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Parimala L
Department of Medical Surgical Nursing, Saveetha College of Nursing, SIMATS, Chennai, Tamil Nadu, India

Hemavathi R
M.Sc (N) II Year, Saveetha College of Nursing, SIMATS, Chennai, Tamil Nadu, India

Corresponding Author:
Parimala L
Department of Medical Surgical Nursing, Saveetha College of Nursing, SIMATS, Chennai, Tamil Nadu, India

Effectiveness of computer assisted teaching program on knowledge of telemedicine and its challenges among staff nurses

Parimala L and Hemavathi R

Abstract
Background: In the word telemedicine "tele" is applying telemedicine is to the practice of medicine "at a distance" which often involves a consultation between a patient and doctor who are geographically separated, using a video conference link. The pandemic situation which is present globally has pushed the patient and healthcare providers to get help in alternate forms of communication through telephones, internet, and social media, to avoid the spread of infection to others.
Objectives: The study aims is to level of knowledge about telemedicine and effectiveness of computer assisted teaching program among staff nurses.
Methods: A pre experimental one group-pre test, post test only research design was conducted among 60 staff nurses. Non-probability convenient sampling technique was used. Structured questionnaire method was used to collect the demographical data and knowledge about telemedicine. The data was summarized, processed with descriptive and non-parametric statistics. Among 60 samples 1 show that level of knowledge regarding telemedicine before and after computer assisted training program.
Results: The knowledge of pre test score was 46.5% and the post test knowledge score was 84.6%, then the level of knowledge gained was 38.1%. This 38.1% of knowledge gain is the net benefit of this study, which indicates the effectiveness of computer assisted program.
Conclusion: The comparison of overall pretest and posttest percentage of knowledge level (p<.001) shows computer assisted training program was an effective method of improvement of knowledge among staff nurses regarding Telemedicine.

Keywords: Effectiveness, telemedicine, staff nurses, knowledge, computer assisted training program

Introduction
In the word telemedicine "tele" is applying telemedicine strictly to the practice of medicine "at a distance" which often involves a consultation between a patient and doctor who were separated geographically, using a video conference link [1]. In the year 1970s the word telemedicine, was coined, which means "healing at a distance" literally. It is the delivery of health care services for diagnosis, treatment advice and continuous education for professionals at a distance, using Information and Communication Technologies (ICTS) to bridge the physical distance between patients and health care providers [2]. Telemedicine has been recently practicing in many countries both developing and developed ones. Like other system applications, several challenges have been arising such as economic, technological and social aspects [3]. The current pandemic situation present globally has pushed the healthcare workers and patients to seek alternate forms of communication through internet, social media, and telephone, to avoid the spread of infection [4].
The historical expansion of telemedicine began in the year 1924, when a physician found his patient over the radio using a television screen. First level of telemedicine programs got started in 1950s and now it is in its 3rd level. Most of the programs that originated in the 1960s–1980s, now no longer exist. During the 1990s, telemedicine got doubled by two-way interactive video programs. One of the features of telemedicine was tele-radiology. One of the most common and helpful feature till date has been to store/forward the data. Technology is rapidly changing and the costs are also decreasing [5].
Telenursing uses telecommunication technology to enhance patient care in nursing. It makes use of electromagnetic channels (e.g., wire, radio, and optical) to transmit voice, data, and video communication signals. It is also referred as distance between humans and/or computers. Telemedicine can avoid unnecessary travel and expense for the patient and the family improves outcomes and even save lives.

Once the "virtual experience" of the specialist is acknowledged, a patient can access resources in a tertiary referral center without the constraints of distance [6]. Telemedicine allows patients to stay at home ensuring family support when needed. It is far easier to establish a good telecommunication infrastructure than to place hundreds of medical specialists in suburban/rural India. The beds available in rural hospital were 279,588 and the beds in urban hospitals 431,173, with 70% of the population of India still living in rural area, which stands for 1.3 beds per 1,000 populations, as compare with WHO criteria of 3.5 beds per 1,000 populations [7].

Facilitated virtual visit may be done when the patient is located at an accessible site (i.e. clinic) where medical provider at distance site and the diagnostic equipment were available. Previous studies had shown that lack of knowledge, skills and training, and resistance to change are some of the important barriers for the adoption of telemedicine among healthcare professionals [8].

Materials and Methods

Pre experimental pre test and post test only design [9, 10] was adopted by the investigator to assess the effectiveness of computer assisted training program to assess the knowledge on telemedicine among staff nurses. The study was conducted in Saveetha medical college and hospital at Thandalam. With a sample size of 60 staff nurses' non-probability convenient sampling technique was used to select the samples who met the inclusion criteria. Informed consent was obtained from each participant before starting the study. Structured questionnaire method was used to collect the demographical data and knowledge about telemedicine. The data was summarized, processed with descriptive and non-parametric statistics.

Table 1: Frequency and percentage of description of level of knowledge Score among staff nurses in pre test (N=60)

Knowledge score	Grade	Assessment of knowledge score				
		Frequency	Percentage	Mean	Median	S.D
0-5	Poor	6	10%	12.3	13.07	14.383
6-10	Average	20	33.33%			
11-15	Good	20	33.33%			
16-25	Excellent	14	23.3%			

Table 2: Frequency and percentage of description of level of knowledge Score among staff nurses in post test (N=60)

Knowledge score	Grade	Assessment of knowledge score				
		Frequency	Percentage	Mean	Median	S.D
0-5	Poor	0	0%	24.07	25.07	26.382
6-10	Average	20	33.33%			
11-15	Good	22	36.66%			
16-25	Excellent	18	30%			

Table 3: Mean, Standard deviation, Mean difference and knowledge (N=60)

	Max score	Mean score	Mean difference in knowledge with 95% confidence interval	Percentage difference in knowledge with 95% confidence interval
Pre-Test	25	12.27	12.01(10.78-12.66)	38.1% (35.2-41.1%)
Post-Test	25	24.07		

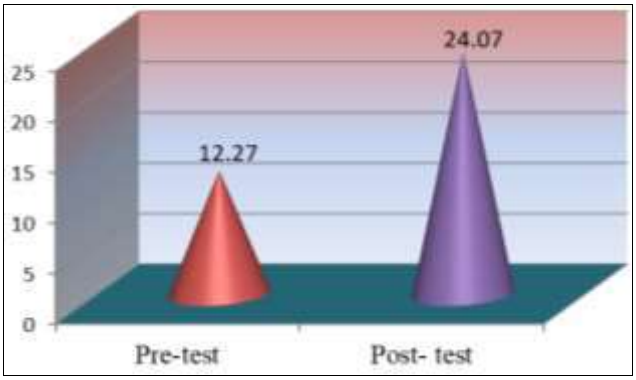

Fig 1: Pretest Posttest Knowledge Level of staff nurses regarding telemedicine

Table 4: Association of Knowledge scores with selected demographic variables among staff nurses in experimental group

Demographic Variables	d. f	x^2	P Value	Level of significance
Age (in year)	9(16.90)	19.1	0.024	Significance
Gender	3	9.67	0.024	Significance
Educational qualification	6	4.66	0.588	Significance
Employment status	6	13.2	0.040	No Significance
Work experience	6	7.09	0.313	No Significance
knowledge of using computers/laptops	3	9.67	0.024	Significance
Telemedicine is needed at your hospital	6	4.66	0.588	Significance

Result and Discussion

Majority (48.3%) of staff nurses were in the age group of 21-25, and (25%) were in 26-30 years of age, (18%) of them were in 31-35 years of age, (8.3%) were above 35 years. Maximum (75%) were female and (25%) were males. Majority (55%) of them were diploma nurses, (45%) was a graduate nurses, (4.3%) was post graduate (11, 12)

In the employment status majority of them (88.3%) were staff nurses, (6.7%) were nurse educator, (1.7%) was nurse manager, and (3.3%) was nursing superintendent. Year of experience majority of (56.7%) of people having 0-5 yrs of experience,(28.3%) people having 6-10 yrs of experience and (3.3%) having 11-15 yrs of experience and (11.7%) have above 15yrs of experience.

Majority of (66.7%) have the knowledge of using computers and (33.3%) do not have the knowledge of using computers. Majority of (76.7%) feels that telemedicine is needed for their hospital and (23.3%) doesn't feel that they don't need telemedicine in their hospital.

This finding is supported by Grace. M. Joseph who determined the effectiveness of computer assisted teaching program on knowledge regarding telemedicine among staff nurses at Ernakulum district, Kerala. The study results determined that 76% of nurses had poor knowledge and 24% had average knowledge prior to intervention. Once the session of computer assisted teaching was completed by staff nurses the result showed that 21% and 79% of nurses' demonstrated average and good knowledge respectively [13]. Another similar study conducted by Khan, Dhanalakshmi, & Naveen who determined effectiveness of self-instructional module on knowledge regarding telemedicine among the staff nurses, at Bangalore. Based on the research finding the study showed that the pretest knowledge score of staff nurses regarding telemedicine was 44.5% and posttest knowledge score was 83.6%. The difference between pre- and posttest knowledge was 39.1%. The staff who received SIM on telemedicine gained 39.1% [14].

In the present study findings reveals that there was an increase in the level of knowledge about telemedicine and its challenges among staff nurses after attending the presentation. There was an increase in the knowledge score at the level of $P<0.05$ level. This reveals that computer assisted training program is highly significant. The knowledge of pretest score was 46.5% and the posttest knowledge score was 84.6%, then the level of knowledge gained was 38.1%.This reveals that computer assisted teaching program is highly significant and also nurses gained 38.1% more knowledge about telemedicine. This 38.1% of knowledge gain is the net benefit of this study, which indicates the effectiveness of computer assisted program.

Conclusion

The comparison of overall pretest and posttest percentage of knowledge level ($p<.001$) shows computer assisted training program was an effective method of improvement of knowledge among staff nurses regarding Telemedicine. The study concluded that computer assisted training program on telemedicine was an effective method for providing poor to excellent knowledge and helps staff nurses to enhance their knowledge regarding telemedicine which would in turn help the nurses to provide quality of care as well as provides best career opportunities in future.

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