

Nursing Interns' Perceptions of Telenursing: Implications for Nursing Education

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Abstract

Background: Telemedicine is a fast-emerging health sector in India. While nurses play an important role in delivering healthcare services through telemedicine, little is known about whether nursing interns are prepared adequately.

Aim: To evaluate nursing interns' perceptions of telenursing and to find out their opinion on whether telenursing should be added to the curriculum.

Methods: This was a cross-sectional descriptive survey carried out among conveniently selected nursing interns ($N = 183$) from renowned colleges in Bangalore, South India. The data were collected using a self-reported questionnaire.

Results: In this study, a majority of the participants had smartphones (74.8%), were accessible to the internet (96.7%), and were using the internet for more than 3 h/day (73.3%). While a majority (65.6%) of the participants were able to correctly identify the definition of telenursing, only 33.9% of them rightly answered the definition of telemedicine. Most of the participants indicated that the inclusion of telenursing in undergraduate studies would be useful for future healthcare workers (92.4%), and telenursing can be practiced in all the medical specialties.

Conclusion: The majority of the nursing interns hold positive perceptions of telenursing and acknowledge its usefulness in nursing practice. However, their knowledge of telenursing is limited. Hence, the findings strongly suggest the need to introduce concepts of telenursing in curricula to prepare future healthcare providers to be able to provide safe and competent care in a highly technical and digital environment.

Keywords: nursing education; nursing informatics; nursing interns; perceptions; telemedicine; telenursing

Telemedicine is a fast-emerging sector in the healthcare system in India. According to the American Telemedicine Association (ATA), 'telemedicine is the natural evolution of healthcare in the digital world' (1). The release of telemedicine practice guidelines by the Ministry of Health and Family Welfare paved a way for the exponential use of telemedicine services by the citizens of India during the midst of the COVID-19 pandemic. Also, a national health initiative 'The Ayushman Bharat Scheme' by the Indian government is encouraging the implementation of telemedicine services at Health and Wellness Centers to provide comprehensive services to the people who live in rural areas.

In the digital era, telenursing is a cost-effective and time-saving innovative approach for better patient care. Telenursing has been defined as the delivery, management, and coordination of care, and services provided

through information and telecommunication technologies (2). Nursing professionals require new skills and attitudes as they use technological devices in telenursing practice (3–5). Although information technology revolution in healthcare has created a demand for nurses with sound knowledge of Nursing Informatics, nursing curricula do not include content on telenursing (6). Also, a considerable amount of research has strongly recommended the importance of integrating telenursing into nursing curricula (7–10).

Nurses being the primary care providers offer healthcare services at the grass-root level. In India, under the National Health Mission, nurses are expected to lead Health and Wellness Centers at the subhealth center level. They are also responsible to enable needy people in meeting the healthcare requisites through teleconsultations with registered medical practitioners at a higher healthcare

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facility. At this juncture, nurse educators have a prime responsibility to prepare nursing students for this reality. Education on telenursing may have a significant impact on nursing students' knowledge, opinions, and awareness on implementing it in their future practice. In India, the undergraduate nursing curriculum included a few theory and practical hours on computer science (15 + 30h), but do not focus on practical aspects of telenursing. Little is known whether undergraduate nursing interns have received an adequate education on telenursing for patient care. In India, few studies have examined the effectiveness of Self Instructional Module (SIM) on knowledge regarding telemedicine among nurses (11). Very few studies have examined the knowledge, perception, and willingness to using telemedicine among Medical and Allied Healthcare students (12). In nursing education, the internship year is considered as a time of transition from undergraduate nursing students to a beginning level of registered nurses (13). It is of utmost importance to assess the nursing interns' views on telenursing. Therefore, the objectives of this study were to evaluate nursing interns' perceptions of telenursing and to find out their opinion on whether telenursing should be added to the curriculum.

Materials and methods

This cross-sectional survey was carried out among conveniently selected nursing interns from renowned colleges in Bangalore, South India. The survey was conducted between May and September 2019. Of the nursing interns who were approached, a total of 197 participants were interested to participate. However, a few incomplete questionnaires ($n = 14$) were discarded. Hence the final sample size comprised of 183 nursing interns with a response rate of 93%.

The data were collected using a self-reported questionnaire developed by Glinkowski et al. (7). This was a 5-point Likert scale with 28 items with four negatively worded items. The participants' responses were rated as strongly disagree (1) to strongly agree (5). The reliability of the questionnaire was established through the test-retest method ($r = 0.83$). The demographic part of the questionnaire included age, gender, whether nursing interns were accessible to computers, the internet, and frequency of internet use per day.

Data collection procedure

The English version of the above-said questionnaire was piloted among a small group ($n = 20$) of nursing interns and found it was feasible. After obtaining permission from the authorities, the questionnaires were administered at the beginning of their regular lectures. The primary researcher was available during the data collection to clarify the doubts of the participants if any. It took approximately 20–30 minutes to complete the questionnaires.

Ethical considerations

Permission was obtained from administrators of the colleges where the study was conducted. The nursing interns were informed of the study's aims and procedures and were invited to participate in the study. It was explicitly explained that the participants' responses would not influence their semester exams. After obtaining verbal consent, the primary researcher distributed the questionnaires. Data collection tools contained no identifying information to ensure the confidentiality of the participants.

Statistical analysis

The negatively worded items were reverse coded, and data were analyzed using appropriate statistical software (SPSS 21 version). Descriptive statistics such as frequency, percentage, mean, and standard deviation were performed.

Results

The sample of the present study included 183 nursing interns, of whom a vast majority were females (97.8%). The mean age of the participants was 21 years (SD, 0.87). While nearly three-fourths of the participants had their smartphones, 21.9% of them had access to computers. Similarly, a majority of the participants had access to the internet (96.7%). Only two of them had no access to the internet. Concerning the frequency of using the internet, a majority (73.3%) of the participants were using the internet more than 3 h/day, and merely 3.8% of them accepted that they don't use the internet at all (Table 1).

While a majority (65.6%) of the participants were able to correctly identify the definition of telenursing, only 33.9%

Table 1. Socio-demographic characteristics of the participants

Variable	Group	Frequency	Percentage
Age	<21	75	41.0
	>22	108	59.0
Gender	Male	04	2.2
	Female	179	97.8
Access to computer	No	0	0
	Yes	40	21.9
	Yes, I use it only in a library	06	3.3
	Smartphone	137	74.8
Access to the internet	Yes	177	96.7
	Yes, only in the library	03	1.6
	Wi-Fi	01	05
	No	02	1.1
Frequency of using internet	I don't use it at all	07	3.8
	Not more than 1 h/day	05	2.7
	2–3 h/day	37	20.3
	More than 3 h/day	134	73.3

of them rightly answered the definition of telemedicine (Table 2). Regarding participants' awareness, nearly three-fourths of the students felt that mobile phone (74.4%), internet (72.1%), and audio-video conferencing system (73.8%) are essential for telenursing practice. While one-fourth of the participants stated it difficult to say about the requirement of landline phone (25.1%), telerobots (27.9%), television (29.0%), and tele-electrocardiogram (ECG) (31.1%), one-third of them denied the use of tablet (36%), telerobots (32.7%), and television in telenursing practice.

Regarding the participants' perceptions toward telenursing, a majority indicated that inclusion of telenursing in undergraduate studies would be useful for future healthcare workers (92.4%); telenursing is an additional form of patient care in their future work (88.6%) and agreed the need to introduce telemedicine services in the healthcare in our country (62.3%) (Table 3).

The majority of participants in this study hold positive perceptions about the advantages of telenursing as they have agreed that telenursing can improve the efficiency of the medical staff (59.6%), can facilitate the contact of medical staff with patients (76.5%), has advantages

(60.6%), and directly reduces the cost of patient care (61.2%). Also, most of the participants disagreed that telenursing can cause technical problems (71.0%) and may loss direct contact between the medical staff and the patient (67.7%) (Table 4).

The highest percentage of participants agreed that telenursing can be most widely used in cardiac nursing (66.7%) followed by pediatric nursing (66.2%), environmental health nursing (66.1%), diabetes nursing (64.5%), long-term nursing (63.4%), and pulmonary nursing (56.3%) (Table 5).

Discussion

The present study was aimed to investigate nursing interns' perceptions of telenursing inpatient care. The findings demonstrated that nursing interns have a moderate level of knowledge and positive perceptions of telenursing practice. The majority of them felt the need to introduce the concepts of telenursing in the undergraduate curriculum.

In the present study, nearly three-fourths of the participants had their smartphones, and only 21.9% of them

Table 2. Participants' knowledge of telenursing

Variable	Response	Frequency	Percentage			
Definition of telemedicine	Right answer	62	33.9			
	Wrong answer	121	66.1			
Definition of telenursing	Right answer	120	65.6			
	Wrong answer	63	34.4			
Requirements for telenursing practice	Strongly agree/agree		Difficult to say		Strongly disagree/disagree	
	n	%	n	%	n	%
Landline phone	87	47.5	46	25.1	50	27.3
Mobile phone	136	74.4	24	13.1	23	12.6
Tablet	85	46.5	32	17.5	66	36.0
Internet	132	72.1	32	17.5	19	10.4
Audio- and video conferencing system	135	73.8	29	15.8	19	10.4
Telerobots	72	39.4	51	27.9	60	32.7
TV	54	29.5	53	29.0	76	41.5
Tele-ECG	88	47.1	57	31.1	38	20.8

Tele-ECG, tele-electrocardiogram.

Table 3. Participants' perceptions toward telenursing

Variable	Strongly agree/agree		Difficult to say		Strongly disagree/disagree	
	n	%	n	%	n	%
Do you think that telenursing in undergraduate studies would be useful for future healthcare workers?	169	92.4	10	5.5	04	2.1
Would you like to use telenursing as an additional form of patient care in your future work?	162	88.6	18	9.8	03	1.6
How do you assess the need to introduce telemedicine services in the healthcare of your country?	114	62.3	60	32.8	09	4.9

Table 4. Participants' responses to the advantages and disadvantages of telenursing

Variable	Strongly agree/agree		Difficult to say		Strongly disagree/disagree	
	n	%	n	%	n	%
Advantages of telenursing						
Telenursing can improve the efficiency of the medical staff	109	59.6	46	25.1	28	15.3
Telenursing can facilitate the contact of medical staff with patients	140	76.5	20	10.9	23	12.6
Telenursing has no advantages	48	26.3	24	13.1	111	60.6
	Yes, directly		Yes, indirectly		No	
	n	%	n	%	n	%
Do you think that telenursing can reduce the cost of patient care	112	61.2	60	32.8	11	6.0
	Strongly agree/agree		Difficult to say		Strongly disagree/disagree	
	n	%	n	%	n	%
Disadvantages of telenursing						
Telenursing can increase the cost of patient care	51	27.9	60	32.8	72	39.4
Telenursing can cause technical problems (hardware, connections, etc.).	15	8.2	38	20.8	130	71.0
Telenursing may result in the loss of direct contact between the medical staff and the patient	18	9.8	41	22.5	124	67.7
Telenursing has no disadvantages	84	45.9	35	19.1	64	35.0

Table 5. Participants' responses toward the application of telenursing in various nursing specialties

Variable	Strongly agree/agree		Difficult to say		Strongly disagree/disagree	
	n	%	n	%	n	%
Telenursing can be most widely used in						
Environmental health nursing	121	66.1	45	24.6	17	9.3
Diabetes nursing	118	64.5	41	22.4	24	13.1
Long-term nursing	116	63.4	45	24.6	22	12.0
Pulmonary nursing	103	56.3	59	32.3	21	11.4
Cardiology nursing	122	66.7	44	24.0	17	9.3
Surgical nursing	112	61.2	40	21.9	31	16.9
Pediatric nursing	121	66.2	40	21.9	21	12.0

were accessible to computers. Further, 96.7% of the nursing interns were accessible to the internet and using it for more than 3 h/day (73.3%). These findings were dissimilar to earlier studies. In a study from Poland, it was found that almost all of the participants were accessible to computers, and merely 40% of students used the internet for 2–3 h/day (7). In another study, about half of the nursing interns were accessible to computers (54.4%) and used the internet for more than 3 h/day (52.7%) (14). It is also important to note that the usage of the internet by the participants was different from the findings of earlier studies as 73.3% of the nursing interns in this study were using the internet for more than 3 h/day. An earlier study from India showed that 35% of nursing students used the internet for 2–4 h/day (15). The rise of internet use among

nursing interns could be because students having online classes amid the COVID-19 pandemic.

Our results were in disagreement with the findings of the earlier studies (7, 14), as a majority of the interns were able to correctly identify the definition of telemedicine than telenursing. These findings were similar to the findings of an earlier study (16). These findings could be attributed to the fact that the interns might have had a brief lecture on the expanded roles of nursing profession, and the faculty might have discussed telenursing. Furthermore, these findings necessitate the need for educating the nursing interns on the concepts of telehealth and telemedicine.

In line with the findings of the earlier research (7, 14), nearly three-fourths of the interns felt that mobile phone

(74.4%), internet (72.1%), and audio-video conferencing system (73.8%) are essential for telenursing practice. The findings were similar to an earlier study (14) as nearly half of the interns agreed with the use of landline phone, telerebots, television, and tele-ECG in telenursing practice. A considerable amount of published research emphasized the importance of integrating telenursing into the nursing curriculum and the need to introduce telemedicine services in the healthcare system (7–9, 17). Similarly, a vast majority of the interns (92.4%) in this study felt that the inclusion of telenursing in undergraduate studies would be useful for future healthcare workers, and telemedicine services need to be introduced in the healthcare system. These positive perceptions of the nursing interns emphasize their awareness about the need for telemedicine services to help the citizens of India during the midst of COVID-19. The 'e-sanjeevani' is a teleconsultation platform that is implemented at Health and Wellness Centers in India and crossed a milestone as it completed one million teleconsultations. These objective data strongly urge the need to include the concepts of telenursing in the undergraduate curricula to prepare them adequately in implementing technology in offering healthcare services to the unreached population in the country.

In this study, three-fourths of the interns have reported that telenursing facilitates the contact of medical staff with patients, improves the efficiency of the medical staff (59.6%), and directly reduces the cost of patient care (61.2%). Similar findings were observed in earlier studies carried out among undergraduate nursing students (14). Also, most of the nursing interns disagreed that telenursing can cause technical problems (71.0%) and may lose direct contact between the medical staff and the patient (67.7%). These findings were dissimilar to earlier studies that reported a majority of the nursing students highlighted that telenursing can cause technical problems, may result in the loss of direct contact between the medical staff and the patient, may result in an increased possibility of nurses' mistakes, and may cause inconvenience for the direct care of elderly, who are not familiar with modern technologies (7, 14). In line with the earlier research (7, 14), two-thirds of the nursing interns opined that telenursing can be applicable in all medical specialties.

In an international survey, 89% of the nurses believed that telenursing should be a part of basic nursing education, and the authors concluded that telehealth education should also include clinical experiences (18). Additionally, published evidence (17, 19–21) also suggests that there was a positive change in the nursing students' perceptions after implementing educational sessions on telenursing. These findings strongly suggest the need for introducing telenursing concepts in undergraduate nursing curricula. However, more research is needed to obtain an in-depth understanding of the best teaching strategies on telenursing.

Limitations

The limitations of this study include a convenient sample, cross-sectional survey, and the data were collected using a self-reported questionnaire. Further, the sample included only nursing interns. Hence, we could not observe the attitudinal changes among nursing students from different academic years. Thus, the generalization of the findings of this study was limited. However, the findings have led to important recommendations for the enhancement of nursing curricula.

Conclusion

The findings of the present study found that nursing interns hold positive perceptions of telenursing and acknowledge its usefulness in nursing practice. However, two-thirds of them were unaware of the definition of telemedicine, and one-third of the interns felt that it was difficult to say about integrating telemedicine services in healthcare, and telemedicine reduces the healthcare cost of the patients. Nonetheless, the majority of interns viewed telenursing as future-oriented and felt that the nursing curriculum should include the concepts of telenursing to prepare future healthcare providers to be able to provide safe and competent care in a highly technical and digital environment.

Implications

This study highlights nursing interns' opinions on introducing telenursing in the undergraduate curriculum to better prepare prospective nurses to increase their knowledge and attitudes toward telenursing practice. Further, introducing the concept of telenursing into undergraduate curricula is required for the dynamic development of telenursing in India.

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Authors' contributions

All the authors, VP, KV, NM, CN, and MS, conceptualized the study, developed the tool, and carried out the study. SN contributed to the initial draft, reviewing, and editing. VP and MS contributed to the data analysis. Also, VP completed the interpretation, review, and editing of the final draft. All authors approved the final draft of the manuscript.

Conflicts of interest and funding

I, the submitting author, warrant that I am authorized by all co-authors to submit this version of the manuscript and to be their spokesperson during the review process and beyond. The authors have not received any funding or benefits from industry or elsewhere to conduct this study.

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