Effectiveness of SIM on Knowledge Regarding Telemedicine among the Staff Nurses

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Abstract

Background: In India, majority of the population (nearly 75%) resides in rural areas where there are restricted opportunities for providing healthcare due to limitations in terms of infrastructure, facility, manpower and funds. Telemedicine offers one of the best options for delivering healthcare among rural and geographical distant populations across the country. The study was undertaken to assess the knowledge regarding Telemedicine among Staff Nurses because Staff Nurses serve as a backbone of health profession and the social network of nurses is far more greater than any other health team. Materials and methods: The research approach adopted for this study is an evaluative approach. The research design adopted for this study is Pre-experimental one group pretest posttest design to assess the effectiveness of Self Instructional Module on knowledge regarding Telemedicine among the staff nurses working, at Selected Hospitals, in Bangalore. Non-probability sampling in which convenient sampling technique was used to select the subjects from various hospitals, in Bangalore, the instrument for the data collection was a structured questionnaire. Results: The findings of the study revealed that the result of this study shows that in the pretest the overall mean of knowledge was 13.37 with 3.11 SD and mean percentage was 44.5% where as in the posttest overall mean of knowledge was 25.08 with 2.37 SD and mean percentage was 83.6% with paired "t"=24.95 at P=0.001 significance and DF=59. Further computed paired ['t'] test value (24.95) in knowledge revealed that there was significant gain in the knowledge of Staff Nurses after the administration of Self Instructional Module. The comparison of overall pretest and posttest percentage of Staff Nurses reveals that the total effectiveness of self-instructional module on knowledge regarding Telemedicine was 39.1%. The above findings clearly indicated that SIM was an effective method of improving the knowledge of Staff Nurses regarding Telemedicine. Conclusion: The study concluded that the SIM 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 serve better as well as provides best career opportunities.

Keywords: effectiveness, knowledge, self-instructional module, staff nurses, telemedicine

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INTRODUCTION

With biomedical engineering on one side and telecommunication-information technology on the other, the advancement in medical science has offered vast prospects for improved health care. Although, much development has been made in this regard, health coverage to majority of the Indian population still remains distant dream.[1]

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.[2]

Time magazine is a combination of two words viz., "Tele" (Greek word, meaning "distance") and "mederi" (Latin word, meaning "to heal"), hence the name telemedicine "healing by wire." Telemedicine makes use of electronic information to communicate technologies thereby providing and supporting healthcare to participants who are located far away. This is called as e-medicine.[3]

Telemedicine encompasses many subspecialties of medicine including Tele-radiology, Tele-pathology, Tele-cardiology, Tele-oncology, Tele-neurology, Tele-stroke, Tele-home care, and Tele-psychiatry as well as the use of remote monitoring devices.[1]

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.[4]

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. 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.[5]

MATERIALS AND METHODS
The research approach adopted for this study is an evaluative approach. A pre-experimental one group pretest posttest design was used to assess the effectiveness of Self-Instructional Module on knowledge regarding Telemedicine among the staff nurses. The sample used for this study was 60 Staff Nurses working in selected hospital at Bangalore (Karanth Specialty Hospital, Malathi Manipal Hospital and Manipal North-side Hospital, Bangalore) and those who fulfill the inclusion and exclusion criteria.

Nonprobability sampling in which convenient sampling technique was used to select the subjects from various hospitals, in Bangalore, the instrument for the data collection was a structured questionnaire.

The instrument for the data collection was a structured questionnaire and has two parts: (i) socio-demographic data, (ii) structured questionnaire to assess the knowledge level of staff nurses regarding telemedicine.

The data obtained was analyzed by using descriptive and inferential statistics in terms of frequency, percentage, mean, standard deviation, paired "t" test and Chi-square test.

The setting for the study was selected hospital at Bangalore (Karanth Specialty Hospital, Malathi Manipal Hospital and Manipal North-side Hospital, Bangalore),

Karnataka. The anonymity and confidentiality of the study subjects was maintained throughout the research study.

RESULTS
A total of 60 Staff Nurses working at selected hospitals Bangalore were included in this study. (Table 1) 48.3% of the subjects were in the age of 21–25 years, 75.0% of them were females, 50.0% of them from Christian religion, 55.0% of students were diploma holders in nursing and followed by remaining demographic variables.

Distribution of the Subjects According to Socio-Demographic Variables
Table 2 shows that the comparison of overall knowledge score between pre- and posttest. On an average, in posttest, staff nurses are having 39.1% of more knowledge than pretest.

Or we can say in posttest, staff nurses are able to answer 12 questions more than pretest. Differences between pre- and posttest score was analyzed using proportion with 95% CI and mean difference with 95% CI.

Table 1. *Shows the Demographic Information of Staff Nurses Who Are Participated in the Study. n=60.*

Demographic information		Frequency	Percentage (%)
Age	21–25 years	29	48.3
	26–30 years	15	25.0
	31–35 years	11	18.3
	>35 years	5	8.3
Gender	Male	15	25.0
	Female	45	75.0
Religion	Hindu	14	23.3
	Christian	30	50.0
	Muslim	7	11.7
	Others	9	15.0
Education status	GNM	33	55.0
	B.Sc.	27	45.0
Employment status	Staff nurse	53	88.3
	Nurse educator	4	6.7
	Nurse manager	1	1.7
	Nursing superintendent	2	3.3
Years of experience	0–5 years	34	56.7
	6–10 years	17	28.3
	11–15 years	2	3.3
	>15 years	7	11.7
Place of residence	Rural	19	31.7
	Urban	35	58.3
	Semi urban	6	10.0
Have knowledge of using computers/laptops	Yes	40	66.7
	No	20	33.3
Do you feel, telemedicine is needed at your hospital	Yes	46	76.7

| | | | No | 14 | 23.3 |

Table 2. *Comparison of Overall Knowledge Score.*

	Max score	Mean score	Mean difference in knowledge with 95% confidence interval	Percentage difference in knowledge with 95% confidence interval
Pretest	30	13.37	11.71 (10.78–12.66)	**39.1% (35.9–42.2%)**
Posttest	**30**	**25.08**		

*Significant at P≤0.05, **highly significant at P≤0.01, ***very high significant at P≤0.001.

Table 3. *Effectiveness of SIM.*

	% of Pretest knowledge	% of posttest knowledge	% of knowledge gain
Knowledge	**44.5%**	**83.6%**	**39.1%**

Table 3 shows the effectiveness of the SIM. Considering the overall aspects, Staff Nurses are gained 39.1% more knowledge after the administration of SIM. This 39.1% of knowledge gain is the net benefit of this study, which indicates the effectiveness of SIM.

The findings of the study reveals that a significant increase in the knowledge of staff nurses in posttest, out of the several demographic variable, education, more service, computer knowledge, positive thought on telemedicine place were significantly associated with the knowledge gain scores regarding Telemedicine. According to the posttest knowledge scores compared to the Staff Nurses education status showed χ^2=7.17 P=0.01** DF=1 significant, scores compared to the Staff Nurses years of experience showed χ^2=9.82 P=0.02* DF=3 significant, Staff Nurses having knowledge of using computers/laptops showed χ^2=4.10 P=0.01* DF=1 significant, Staff Nurses positive thought on telemedicine showed χ^2=7.46 P=0.01** DF=1 significant.

DISCUSSION
Telemedicine is a new branch of treatment. The more nurses know about it, better will be the patient care and prognosis. Once the nurses are trained in this emerging field of care, this will lead to a swing from illness to wellness. The findings of this study support the need for staff nurses to

understand and rendering these modes of services in the hospitals and community settings in providing Tele based services and to spread this Knowledge to their future students, family, colleagues, clients and the public. This study has proved that the staff nurses have a remarkable increase in the Knowledge regarding Tele-medicine when compared to their previous Knowledge to the implementation of the SIM.

The pretest-knowledge level of staff nurses on telemedicine were supported through a study conducted among nurses on Knowledge, perceptions and expectations in e-health in a children's hospital, Royal Children's Hospital Centre for Online Health. All available nurses working at a tertiary pediatrics hospital from 27 hospital departments were involved. A total of 365 questionnaires were distributed. A total of 253 surveys were completed (69%). Most respondents mentioned that they never had any e-health education (87%) and that their e-health knowledge and skills were low (71%), while few nurses reported some exposure to e-health through their work (11%). More than half of the respondents indicated that e-health was important/very important/critical for health professions (56%) while some were not sure about it (26%). The study concludes that Telemedicine education was necessary for adopting e-health services as 71% lacked knowledge and skills.[6]

The posttest-knowledge level of staff nurses on telemedicine was supported through a study conducted in the objective to find achieving Success Connecting Academic and Practicing Clinicians through Telemedicine. From the results it was found that majority of the participants agreed that the presentations were related to their professional needs (95%), increased their subject-matter knowledge (98%), were the best they had attended (81%), and that the presentations provided the information that could be translated into professional practice, enhancing patient care (93%). This study concludes that participants were highly satisfied with Pediatric Physician Learning and Collaborative Education and consider it as an effective way to address the continuing education needs of practitioners throughout Arkansas, particularly in the rural and underserved areas.[7]

The effectiveness of Self Instructional Module on Telemedicine among Staff Nurses was supported through a study conducted to evaluate the nurse's response to the introduction of telemedicine into the dialysis units of a renal ward in South Australia. The first questionnaire was distributed to all the staff nurses that were involved with the introduction of the system, out of which 44 responses were received (80%). Staff nurses were relatively positive about the telemedicine system, and found it an easy and reliable method to use. Result showed that significant changes in Staff Nurses opinion about the degree of confidentiality ($P<0.05$) and privacy ($P<0.01$) offered by the system, with responses becoming more positive in each case. Study concludes the importance of planning, effort, cooperation and an appropriate culture within a renal unit with telemedicine acceptance.[8]

The pre- and posttest knowledge level of Staff Nurses with selected demographic variables was supported by a study conducted to determine which was most effective in improving blood pressure (BP) control using telephone-based intervention: (1) nurse-administered behavioral management, (2) nurse- and physician-administered medication management, (3) a combination of both. A total of 1551 patients participated in the intervention telephone calls and BP values transmitted via Tele-monitoring devices. The results showed that 12.8% (95% confidence interval [CI], 1.6–24.1%) and 12.5% (95% CI, 1.3–23.6%), respectively. In subgroup analyses, for those with poor baseline BP control, systolic BP decreased in the combined intervention group by 14.8 mm Hg (95% Cl, A21.8–A7.8 mm Hg) and 8.0 mm Hg (95% CI, 15.5–0.5 mm Hg). The study concludes that overall intervention effects were moderate, but for individuals with poor BP control at baseline, the effects were found to be larger.[9]

Thus for the future outlook, there is a need to improve our knowledge by conducting teaching and awareness program on telemedicine.

CONCLUSION

From the findings of the present study, it is concluded that the level of Knowledge regarding Telemedicine among Staff Nurses was inadequate during the pretest assessment. However, the findings of the posttest show that, the level of knowledge has improved and the scores have indicated an adequate level of knowledge among Staff Nurses. The improvement is due to the administration of the Self-Instructional Module. Therefore, the knowledge of the Staff Nurses can be further improved by providing on-going teaching and educational programme.

Based on the finding the result of the study shows 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 is 39.1%. The students who received SIM on telemedicine gained 39.1%. This is due to effectiveness of SIM. To conclude that the results of findings indicated that Staff Nurses had inadequate knowledge in various aspects of Telemedicine. SIM was found to be a very effective method of providing information regarding Telemedicine.

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