest I (n=370)				Follow-up test (n=370)				Cochran's Q test	P-value	Conversion rate (%)
	High		Low		High		Low		High		Low				
	NO	%	NO	%	NO	%	NO	%	NO	%	NO	%			
Perceived susceptibility	124	33.5	246	66.5	264	71.4	106	28.6	254	68.6	116	31.4	221.8	0.001*	35.1
Perceived severity	133	35.9	237	64.1	303	81.9	67	18.1	292	78.9	78	21.1	305.6	0.001*	43.0
Perceived barriers	198	53.5	172	46.5	108	29.2	262	70.8	123	33.2	247	66.8	139.5	0.001*	-20.3
Perceived benefits	210	56.8	160	43.2	330	89.2	40	10.8	326	88.1	44	11.9	219.4	0.001*	31.3
Cues to action	132	35.7	238	64.3	234	63.2	136	36.8	230	62.2	140	37.8	130.2	0.001*	23.5
Perceived self-efficacy	100	27.0	270	73.0	258	69.7	112	30.3	240	64.9	130	35.1	259.4	0.001*	37.9

Data presented as percentage, Cochran's Q test

Table (4) shows that after implementation of the educational program, there is an increase in the level of all of the HBM scales regarding IA among the participants except for perceived barriers with significant statistical differences between the pre, post, and follow up tests where the P-value is 0.001*. Also, the table shows that after the follow-up test, perceived severity toward IA among the participants has the highest conversion rate (43.0%) while the perceived barriers have the lowest conversion rate (-20.3%).

Table (5) Comparison of the studied Minia University nursing according to their mean level of health beliefs toward IA in the pre, pos and follow up tests (N=370)

ITEMS	Pretest (n=370)	Posttest I (n=370)	Follow-up Test (n=370)	F st	p-value	Conversion rate
Perceived susceptibility	2.96±1.16	3.76±1.36	3.63±1.30	346.2	0.001*	0.67
Perceived severity	14.65±4.27	19.59±3.90	19.02±3.83	482.4	0.001*	4.37
Perceived barriers	28.0±7.57	22.28±7.20	23.17±7.25	367.4	0.001*	-4.83
Perceived benefits	18.96±4.60	23.01±3.95	22.89±3.80	329.9	0.001*	3.93
Cues to action	5.57±2.29	7.07±1.47	6.97±1.44	210.4	0.001*	1.4
Perceived self-efficacy	12.49±5.45	17.88±4.12	17.42±3.82	385.4	0.001*	4.93

Data presented as mean ±SD, st Friedman

Table (5) shows that after implementation of the educational program, there is an increase in the mean score of all the scales of HBM regarding IA among the participants except for perceived barriers with significant statistical differences between the pre, post and follow up tests where the P-value is 0.001*. Moreover, the table shows that after the follow-up test, the conversion rate for the mean level of perceived self-efficacy toward IA is the highest (4.93) among participants while the conversion rate for the mean level of perceived barriers is the lowest (-4.83).

Table (6) Comparison of the studied Minia university nursing students' perceived barriers to reduce the internet time in the pre, post and follow up tests (N=370)

Phase Item	Pretest (n=370)						Posttest I (n=370)						Follow-up (n=370)						
	Strongly agree/Agree		Neutral		Strongly disagree/disagree		Strongly agree/Agree		Neutral		Strongly disagree/disagree		Strongly agree/Agree		Neutral		Strongly disagree/disagree		
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	
Perceived barriers																			
1- Decrease social connection	176	47.6	76	20.5	118	31.9	143	38.6	60	16.2	167	45.1	163	44.0	54	14.6	153	41.3	
2- Life seems boring without internet	170	46.0	68	18.4	132	35.7	170	46.0	68	18.4	132	35.7	189	51.0	67	18.1	114	30.8	
3- Feeling lost without internet	128	34.6	80	21.6	162	43.8	52	14.0	79	21.4	239	64.6	61	16.5	79	21.4	230	62.1	
4- Being an old fashioned person	156	42.2	55	14.9	159	42.9	40	10.8	62	16.8	268	72.4	46	12.5	61	16.5	263	71.1	
5- No encouragement to ↓ online time	177	40.6	61	16.5	159	43.0	24	6.5	54	14.6	292	79.2	28	1.2	62	16.8	280	75.7	
6- Feeling lonely without internet	164	44.3	82	22.2	124	33.5	80	21.6	78	21.1	212	57.3	81	21.9	80	21.6	209	56.5	
7- Negative effect on self-esteem	84	22.7	69	18.6	217	58.7	33	8.9	69	18.6	268	72.4	35	9.4	73	19.7	262	70.8	
8- No other way to relieve stress	181	49.0	50	13.5	139	37.5	157	42.4	59	15.9	154	41.6	166	44.8	54	14.6	150	40.8	
9- No help in decision making	148	40	70	18.9	152	41.1	85	23.0	78	21.1	207	56.0	86	23.3	80	21.6	204	55.2	

Table (6) shows the perceived barriers to reduce internet time among the participants, while 47.6% strongly agree/ agree that decreasing online time will limit their social connection in the pretest, 51.0% strongly agree/ agree that life is boring without the internet in the follow-up test, 64.6% strongly disagree/disagree they will feel lost without the internet in post-test I, 79.2% strongly disagree/disagree that nobody encourages them to decrease their online time in post-test. Also, 57.3% strongly disagree/disagree they will feel lonely without the internet in the post-test., 49.0% strongly agree/ agree there are no other ways to relieve stress without the internet in the pretest.

Table (6) Comparison of the studied Minia University nursing students' level of IA in the pre, pos and follow up tests

Level of IA	Pretest (n=370)		Posttest I (n=370)		Follow-up (n=370)		χ ² F st	P -Value	Conversion rate
	No	%	No	%	No	%			
Normal	48	13.0	118	31.9	108	29.2	55.5	0.0003*	16.2%

Mild	165	44.6	140	37.8	132	35.7			-8.9%
Moderate	144	38.9	101	27.3	117	31.6			-7.3%
Severe	13	3.5	11	3.0	13	3.5			0%
Mean ± SD	48.29±15.48		42.92 ±15.89		44.01±16.14		244.2 [Ⓜ]	0.000*	-4.28

* Statistical significant difference, [Ⓜ]Friedman test, [Ⓢ]Chi-square test

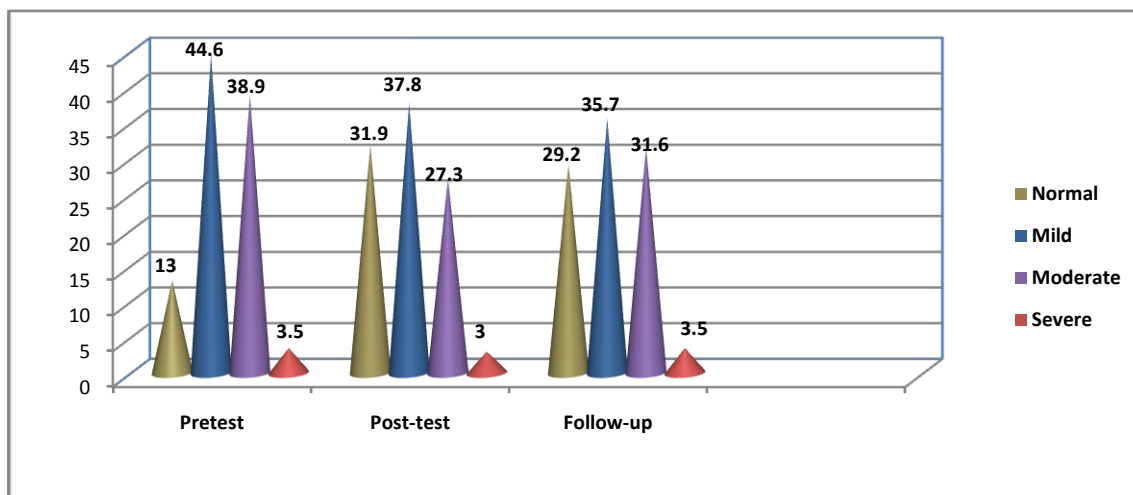


Figure (2) Comparison of the studied Minia University nursing students' level of IA in the pre, pos and follow up tests

Table (6) shows that before the implementation of the educational program, 44.6% of the participants have a mild level of IA and 3.5% have a severe level of IA with a mean score ± SD 48.29±15.48, while after implementation of the educational program, the percent of participants with a mild level of IA has decreased to 37.8% and the percent of participants with severe IA has decreased to 3.0% with a mean ± SD 42.92 ±15.89. The same table shows that the conversion rate for the percent of participants who are normal internet users after the follow-up test is the highest (16.2%) while the conversion rate for the percent of participants with a severe level of IA is 0%. Moreover, the present table shows that there are statistically significant differences between the pre, post, and follow up tests among the participants regarding their level of IA where the p-value is 0.0003*

IV. Discussion

One of the significant attributes of the current societies is the increased media utilization particularly the internet. Important benefits of the internet shall not delude us from the rising inclination of IA (Maheri et al., 2018). The current study aimed to evaluate the effect of an educational program about IA on knowledge, beliefs, and level of addiction among nursing students at Minia University. The Health Belief Model was used as a theoretical framework for the current study

Part I: Regarding the pattern of internet use among the participants.

Regarding the purposes of the internet use among the participants, the current study revealed that the majority (99.5% in pretest, 98.1% in post and follow up test) use the internet for social connection which indicates that those social networking sites such as Facebook, Twitter or Instagram have become a dominant daily social practice among university students. Moreover, the current study revealed that the minority (6.2%) accesses the internet for online shopping. These results agreed with Xin et al. (2018), who found that the majority (95.9%) and (97.9%) of IA individuals (including mild and severe IA) using social networks, and the minority (33.6%) accesses the internet for online shopping. Additional results were similar to the current results revealed by Sampasa-Kanyinga and Hamilton (2015) & Tsitsika et al. (2014), and Rosliza et al. (2018).

Concerning the number of daily hours of internet use among the participants, the current study revealed that before implementation of the educational program, more than two thirds (68.4%) were using the internet for three to five (3-5) hours/day. This result agreed with Maheri et al. (2017) who found that before the intervention more than two thirds (71.2%) were using the internet for 3-5 hours/day. Different from the current study, Rosliza et al. (2018) revealed that the majority (72.4%) of the participants reported spending an

average of four to ten hours per day on the internet. This difference might be attributed to the disparity in internet accessibility among the participants of the prior and the current study.

The current study revealed that there were significant statistical differences between the pre, post, and follow up tests regarding the number of daily hours of the internet use among the participants, while the P-value was 0.0001. In the same line with the current study, **Maheri et al. (2017)** & **Gholamian et al. (2019)** found that after the educational intervention, there were significant statistical differences regarding the daily hours of the internet use in the intervention group ($P < 0.001$). However, the current study was different from **De Leeuw et al. (2010)** who illustrated that the time spent on the internet (hours/day) increased during the study. This dissimilarity might be related to the degree of IA being mild to moderate among the majority of the participants of the current study which might be easier to manage than if they had a severe level of IA.

Regarding the predominant time of using the internet among the participants, the current study revealed that before the implementation of the educational program, the majority (82.3%) used the internet in the afternoon and the evening, followed by 30.2% at midnight and later on. Similarly, **Abdel-Salam et al. (2019)** reported that more than half (51.4%) used the internet in the evening, followed by 33.5% at midnight. Accessing the internet at night and midnight can result in educational, social, or work-related problems, which might aggravate IA among university students.

The current study revealed that there were significant statistical differences are found between the pre, post, and follow up tests regarding the time of using the internet at midnight and later on among the participants while the P-value was 0.031, this finding could be attributed to the effect of the educational program on increasing of knowledge of the participants about the negative effects of accessing internet on late night on their physical health.

Part II: Regarding Knowledge about IA among the participants.

The current study revealed that the implementation of the educational program achieved improvements in the participants' level of knowledge about IA, while more than one half (52.2%) had a good level of knowledge and more than one third (35.4%) had a very good level of knowledge about IA, with high statistical significant differences between the pre, post-test and follow up tests. A Previous study by **Zadeh et al. (2014)** reported that knowledge is essential for admitting healthy behavior such as addiction protective behaviors. Also, knowledge about the negative effects of addictive behaviors can save students against it. Thus, raising knowledge of university students about the addictive nature of the internet and the side effects of IA is necessary for changing their IA behavior.

In the same line with the current study, **Gholamian et al. (2019)** & **Khoshgoftar et al. (2019)** & **Joy and Rappai (2017)** found that after applying the educational intervention about IA, the mean scores of knowledge about IA showed a significant increase. Moreover, the current study was congruent with **Chander (2019)** who detected that after the structured teaching program concerning the negative effects of IA, 66.67% of College students had very good knowledge and 33.33% of College students had good knowledge regarding IA.

Part III: Regarding the health beliefs toward IA among the participants.

Concerning the beliefs regarding the barriers to reduce internet time, the current study revealed that before the implementation of the educational program, less than half (46%) of the participants agreed that feeling bored without the internet is a barrier for reducing internet time. This finding was congruent with **Lau et al. (2018)** who detected that less than half (47%) of the participants had the same belief. Another important barrier for reducing internet time agreed on by about half (49%) of the participants of the current study is that no other way to relieve stress in their life if they reduce their internet time. Based on that, internet accessing may offer advantages as believed by students, so they have to be taught to manage their Internet access. One of the strategies that could be used to achieve that is to increase their believed self-efficacy to organize their time of Internet use. Also, gaining skills in managing their time and real social connection can be of great benefit. Based on a study explored the multidimensional needs of students for the prevention of IA by **Shahrbabakiet al. (2017)** adequate societal support such as designing entertainment programs for students or organizing sports events can help them overcome these barriers.

The current study showed that after implementation of the educational program, the mean score of all the scales of HBM regarding IA had increased among the participants except for perceived barriers (which is good as it is inverted scores) with statistically significant differences between the pre, post and follow up tests where p-value was 0.001. This increase could be attributed to the effect of the intervention on the students' beliefs toward IA. In the same line with the current study, **Maheri et al. (2017)** found that before and after the educational intervention regarding IA, the mean scores of the HBM constructs among the participants in the intervention group was significant where P value was 0.001.

Similar to the current study, **Khoshgoftar et al. (2019)** found a significant increase in perceived susceptibility, perceived severity, and cues to action scores regarding IA after the intervention. Based on the

HBM, high perceived severity and susceptibility are necessary to increase the motivation of individuals to adopt healthy behaviors (Luquis&Kensinger, 2019). A Previous study reported that increasing perceived susceptibility and severity are predictive factors that lead to avoidance of addictive behaviors (Zadeh et al., 2014). On the other hand, cues to action refer to cases that remind the person to do proper behavior and to avoid unsafe behaviors.

Congruent with the results of the current study, Gholamian et al. (2019) & Khoshgoftar et al. (2019) showed that after the educational intervention aimed at reducing internet and mobile phone addiction, the mean scores of perceived behavioral control (Perceived self-efficacy) related to IA and mobile phone addiction were significantly higher than before the intervention. Self-efficacy is the strength or level of one's belief in his/her capability to perform and accomplish tasks which is an important factor that effectively influences individuals' behaviors. Numerous studies confirmed that increased self-efficacy leads to increased adoption of healthy behavior (Wanget al. 2016).

Contrary to the results of the current study, Khoshgoftar et al. (2019) showed that after the intervention, there was no considerable change in the perceived benefits regarding mobile phone addiction among the participants. This contradiction might be as in the previous study, the participants were younger than our participants while their mean age was 14.62 ± 0.52 . The Perceived benefits of decreasing the use of the internet and phone from the point of view of adolescents may be dissimilar to that of young adults.

The current study revealed significant changes in the perceived barriers to reduce internet time after the implementation of the educational program. This result was contradicted by Khoshgoftar et al. (2019). This contradiction may be due to the strong connection between the higher perceived benefits and lower perceived barriers regarding healthy behaviors and hence, the perceived benefits not significantly changed in the previous study so were the perceived barriers not affected. According to different studies conducted, high perceived benefits and lower perceived barriers are predictive factors in accepting and performing healthy behaviors such as preventive behaviors of addiction (Maher et al., 2017).

Part IV: Regarding the Level of IA among the participants

According to Young (1998) IAT, the current study showed that before the implementation of the educational program, 13% of the participants were normal internet user, less than half (44.6%) had a mild level of IA followed by more than one third (39.9%) had a moderate IA, while the minority (3.5%) had a severe level of IA. These findings were in harmony with Khalilet al. (2017) who detected that more than one third (38.4%), and 2.1% of participants were categorized as moderate to severe internet addict respectively while almost two-thirds (59.6%) of the participant students were average (normal and mild) internet user. Similar results to the current study were found in a study conducted by Rajeswari et al. (2017) who found that less than one quarter (22%) were normal internet user, about half (49%) of the participants were mildly addicted to the internet followed by less than one third (28.5%) moderately addicted, and the minority (0.5%) severely addicted to the internet

The current study revealed that the implementation of the educational program achieved a significant decrease in the level of IA among the participants with high statistical significant differences between the pre, post, and follow up tests. These findings were congruent with Maheri et al. (2017) & Mun and Lee (2015) & Ruggieri et al. (2016) & Chander (2019) & Celik (2016).

Contrary to the present study, De Leeuw et al. (2010) indicated that the number of internet addicts increased during the study. This contradiction may be as the participants of the current study were enthusiastic to increase their awareness about the intervention concerning IA besides, their high perceived self-efficacy for reducing internet time after implementation of the educational intervention, while the prior author (2010) stated that the participants did not indicate that the intervention influenced their intention to change the internet and game use behavior.

V. Conclusion

The findings of the current study support the effectiveness of an educational program based on the HBM in increasing knowledge and decreasing the level of IA among nursing students. Also, the results of the study supported that specific constructs of the HBM (perceived susceptibility and perceived severity of IA, perceived barriers, perceived benefits, and perceived self-efficacy for reducing Internet use) were affected by the educational program.

VI. Recommendation

- 1- Due to the proven effectiveness of the educational program based on the HBM in increasing IA knowledge and decreasing its level among nursing students, it is suggested that this educational program be implemented among the students of other faculties of Minia University.
- 2- Further studies include the participants' families in the intervention of IA is recommended especially for

students with severe levels of IA to emphasize novel methods of socialization and pleasure for the whole family.

- 3- Sustained implementation of an educational program about IA across different generations is recommended to counteract its effect
- 4- Nurse teachers need to include the different types of addictions, such as IA to nursing study courses.

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