

Telenursing Perception among Nursing Students AtPortsaid University

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Abstract: *The 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 their home. Little is known about whether university courses include the concept of telehealth/telenursing or their applications. The study aimed to assess telenursing perception among nursing students at Port Said University. Subject and methods: the study was conducted at Faculty of nursing/Port Said University using a descriptive research design; all nursing students from third and fourth academic years were enclosed in this study, with total number 169 students. Data was collected by using a questionnaire sheet aimed to evaluate students' knowledge and attitude towards telenursing. Results, studied students are moderately having knowledge regarding telenursing. 53.9% of them look forward to incorporate telenursing service into the national healthcare system, and 75.8% appreciated the addition of telenursing classes to the curriculum. Additionally, 53.9% of studied students are aware of the need for national telenursing implementation and like to use it in their future work (79.6%) that reflects a positive attitude toward telenursing. Therefore, the study recommended that nursing faculties should introduce the concept of telenursing into undergraduate curricula as it will increase their knowledge and influence their attitude.*

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I. Introduction

Telehealth is considering an evolving area of health care that is becoming more prominent as technology capabilities advance. Telehealth as a service delivery model incorporates technology into health care services¹. It defined as “the use of telecommunications technologies and electronic information to support long-distance clinical health care, patient and professional health-related education, public health and health administration”^{2,3}. Telehealth services include health promotion, disease prevention, diagnosis, consultation, treatment, education, care management, and therapy⁴. These services provided through using information and communication technologies (ICTs) as telephones (landlines and mobile phones), facsimile machines (fax), internet, video and audio conferencing, personal digital assistants (PDAs, Smart Phones), telerobotics, teleradiology, computerized information systems, and devices for transferring data in general^{1,5}, these technologies allow health care professional to access patient information from any remote location, to manage health care through electronic health record systems, and to assist from a distance⁶.

Telehealth may aid to decrease time and cost of healthcare service delivery by reducing the distance traveled by the client or practitioner, allow to monitor clients in their home who may need increased level of supervision due to safety concerns or need for assistance with chronic disease management, and gives opportunity for clients whom are unable to visit healthcare providers in person to access healthcare services. Moreover, Patients benefit from decreased hospital readmission, prevention of complications related to the disease process. On other hand, telehealth services may confront some technical issues; as a client who does not understand how to use the technology or the system malfunctions services needed cannot be delivered, lack of technical support may delay services. Additionally, some caregivers view technology as an added burden with increased responsibilities, as well as increase the cost of used technology^{1,7}.

Accordingly, nursing uses this technology as a tool to overcome the nursing shortage and lack of health care resources; as nurses can establish and maintain communication channel with clients over geographical, social, and cultural barriers. Tele-nursing defined as “use of telehealth technology to deliver nursing care and conduct nursing practice”⁸. Tele-nursing may include “home health care, nursing homes, ambulatory care, hospital consultations, prison settings, mentoring, ICU monitoring, and health promotion. The telenursing process and scope of practice are the same as in the traditional way whenever a large physical distance exists between the patient and the nurse⁹. Therefore, it may face unique liability issues that confront this type of nursing as technology failure, availability of resources in the home environment, confidentiality of health information, consistency of delivery methods and competencies related to telenursing^{10,11}.

Education of students has a significant impact on their knowledge, opinions, and awareness of future work. Little is known about whether university courses include the concept of telehealth/telenursing or their

applications. So, the study aimed at assesse telenursing perception among nursing students at Port Said University.

II. Material And Methods

Research design and setting: this descriptive study was conducted in the Faculty of Nursing, Port Said University, that adopting innovative approaches in education, such as Problem Based Learning (PBL), Community Based Learning (CBL), and Self-Learning (SL).

Subjects: The study subjects involved all senior nursing students from the third and fourth undergraduate academic years. Their total number was 169; 73 from the third years and 96 from the fourth years.

Data collection tool: A questionnaire designed by Glinkowski, Serafin, and Pawłowska¹² was used to collect the data concerning this study, aiming to assess students' perception regarding telenursing. It consisted of 32 multiple-choice closed questions and four open questions. The questionnaire translated into the Arabic language by the researcher and adjusted to fit the students' culture. Additionally, one item was added to assess students' opinion regarding the availability of facilities/possibilities of providing "telenursing" in their country. The questionnaire tested for validity by seven experts from Nursing Administration field, no modification was required. The reliability of the questionnaire was tested through examining its internal consistency, and demonstrated a high level of reliability with Cronbach's α coefficient 0.86.

A pilot study was carried out on 10% (17 students) of the sample students to assess the feasibility and to estimate the time needed to fill out the tools. Since no modifications were needed in the tool, the pilot sample was included in the main study sample.

Fieldwork: Upon fulfillment of all administrative arrangements, data collection phase was initialized by meeting students in the beginning, ending or in the break of problem based learning sessions for two days per week, according to their academic time schedule. The researcher introduced herself to students; and distributed the tools and asked them to fill it after explaining the aims of the study and its implication on the spot in the presence of the researcher to ensure the objectivity of the responses. The researcher collected data by herself with assistance from sessions' tutors. The filled forms were then collected and revised for completeness. The time needed to fill questionnaires was 15-20 minute. The data were collected over a period of two months, from March to April 2019.

Administrative and ethical consideration: Initially, The researcher contacted the questionnaire authors' and took their agreement to use it. Furthermore, a written permission to carry out the study was obtained from Faculty Dean, with coordination of Vice-Dean of Education and student's affair and academic years' coordinators to facilitate the process of data collection. The aim of the study was explained to students before taking their informed consent and they informed about their right to refuse to participate in the study. Also, they were reassured that any information obtained would be confidential and used only for purpose of the study.

Statistical analysis: Data entry and statistical analysis were done using SPSS20.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations for qualitative variables. Cronbach alpha coefficient was calculated to assess the reliability of the scales through their internal consistency.

III. Result

Table (1) Personal characteristics of studied nursing students (n=169)

Items	No	%	
Age	< 20	4	2.4
	20-22	124	73.3
	23 ≥ 25	41	24.3
	Mean Age ± (SD) 21.53 ± 1.4		
Gender	Male	52	30.8
	Female	117	69.2
Academic year	Third level	73	43.1
	Fourth level	96	56.9
Last year grade	Pass	12	7.1
	Good	41	24.3
	Very good	80	47.3
	Excellent	36	21.3
Do you have a computer access?	No	30	17.8
	Yes	92	54.4
	Yes, but I use it only in a library	3	1.8
	Yes (tablet)	6	3.6
	Yes (Smartphone)	38	22.5
Do you have an Internet access?	No	46	27.2
	Yes (I use paid service)	81	47.9
	Yes, only in a library	7	4.1
	Yes, I use free WiFi	35	20.7

How often do you use the Internet?	I don't use it at all	35	20.7
	Not more than 1 hour per day	13	7.7
	2 - 3 hours per day	32	18.9
	More than 3 hours per day	89	52.7

Table 1 illustrates that the highest percentage of students is in the age group between 20 to 22 years old; more than two-thirds of them are female (69.2%). Less than half of the students rated their academic achievement as very good in the last academic year (47.3%). Additionally, about half of the students have computer access and used paid services to get access to the internet for more than three hours per day (54.4%, 47.9%, &52.7% respectively).

Table (2) Students' knowledge about telenursing (n=169)

Item	No		%				
	Definition of telemedicine	True	102	60.4			
	False	67	39.6				
Definition of Telenursing	True	90	53.3				
	False	79	46.7				
Resources used in tele-nursing	Telenursing service requires	Agree		Difficult to say		Disagree	
		No	%	No	%	No	%
	Landline phone	98	58	31	18.3	40	23.2
	Mobile phone	122	72.2	21	12.4	26	15.4
	Tablet	106	62.8	27	16.0	36	21.3
	Internet	122	72.2	20	11.8	27	15.9
	Audio- and video conferencing system	120	71	21	12.4	28	16.6
	Telerobots	92	54.4	40	23.7	37	21.9
	TV	98	58	23	13.6	48	28.5
TeleECG	90	53.2	37	21.9	42	24.9	

Concerning studied students' Knowledge regarding telenursing, Table 2 denotes that less than three thirds of students define telemedicine correctly while slightly more than half define telenursing accurately (53.3%). Regarding resources used in telenursing, more than half of students reported that landline phone, telereports, TV, teleECG used in telenursing (58%, 54.4%, 58%, & 53.2% respectively); less than two thirds reported that tablets are used in telenursing (62.8%); and less than three-quarters reported that mobile phone, internet and audio-and video conferencing system are used in telenursing (72.2%, 72.2%, & 71% respectively).

Table (3) Students' perception toward telenursing (n=169)

Items	Agree		Difficult to say		Disagree	
	No	%	No	%	No	%
Do you think that telenursing in undergraduate studies would be useful for future healthcare workers?	128	75.8	20	11.8	21	12.4
Would you like to use telenursing as an additional form of the patient care in your future work?	130	76.9	15	8.9	24	14.2
How do you assess the need to introduce telemedicine services in the healthcare of your country?	91	53.9	51	30.2	27	16
The facilities/possibilities of providing "telenursing" care are available in your country	91	53.9	51	30.2	27	16

As for the nursing students' perception toward telenursing Table 3 indicated that more than three quarters of students reported that studied telenursing in undergraduate would be useful for future healthcare workers (75.8) and like to use it as an additional form of the patient care in their future work (76.9%). Additionally, more than half of then indicated that introduce telemedicine service in healthcare is needed of their country (53.9%) and have facilities/possibilities of providing this service (53.9%).

Table (4) Students' responses toward the advantages and disadvantages of telenursing (n=169)

Items	Agree		Difficult to say		Disagree	
	No	%	No	%	No	%
Advantages of tele-nursing						
Telenursing can improve the efficiency of the medical staff	107	63.4	34	20.1	28	16.5
Telenursing can facilitate the contact of medical staff with patients	133	78.7	14	8.2	22	13.1
Telenursing has no advantages	61	36.1	34	20.1	74	43.8
Do you think that telenursing can reduce the cost of patient	Yes, directly		Yes, indirectly		No	

care?	21	12.4	76	45.0	72	42.6
Disadvantages of tele-nursing						
Telenursing can increase the cost of patient care	86	50.9	21	12.4	62	36.7
Telenursing can cause technical problems (hardware, connections, etc.).	97	57.4	33	19.5	39	23.1
Telenursing may result in the loss of direct contact between the medical staff and the patient	73	49.1	23	13.6	63	37.3
Telenursing has no disadvantages	53	31.3	22	13.0	94	55.6

Table 4 points less than three quarters of studied students reported that telenursing has some advantages; less than half of them think that applying telenursing can indirectly reduce the cost of patient care (45.0%), less than two thirds reported it can improve the efficiency of the medical staff (63.4%) and more than three quarters reported it can facilitate the contact of medical staff with patients (78.7%).

In relation to the disadvantages of telenursing, more than half of students think that telenursing can cause technical problems (57.4%), and 49.1% reported it may result in the loss of direct contact between the medical staff and the patient.

Table (5) Student's responses toward Nursing specialties that can apply tele-nursing (n=169)

Telenursing can be most widely used in	Agree		Difficult to say		Disagree	
	No	%	No	%	No	%
Community health nursing	118	69.8	19	11.2	32	18.9
Patient with Diabetes	115	68	25	14.8	29	17.1
Patient with chronic disease	96	56.9	31	18.3	42	24.8
Patient with Pulmonary disease	104	61.5	27	16.0	38	22.5
Patient with heart disease	105	62.1	30	17.8	34	20.1
Pediatric nursing	102	60.4	30	17.8	37	21.9
Medical-Surgical nursing	103	60.5	21	12.4	45	26.7

As displayed in Table 5 the highest percentage of students agreed that telenursing can be most widely used in community health nursing (69.8%), medical-surgical nursing (60.5%), and pediatric nursing (60.4%); additionally it can be used with patient have diabetes (68%), heart disease (62.1%), pulmonary disease (61.5%), and chronic disease (56.9%).

IV. Discussion

The current era of healthcare reform is leading the change in priorities and pressures for delivery of high quality healthcare and with a surge in the need to efficiently meet patient care demands, and to accommodate the ever-evolving sophistication and modernization of information and communication technologies (ICT), it is an opportune time for innovative care delivery by telehealth. Telenursing as a component of telehealth⁵ is a cost-effective and time saving innovative technology. It has expanded very fast over the last few years and will continue to expand. It will be an excellent carrier option for the nurses of the 21st century¹³.

According to the present study findings, less than two thirds of students define telemedicine correctly while the definition of telenursing was recognized correctly by slightly more than half of them. This finding could be attributed to students curriculum may include brief lectures about telehealth and telemedicine as general not specified to telenursing, or students may be acquired their information about the concept from the Internet as there is an addiction on it from youth as more than half of students reported that they get access to the internet for more than three hours per day.

In disagreement with study findings, Glinkowski, Serafin, and Pawłowska¹² in a study at Poland regarding telehealth and telenursing perception and knowledge among university students of nursing, mentioned the most of participants identified the definition of telemedicine correctly meanwhile three quarters of them recognized the definition of telenursing properly. Additionally, Nissen and Brockvelt¹ who study the effect of education on student perceptions about telehealth and found a lack of knowledge in relation to telehealth before implementing the educational session. In the same line, Erickson, Fauchald, and Ideker¹⁴ in a study regarding integrating telehealth instruction into the graduate nursing curriculum pointed out that after orientation and clinical experience using telehealth indicated that students' overall knowledge regarding telehealth increased with most scoring agree to strongly agree that they are knowledgeable regarding telehealth.

According to the present study findings, less than three quarters of participants indicated that the service can be provided via the internet by using the mobile phone, and audio- and video conferencing system. Additionally, more than half reported that landline phone, telereports, TV, teleECG and less than two thirds reported that tablets can be used in telenursing. Glinkowski, Serafin, and Pawłowska¹² contradicted

these findings as he pointed out the most of students considered the use of internet, mobile phones and audio-and videoconferencing as the most useful for telenursing.

Concerning the advantages and disadvantages of telenursing, three quarters of studied students reported that telenursing has some advantages; less than half of them think that applying telenursing can indirectly reduce the cost of patient care, less than two thirds reported that it can improve the efficiency of the medical staff and more than three quarters reported it can facilitate the contact of medical staff with patients. However, more than half of the students highlighted that telenursing can cause technical problems, and less than half reported it may result in the loss of direct contact between the medical staff and the patient.

The foregoing present study findings are in disagreement with Reiersen, Solli, and Bjørk¹⁵ who conduct a study about nursing students' perspectives on telenursing in patient care after simulation, and concluded that the studied students saw telenursing as a favorable economic approach. As well, Glinkowski, Serafin, and Pawłowska¹² concluded that the most of respondents presented the opinion that telenursing is able to reduce the cost of patient care, facilitate the patient's contact with medical personnel, and improve the efficacy of medical personnel work.

In relation to student's perception toward telenursing, more than three quarters of students pointed out the importance of studying telenursing in undergraduate for future healthcare workers and like to use it as an additional form of the patient care in their future work. Moreover, more than half of them reported that introduce telemedicine service in healthcare is needed and their country has the facilities/possibilities for providing this type of service. These findings may be interpreted as Egypt is seeking to develop her health care delivery system to improve the level of health services provided and the health of citizens, this development was reflected in students' awareness and enthusiasm for this development witnessed by the country recently.

In line with the aforementioned findings, Reiersen, Solli, and Bjørk¹⁵ mentioned that students viewed telenursing as future oriented and argued that nursing education must prepare students for this reality. It was viewed as a complex way of delivering care and should be taught over time throughout undergraduate nursing education; and added that more research is needed to obtain a broader insight into best practice telenursing education. Similarly, Glinkowski, Serafin, and Pawłowska¹² who found that more than two thirds of students would anticipate telenursing services implementation into the national healthcare system and less than three quarters of them would like to use telenursing services in their future work as an additional form of patient care. However, he indicated that only two fifths of students would like to have telenursing classes in the curriculum which contradicted with the present study findings.

Furthermore, Erickson, Fauchald, and Ideker¹⁴ conducted that the students indicated that they agreed to strongly agree with the statement that they would recommend telehealth and that they would like to use it. Moreover, the students had positive perception regarding telehealth in terms of recommending it to patients and desire to use in future practice and incorporation of it into the curriculum. The students' overall impression of telehealth as a high quality means for providing patient care.

Generally, the findings underscore the importance of incorporate education regarding telenursing into the undergraduate nursing curriculum to increase students' knowledge and influence their attitude toward telenursing that become a milestone in the development of telenursing in Egypt.

V. Conclusion

The study results lead to the conclusion that studied students are moderately having knowledge regarding telenursing. However, they are aware of the need for national telenursing implementation and like to use it in their future work that reflects a positive perception toward telenursing.

Based on the study findings, the recommendations are as following:

- Nursing faculties should introduce the concept of telenursing into undergraduate curricula as it will increase their knowledge and influence their attitude.
- Policy and decision-makers should integrate telenursing as a new method of service delivery and develop guidelines and laws regulating it.
- Replication of the study to involve all nursing students in Egypt.

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