

Knowledge and Attitude of Faculty of Nursing Students regarding Telenursing

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Abstract

Background: Telenursing is cost effective and time saving innovative technology that can play a vital role in patient care and enable them to access nursing services at home. **The aim** of the study was to assess the knowledge and attitude of nursing students regarding telenursing. **Research Design:** A descriptive research design was utilized to conduct this study. **Setting:** This study was conducted at Faculty of Nursing /Benha University. **Sample:** Simple random sample was used in this study and the sample size was 214 students from fourth academic year. **Tools:** Two tools were used in this study to collect the data. **(I):** A structured interviewing questionnaire which consisted of two parts to assess nursing students' demographic characteristics and their knowledge about telenursing. **(II):** Scale to measure attitude of nursing students regarding telenursing. **Results:** 86% of the studied nursing students their age were from 20 to 22 years old with mean age was 21.15 ± 1.86 , 69.2% of them were female, 86% of them didn't have training courses about telenursing, 45.8% of them had average total knowledge score and 65.4% of them had positive attitude scores regarding telenursing. **Conclusion:** There was highly statically significant relation between the studied nursing students' total knowledge scores and their total attitude scores. **Recommendations:** Develop and implement educational programs to increase knowledge and attitude of nursing students regarding telenursing

Keywords: Attitude, Knowledge, Nursing students, Telenursing

Introduction

Telenursing is a part of telehealth, which is a long-distance health service conducted using information technology. Many countries have implemented telenursing as a part of the healthcare services. Telenursing process and scope of practice are the same as in the traditional way whenever a large physical distance exists between the patients and the nurses' activities. Telenursing has become the new reality in studying nursing. Education of students has a significant impact on their knowledge, opinion, and awareness of future work (Ghorbanadeh, et al., 2017).

Telenursing is an important way for reaching modern nursing care, to improve the quality of care and quick access to nursing care services

by overcoming geographical barriers. Telenursing focuses on patients' long-term wellness and health as well as empowerment of nurses with opportunity of education, follow up and family support through using Information and Communication Technology system (ICT) as telephones, fax, internet, soft applications as Facebook, WhatsApp, audio and video conferencing, and computer system (Sharma, 2018).

Telenursing applications have been already described in case of a disaster or a public health emergency, which an organized and structured care is provided from distance. In the time of COVID-19, the ICT system has been expanded and put into practice by monitoring and caring patients in hospitals and community, through

hemodynamic monitoring of patients in ICUs and the use of electronic files to both clinical nursing and the community. The ICT system has become an integral part of nursing care **(Alipour&Haghighi, 2021)**

Telenursing involves the use of technology tools and facilitates for providing remote healthcare services. Telenursing provides access to health services, which can affect the condition of remote patients. Nursing services performed in telenursing include patient triage, case management, education, counseling, diagnosis, and record of patients' information **(Ghoulami&Esmailpour, 2019)**.

Telenursing provides several benefits such as improving access and quick patient engagement at a cheaper cost. One precise advantage to telenursing is the number of patients that can be effectively cared for per nurse. It supports in filling the gap resulting from the burden of patients and a scarcity of healthcare providers. Nurses can visit nearly twice the number of patients when travel time is not fact. Among many advantages of telenursing in nursing care are improved accessibility to health care, faster services development, data security, better information flow, facilitate communication between nursing staff and hospitals, and improvement of time and resource allocation **(Asimakopoulou, 2020)**.

Although telenursing has many advantages, also has disadvantages as lack of physical interaction between healthcare provider and the patient which may lead to impossible to diagnose certain condition which require physical examination. Additionally, it is hard for the nurse to ascertain that the caller is the person that they claim to be. Thus, it is hard to handle the issue of integrity in telenursing **(Elsayed & Ebrahim, 2018)**.

Nursing students are an intrinsic part of healthcare system. Nursing students should be prepared for the use of technology from the

start of education for the purpose of increasing the use of computers in healthcare practice. Informatics and information competencies should be incorporated into the nursing curriculum in order to prepare nursing graduates to meet the ever-changing technologies need to patients and to prepare the nursing students for "high-touch, high-technology" patient care **(Terkes et al., 2019)**.

Significance of the Study:

Telehealth and telenursing can play an important role in solving the global challenges facing the health system. Particularly, when telehealth is being a part of the national health strategy. In Egypt one of the most challenging problems that encounter the Egyptian society is the lack of significant health care in rural areas. This problem led to more severe problems that face society. The telenursing is considered one of the most solutions for the problem, but application of telehealth and telenursing facing several challenges in Egypt; the lack in experience in dealing with telenursing, resistances to change, and unavailability of special equipment **(El Sayed, 2017)**.

The study is important to increase nursing students' knowledge and attitude toward telenursing technology

Aim of the study

This study aim was to assess knowledge and attitude of faculty of nursing students regarding telenursing.

Research questions

- 1- What is the nursing students' knowledge regarding telenursing?
- 2- What is the nursing students' attitude regarding telenursing ?
- 3- Is there a relation between nursing students' knowledge and attitude toward telenursing?

- 4- Is there a relation between nursing students' knowledge toward telenursing and their characteristics?
- 5- Is there a relation between nursing students' attitude toward telenursing and their characteristics?

Subject and Methods

Research design:

Descriptive design was used in carrying out the study. Descriptive research design is a research method that describes the characteristics of the population that is being studied and focuses more on the "what" of the research subject rather than "why" of the research subject.

Setting:

This study was conducted at Faculty of Nursing in Benha University

Sampling

Simple random sample was used in this study of fourth year student of Nursing Faculty.

Sample size was calculated using the following formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where 'n' is sample size.

'N' is total number of all students studying in the fourth year of Nursing Faculty/ Benha University (2021).

N= 459

'e' is Coefficient factor=0,05

Sample size is=214

Tools of data collection:

Two tools were used in this study to collect the data:

Tool (1): A structured interviewed questionnaire

It was developed by researchers based on literature review and written in a simple clear Arabic language; it comprised of two parts to assess the following:

First part: (A): Was concerned with personal characteristics of nursing students which

include four questions: Age, gender, residence, and previous graduation school.

(B) Was concerned of nursing students' using of technology which include eight questions (having mobile phone, type of mobile phone, having a computer access, having an internet access, numbers of hours using the internet per day, the way of connection to the internet, having training courses about telenursing, and name of courses about telenursing).

Second part: It was concerned with nursing students' knowledge regarding telenursing consisted of questions as (meaning of telenursing, aim of telenursing, advantages, and disadvantages of telenursing).

Scoring system for nursing students' knowledge:

Nursing students' knowledge about telenursing is calculated for each item as follow, correct and complete answer was scored (2), correct and incomplete answer was scored (1), while don't know was scored (0). For each area of knowledge, the score of questions was summed up and the total divided by the number of questions, which converted into a percent score.

The total score for all questions related to knowledge represent 100% and categorized into three levels as following:

Good→ when the total score were $\geq 75\%$ (16points)

Average→ when the total score was 50% to less than 75% (11-16 points)

Poor→ when the total score was less than 50% (11points).

Tool (II): It was concerned with scale to measure the attitude of nursing students about telenursing adopted from (**Glinkowski et al., 2013**) and modified by the researchers which included 12 items.

Scoring system of attitude:

Attitude scale score were calculated as (2) score for agree, (1) score for uncertain and (0) for disagree.

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The total attitude score were considered positive attitude if the score $> 80\%$ (≤ 19 points) and considered negative attitude if the score $< 80\%$ (≤ 19 points).

Content validity and reliability of the tools:

The tools were reviewed for comprehensiveness, appropriateness and legibility by five of Faculties of Nursing Staff from the Community Health Nursing Specialties, Faculty of Nursing at Benha University. The staff ascertained the face and content validity of the tools. The reliability was done by Cornbrash's Alpha coefficient test which revealed that each of the two tools consisted of relatively homogeneous items as indicated by the moderate to high reliability of each tool. The internal consistency of knowledge was 0.853 and attitude was 0.715.

Ethical consideration:

Permission has been obtained orally from each nursing student before conducting the interview and give a brief orientation to the purpose of the study. They were also reassured that all information gathered would be confidential and used only for the purpose of the study. No names were required on the forms to ensure anonymity and confidentiality. They were also informed about their right to withdraw at any time from the study without giving any reasons.

Pilot study:

A pilot study was conducted on 10% (21students) of the studied nursing students to test the content, applicability and simplicity of the tool using the interviewing questionnaires. Based on the pilot study the modification of the tools included rephrasing, rearrangement of some questions. The pilot study was carried in two weeks before starting the study and those who shared in the pilot study were included in the studied sample.

Field work:

Data were collected over three months from 20 September2021 to end of December 2021; the study was conducted by the researchers for the studied sample in the Faculty of Nursing/Benha University. The researchers visited the Nursing Faculty 3days/week (Sunday, Monday and Wednesday) from 9:00 am to 2:00 pm according to their lectures schedule. The researchers explained the purpose and importance of the study to the nursing students, the researchers collect the data from the nursing students, the average numbers of interviewing nursing students were between 9-10 students/day depending on their response to the interviewer, each interviewed nursing student take about 20-25 minute to fill the sheet depending on their understanding and response.

Statistical analysis:

Computerized data entry and statistical analysis were fulfilling scored using Statistical Package for Social Science (SPSS), version 20. Descriptive statistics were used (frequency, percentage, and mean \pm SD) then Chi square test was used.

Statistical significance is considered as:

*Significant when p- value < 0.05 .

*Highly significant when p - value < 0.001 .

*No significant result when p – value > 0.05 .

Results

Table (1): Shows the students characteristics and clears that 86% of studied nursing students their age was from 20 years to22 years with mean age 21.15 ± 1.86 , and 69.2% of them were female. Also 86.0% of the studied nursing students were living in rural area, and 67.3% of them had secondary education for the previous education.

Table (2): Shows that 93% of studied nursing students had mobile phone, 74.3% of them used smart phone, 51.9% of them had a computer access, and 83.2% of them used an internet access. As regard the number of hours

they used the internet per day 36.9% of them spent more than three hours per day, 62.1% of them connected to the internet through mobile phone, and 86% of them didn't have training course about telenursing.

Figure (1): Reveals that 45.8% of the studied nursing students had average total knowledge scores regarding telenursing and only 18.7% of them had poor total knowledge scores regarding telenursing

Figure (2): Illustrates that 65.4% of the studied nursing students had positive total attitude scores regarding telenursing and 34.6% of them had negative total attitude scores regarding telenursing.

Table (3): Reveals that there was a highly statistically significant relation between the studied nursing students' total knowledge scores and their total attitude scores.

Table (4): Illustrates that there were no statistically significant relations between the studied students' total knowledge scores and their age, gender, and residence. While there was a highly statistically significant relation between total knowledge scores and their previous graduation school.

Table (5): Shows that there were statistically significant relation between the studied nursing students' total attitude scores and their age and gender while $P\text{-value} \leq 0.05$. While

there were no statistically significant relation between the studied nursing students' total attitude scores and their residence and previous graduation school.

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Table (1): Frequency distribution of studied nursing students regarding their demographic characteristics (n=214).

Demographic characteristics	No	%
Age		
Less than 20 years	3	1.4
20-22 years	184	86.0
More than 22 years	27	12.6
Mean ±SD	21.15±1.86	
Gender		
Male	66	30.8
Female	148	69.2
Residence		
Urban	30	14.0
Rural	184	86.0
Previous education school		
Secondary education	144	67.3
Nursing Technical Institution	70	32.7

Table (2): Frequency distribution of studied nursing students regarding their using of technology(n=214).

Using of technology	No	%
Do you have mobile phone?		
Yes	199	93.0
No	15	7.0
Type of mobile phone (n=199)		
Smart phone	159	79.9
Not smart phone	40	20.1
Do you have a computer access?		
Yes	111	51.9
No	103	48.1
Do you have an internet access?		
Yes	178	83.2
No	36	16.8
How often do you use the internet?		
One hour per day	37	17.3
Two hours per day	44	20.6
More than three hours per day	79	36.9
Don't use it at all	54	25.2
You can connect to the internet through		
Computer device	29	13.6
Mobile phone	133	62.1
Computer and mobile phone	52	24.3
Do you have training courses about telenursing?		
Yes	30	14.0
No	184	86.0

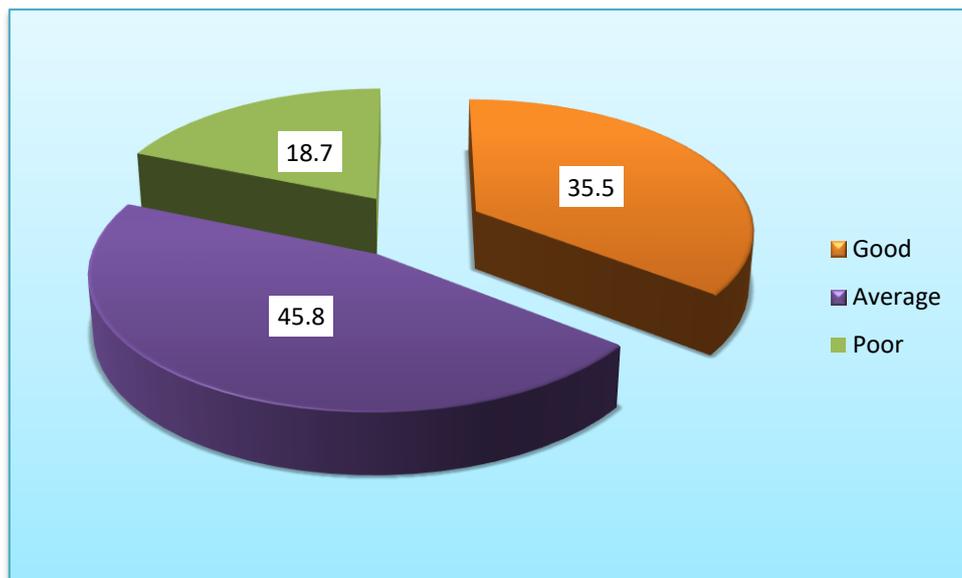


Figure (1): Percentage distribution of studied nursing students regarding their total knowledge score (n=214).

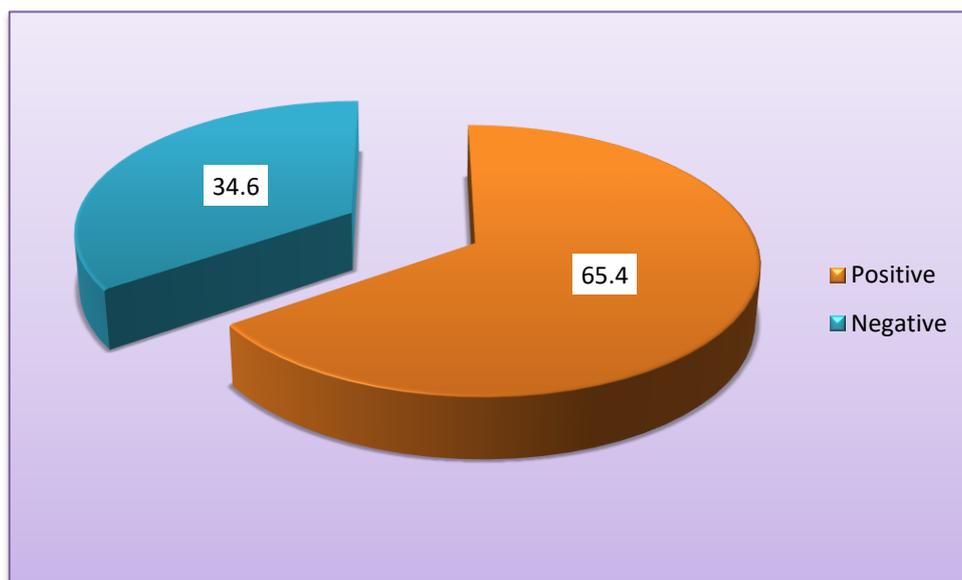


Figure (2): Percentage distribution of studied nursing students regarding their total attitude score

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Table (3): Relation between nursing students' total attitude level and their total knowledge scores (n=214).

Total knowledge scores	Total attitude scores					
	Negative (N=74)		Positive (N=140)		X ²	P-Value
	No	%	No	%		
Poor (n=40)	26	35.1	14	10.0	21.74	≤0.001**
Average (n=98)	31	41.9	67	47.9		
Good (n=76)	17	23.0	59	42.1		

****High statistically significant P- value ≤ 0.001**

Table (4): Relation between nursing students' total knowledge level and their demographic characteristics (n=214).

Demographic characteristics	Total knowledge level							
	Poor (n=40)		Average (n=98)		Good (n=76)		X ²	p-value
	No	%	No	%	No	%		
Age								
Less than 20 years	0	0.0	3	3.1	0	0.0	5.242	0.263
20-22 years	37	92.5	83	84.7	64	84.2		
More than 22 years	3	7.5	12	12.2	12	15.8		
Gender								
Male	18	45.0	27	27.6	21	27.6	4.624	0.099
Female	22	55.0	71	72.4	55	72.4		
Residence								
Urban	6	15.0	15	15.3	9	11.8	0.465	0.792
Rural	34	85.0	83	84.7	67	88.2		
Previous graduation school								
Secondary education	33	82.5	74	75.5	37	48.7	19.166	≤0.001**
Nursing Technical Institute	7	17.5	24	24.5	39	51.3		

****Highly significant difference P ≤ 0.001**

Non statistically differences P ≥ 0.05

Table (5): Relation between nursing students' total attitude level and their demographic characteristics (n=214).

Demographic characteristics	Total attitude level					X ²	P-Value
	Negative (N=74)		Positive (N=140)				
	No	%	No	%			
Age							
Less than 20 years	0	0.0	3	2.1	9.465	≤0.05*	
20-22 years	71	95.9	113	80.7			
More than 22 years	3	4.1	24	17.1			
Gender							
Male	15	20.3	51	36.4	5.926	≤0.05*	
Female	59	79.7	89	63.6			
Residence							
Urban	12	16.2	18	12.9	0.453	0.501	
Rural	62	83.8	122	87.1			
Previous graduation school							
Secondary education	55	74.3	89	63.6	2.543	0.111	
Nursing Technical Institute	19	25.7	51	36.4			

Discussion

The current era of healthcare reform is leading the change in the priorities and pressures for delivery of high-quality healthcare and with a surge in the need to efficiently meet patient care demand, and to accommodate the ever-evolving sophistication and modernization of information and communication technologies, it is an opportune time for innovative care delivery by telenursing. Telenursing is defined as distance communications, using electrical or optical transmission between humans and or computers, it is a cost effective and time saving innovation technology. Telenursing has expanded very fast over the last few years and will continue to expand. It will be an excellent carrier’s opinion for the nurses of the 21Th century (Mohammed, 2020).

Regarding characteristics of the nursing students, the current study revealed that, the majority of the studied nursing students age

ranged from 20 years to 22 years with mean age 21.15 ± 1.86. This result was in the same line with **Abd-Aleem, (2019)**, who studied "telenursing perception among nursing students at Port said University, Egypt"(n=169), who reported that 73.3% of the studied nursing students their age ranged from 20-22 years with mean age 21.53±1.4. This might be due to the sample of the study was the fourth year of students of Nursing Faculty.

Regarding the previous education school of the studied nursing students, the present study revealed that; more than two thirds of the studied nursing students had secondary education. This finding agreed with **Ghrobanadeh et al (2017)**, and studied "telehealth and telenursing knowledge and attitude among students of nursing in Ardebil University of medical science, Iran" (n=200), and reported that 60% of their participants had secondary education

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Regarding to using of technology, the present study showed that; less than three quarters of the studied nursing students had smart phone. This finding agreed with **El-Ramedy (2020)**, and studied "nursing students' perception regarding using of social net working in nursing education and its effect on their engagement, Egypt" (n=350), and found that most of the studied nursing students had smart mobile phone. This result might be due to the ability of the current generation of the nursing students to deal with new communication technology.

Regarding having internet access, the current study revealed that the majority of the studied nursing students had an internet access. This finding agreed with **Barbara & Samaria (2020)**, who studied "technology use among Indonesian nursing students does not correlate with their perception of telenursing competence, Indonesia" (185), who found the majority of the studied sample had an internet access. This might be due to widespread of internet connection in Egypt and the need of the nursing students to discover the world by using the internet

Concerning the total knowledge score of the studied nursing students regarding telenursing, the result of the current study revealed that more than half of the studied nursing students had average total knowledge scores regarding telenursing. This finding were consistent with **Kunjumon et al. (2021)**, who studied "knowledge regarding telenursing among nursing students (n=100), and found that 72% of the studied sample had average knowledge. This might be due to positive nursing students' background information regarding telenursing. The result of the current study revealed that; less than two thirds of the studied nursing students had positive total attitude scores regarding telenursing. This finding agreed with **Ghrobanadeh et al (2017) and** found that 70% of the studied nursing students had

positive total attitude scores regarding telenursing. This might be due to the current generation of nursing students seem to be well skilled for medical informatics and technology use.

The current study revealed that there was highly statically significant relation between the studied nursing students' total knowledge scores and their total attitude scores. This finding disagreed with **Ahmed & Bashir (2021)**, and studied "knowledge, attitude and perception related to telenursing among nursing students and nursing staff at The King Abdul-Aziz University, KSA (n=335), who found that there was no statically significant relation between total knowledge scores and the total attitude scores. This result might be due to acquiring more knowledge and information affect.

The current study revealed that there were no statistically significant relation between the studied nursing students' total knowledge scores and their age, gender and the residence. This result disagreed with **Kunjumon, et al (2021)**, who found that there was statistically significant relation between total knowledge scores and the age, gender and the residence of the studied students.

The current study revealed that there was no statistically significant relation between the studied nursing students' total attitude scores and their previous graduation school. This finding was in the same line with **Nissen&Brockevelt (2017)**, who studied "the effect of education of students, perception about telehealth, USA" (n=100), who found that there was no statistically significant relation between the studied nursing students' total attitude scores and their previous graduation school.

Conclusion

The majority of the studied nursing students had an internet access. Less than half of the

studied nursing students had average total knowledge regarding telenursing and less than two fifth of them had good total knowledge regarding telenursing. Less than two thirds of studied nursing students had positive attitude regarding telenursing while more than fifth had negative attitude regarding telenursing. The majority of the studied nursing students had an internet access.

There was a highly statistically significant relation between the studied nursing students' total knowledge scores and their total attitude scores. There was no statistically significant relation between the studied nursing students' total knowledge scores and their age, gender, and residence. There was no statistically significant relation between the studied nursing students' total attitude scores and their residence and previous graduation school. nursing students' background information about telenursing.

Recommendations

- ❖ Develop and implement educational programs to increase knowledge and attitude of nursing students regarding telenursing.
- ❖ Implement training courses for nursing students about telenursing and its applications.
- ❖ Further researches are required to study as factor affecting implementation and utilization of telenursing

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معلومات واتجاهات طلبة كلية التمريض تجاه التمريض عن بعد

أميرة السعيد عبداللطيف - دعاء محمد صبحي السيد - تيسير حميدو أبوسريع

يعتبر التمريض عن بعد هو أحد مكونات الرعاية الصحية عن بعد, حيث يمكن من خلاله تقديم خدمة تمريضية للمرضى عن بعد متغلبا علي حاجز المسافات الجغرافية وذلك عن طريق استخدام وسائل اتصال و التكنولوجيا الحديثة. يساعد التمريض عن بعد في تقديم وتنسيق وإدارة الخدمة الصحية للمريض. الخدمات الصحية التي يمكن تقديمها بواسطة التمريض عن بعد مثل: التثقيف الصحي, الوقاية من الأمراض, التشخيص التمريضي, تقديم الاستشارة الصحية, تنفيذ العلاج و التعامل مع الحالات. وتهدف الدراسة إلي تقييم معلومات واتجاهات طلاب كلية التمريض تجاه التمريض عن بعد. وقد أجريت هذه الدراسة في كلية التمريض- جامعة بنها. وتم إختيار العينة بالطريقة العشوائية للفرقة الرابعة من كلية التمريض جامعة بنها . حيث كشفت النتائج ان لدى 93% من الطلاب يمتلكون موبايل, 74.3% منهم يمتلكون هواتف ذكية, 51.9% من الطلاب يمتلكون أجهزة كمبيوتر 83.9% منهم يمتلكون إنترنت, 36.9% من الطلاب يقضون أكثر من ثلاث ساعات يوميا علي الإنترنت و 86% من الطلاب لم يحصلوا علي دورات تدريبية عن التمريض عن بعد, وجود علاقة ذات دلالة إحصائية عالية بين معلوماتالطلاب كلية التمريض وإتجاهاتهم. لا توجد علاقة ذات دلالة إحصائية بين درجات المعرفة الكلية للطلاب وبين أعمارهم والجنس والإقامة. كما أوصت الدراسة وضع وتنفيذ برنامج تعليمي للطلاب كلية التمريض لتحسين معلوماتهم واتجاهاتهم تجاه التمريض عن بعد. زيادة البرامج التدريبية عن التمريض عن بعد وتطبيقاته للطلاب كلية التمريض . يجب إجراء مزيد من الدراسات حول العوامل المؤثرة علي تطبيق التمريض عن بعد