Effectiveness of Structured Teaching Programme on Knowledge Regarding Telemedicine among Nursing Students in Selected Nursing Colleges of District Mandi, H.P.

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ABSTRACT

Good health is central to human happiness and well-being that contributes significantly to prosperity and wealth and even economic progress, as healthy populations are more productive, save more and live longer. Telemedicine is the exchange of medical information from one location to another using electronic communication, which improves patient health status. This study aimed to assess the effectiveness of structured teaching programme in improving the knowledge regarding telemedicine among nursing students.

Objectives: To assess the level of knowledge regarding telemedicine among nursing students. To evaluate the effectiveness of structured teaching program on knowledge regarding telemedicine among nursing students. To find out the association between level of knowledge score regarding telemedicine among nursing students and their selected socio-demographic variables.

Material and Method: Investigator adopted a quantitative research approach with the Quasi-experimental research design (non-randomized control trial design). The subject were 100 nursing students and the non-probability purposive sampling method was used for selection criteria. Data was collected using socio-demographic data profile and self-structured knowledge questionnaire regarding telemedicine. A structured teaching programme regarding telemedicine was implemented in the experimental group after the pre-test, followed by the post-test after seven days. Data were analyzed using descriptive and inferential statistics.

Result: In experimental group the mean knowledge score increased significantly from 20.26 (SD= 4.818) to 25.90 (SD = 1.446). this shows that the result was highly significant (t = 8.067, p < 0.001), indicating the intervention was effective. Whereas in control group there was no significant change in the knowledge score (Pre: 19.660, Post: 19.70, t = 0.096, p = 0.924), showing no impact without intervention.

Conclusion: In the present study majority of the nursing students had Average level of knowledge regarding telemedicine in pretest. After implementing structured teaching program majority of the nursing students had good level of knowledge. Which indicates that the structured teaching programme was effective in enhancing the knowledge of nursing students regarding telemedicine.

Keywords: *Assess, Structured teaching programme, Telemedicine, Knowledge.*

INTRODUCTION

ʹTeleʹ is a Greek word meaning 'at a distance' and the word 'medicine' which derived from Latin word 'mederi' means healing. Developing countries like India has 138 crores of the population and out of which two third of its population predominantly lives in rural area with immense health care needs has limited care facilities. And to tackle that the Indian government who is committed to strengthening the healthcare system of entire country lays a significant focus on the Telemedicine services.[1]

Goal of Telemedicine is to satisfy the requirement of today's health care customers and has the potential to revolutionize the delivery of health care services. It supports efforts to improve the standard of health care by increasing accessibility and potency through reducing the necessity to travel, providing clinical support, for long term management and patient satisfaction, overcoming geographical barriers, offering various types of communication devices (e.g. via e-mail and interactive chats or video or audio) and improving patient outcomes. It is a captivating tool to use for fulfilment in health domain.[2]

Telemedicine has had a fascinating journey originating from the humble roots in semaphore to the telegraph to the radio to advanced digital communication technologies of today.[3]

Telemedicine can be enabling the availability of vital parameters of the patient available to the physician with the help of medical devices such as blood pressure, blood glucose, and heart beats etc. management. Some of the initiative of Telenursing in India includes in COVID-19 pandemic scenario like webinars, providing training and conducting patient case discussion and education.[4]

Telemedicine is the integrated use of electronic information and telecommunications technology to support remote clinical health care, patient and professional health-related education, public health, and health administration.[5]

World Health Organization has adopted this broad description as a definition for telemedicine "The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities".[6]

The poor infrastructure of rural health centres makes it impossible to retain doctors in villages, who feel that they become professionally isolated and outdated if stationed in remote areas. In addition, poor Indian villagers spend most of their out-of-pocket health expenses on travel to the specialty hospitals in the city and for staying in the city along with their escorts.[7]

In a developing country like India, most of the 620 million rural Indians lack access to basic health care facilities. In addition, Indian institute of public opinion found that 89% of rural Indian patients have to travel about 8 km to access basic medical treatment, and the rest have to travel even farther.[7]

One of the most essential issues in giving the poor access to high-quality healthcare is the technology used in telemedicine, which enables clinicians and patients to be nearly anywhere. Due to the development of telemedicine, access to healthcare in rural areas is no longer hampered by distance. Poverty, a lack of development, and civil upheaval have an especially negative influence on India's North Eastern states.[8]

NEED OF THE STUDY

In a developing country there is huge inequality in health-care distribution. Although nearly 75% of Indians live in rural villages, more than 75% of Indian doctors are based in cities. The Indian government spends just 0.9% of the country's annual gross domestic product on health, and little of this spending reaches remote rural areas.[9]

About 75% doctors in Kangra district of Himachal Pradesh revealed that hospital lacks diagnostic facilities for acute myocardial infarction (AMI) and 94% agreed to the fact that tele-cardiology services can improve health care services for AMI patient.[10]

The poor infrastructure of rural health centres makes it impossible to retain doctors in villages, who feel that they become professionally isolated and outdated if stationed in remote areas. In addition, poor Indian villagers spend most of their out-of-pocket health expenses on travel to the specialty hospitals in the city and for staying in the city along with their escorts.[11]

As Telehealth has made remote care possible, it is also easier to record a person's vital-time using smart devices. In this way, nurses can assist with diagnosing a person virtually and decide if immediate care is necessary. The best part in this approach works before a patient comes for an in-person visit and after a patient has been discharged.[12]

"A study to assess the effectiveness of structured teaching programme on knowledge regarding Telemedicine among nursing students in selected nursing Colleges of district, Mandi (H.P.)"

OBJECTIVES

i.   To assess the pre-test level of knowledge regarding telemedicine among nursing students.

ii.   To evaluate the effectiveness of structured teaching program on knowledge regarding telemedicine among nursing students.

iii.   To find out the association between level of knowledge score regarding telemedicine among nursing students and their selected socio-demographic variables.

CONCEPTUAL FRAMEWORK

In this study, the conceptual framework the investigator adopted **Ludwig von Bertalanffy's** General System Theory (GST), that views any process or entity (biological, social, or educational) as an interrelated and interdependent system made up of interacting components. GST provides a lens through which the structured teaching programme in a study can be systematically designed, implemented, evaluated, and refined.

The first component of the GST is **input**, which refers to the information received by the system from the environment. In this study, the input includes two primary components: first is demographic characteristics of the participants and the previous level of knowledge regarding telemedicine assessed through pre-test and the source of information significantly influence the way of student's perception and observation of a new knowledge.

The second component is **throughput** which is also called as transformation process. In present study the throughput is characterized as structured teaching programme regarding telemedicine which was administered to the experimental group. The teaching was provided to students using interactive and learner-centered methods, allowing students to have their views and their questions about topic telemedicine.

The third component **output** which is the result or product that the system releases back into the environment after processing the input. In the present study, the output is the level of knowledge expressed by the students in post-test. The findings showed a statistically significant improvement in knowledge levels of nursing students among the experimental group indicating that the structured teaching programme was effective in facilitating knowledge gain.

The final component of GST is **feedback** which is information about the system's performance, in the present study, positive feedback was gathered through the comparative analysis and post-test scores.

MATERIAL AND METHODS

The quantitative approach was used with a Quasi-experimental research design / non-randomized control trial design. The subject were 100 nursing students and the non-probability purposive sampling method was used for selection criteria. The present study was conducted among nursing students from Abhilashi college of nursing, Tanda, district Mandi (H.P.) and Nandini college of nursing Kanaid Sundarnagar District Mandi (H.P.).

GROUP	PRETEST	INTERVENTION	POSTTEST
EXPERIMENTAL		X	
	O_1		O_2
CONTROL		-----	

O_1: Assessment of pre-test knowledge on Telemedicine among nursing students prior to structure teaching programme in both experimental and control group.

X: Administration of structured teaching programme regarding Telemedicine.

O_2: Evaluate the post-test knowledge on Telemedicine among Nursing students in an experimental and control group.

Sample Selection Criteria:
Inclusive criteria: All the nursing students who were: -
1. Willing to participate in the study.
2. Present during the time of data collection.
Exclusive criteria: Students who were: -
1. Interested to participate in the study.
2. Part of another same study participant.

RESEARCH VARIABLES

Independent Variable: In the study structured teaching programme on telemedicine is an independent variable.
Dependent Variable: In this study knowledge of students regarding telemedicine is dependent variable.
Demographic Variables: - Demographic variables include: age in years, religion, marital status, family type, educational status of father, educational status of mother, occupation status of father, occupation status of mother, monthly income status of family, area of residence and Source of information regarding telemedicine.
Validity of the tool: To ensure content validity of the tools which includes demographic data, structured knowledge questionnaire regarding the telemedicine were submitted to five nursing experts and one language expert. Their suggestions were taken in to consideration and modifications were incorporated in the final preparation of the tool.
Criteria measure for knowledge:

Criteria measure of knowledge score

Category score	Pre-experimental	Pre-control
Good (21-30)	22(44%)	11(22%)
Average (11-20)	28(56%)	39(78%)
Below Average (0-10)	0(0%)	0(0%)

Maximum:30
Minimum:0

Pilot Study: The pilot study was conducted in the month of June, 2025. The study was conducted in Sri Sai College of Nursing, Dadho Sundarnagar before actual data collection to assess the availability of sample and feasibility of the study of knowledge regarding nursing students of selected colleges of Mandi (H.P). Informed consent was taken from the students and instructions was given prior to the pilot study. Pilot study was conducted on 10 nursing students, in which 5 were in experimental group and another 5 were in control group. Pre-test knowledge of both groups was assessed by self-structured knowledge questionnaire. Structured teaching programme was given to experimental group for 45 min. After the duration of 7 days, post-test knowledge of both the groups was assessed with the help of same self-structured knowledge questionnaire.
Reliability of the Tool:
Reliability was obtained by test-retest method and was calculated by Karl's Pearson co-efficient of co-relation formula. The reliability of the tool was 0.82, which indicates that the tool was highly reliable to conduct the study.
Data Collection procedure:
Data collection is the gathering of information needed to address research problem. The main study was conducted in two colleges. One was Abhilashi college of nursing, Tanda district Mandi (H.P.) and another college was Nandani college of nursing, Kanaid Sundarnagar District Mandi (H.P.). Formal written permission was obtained from Principal of nursing colleges respectively. The samples of 100 nursing students were selected on the basis of inclusion criteria by using purposive sampling technique. The investigator introduced her and developed rapport with the subjects. The investigator explained the purpose of the study and reassured that the data collected would be kept confidential. The investigator obtained consent from the subjects prior to the study. The data collection was done in two phases.
Phase 1: After obtaining the permission from the significant authorities' structured interview schedule for demographic data of nursing student's age, Religion, marital status, socioeconomic status, Source of information.
Phase 2: Structured questionnaire was administered for 45 minutes to assess the knowledge of nursing students regarding telemedicine.
Post test**: -** Post test was conducted on the 7th day after administration of planned teaching programme. The same tool was used for the post test.
Ethical Consideration: Written permission was taken from:
 i. Principal of Abhilashi college of nursing Tanda, Mandi, H.P.
 ii. Ethical committee of Abhilashi college of nursing Tanda, Mandi, H.P.
 iii. Principals of Sri Sai College of nursing, Dadho Sundarnagar, Nandini College of nursing, Kanaid, Sundarnagar Distt. Mandi, H.P.
Also, an informed written consent was taken from the nursing college students. Confidentiality and anonymity of each study sample was maintained throughout the study.

RESULT

Organization of data: The raw data was entered in a master sheet and analyzed and interpreted by using descriptive and inferential statistics. The data was organized and presented under the following sections:
Section I: Description of Socio-demographic Variables.
Section II: Data related to pre-test level of knowledge regarding telemedicine.

Section III: Effectiveness of structured teaching programme on knowledge regarding telemedicine among nursing students.

Section IV: Association of knowledge score regarding telemedicine among nursing students with their selected socio-demographic variables both in experimental and control group.

Section I

Distribution of Sociodemographic Variables

Table-4.1: frequency and percentage distribution of socio-demographic variables.

(N=100)

Sr. no.	Sociodemographic variables	Experimental group (n=50)		Control group (n=50)	
		(f)	(%)	(f)	(%)
1.	**Age (in years)**				
	18-19	20	40.0%	24	48.0%
	20-21	23	46.0%	19	38.0%
	22-23	7	14.0%	6	12.0%
	24 and above	0	0.0%	1	2.0%
2.	**Religion**				
	Hindu	48	96.0%	40	80.0%
	Muslim	0	0.0%	3	6.0%
	Sikh	2	4.0%	7	14.0%
3.	**Marital status**				
	Married	1	2.0%	3	6.0%
	Unmarried	49	98.0%	47	94.0%
4.	**Family type**				
	Nuclear family	16	32.0%	21	42.0%
	Joint family	18	36.0%	16	32.0%
	Extended family	16	32.0%	13	26.0%
5.	**Educational status of father**				
	No formal education	0	0.0%	5	10.0%
	Primary education	10	20.0%	10	20.0%
	Higher secondary education	17	34.0%	19	38.0%
	Graduate and above	23	46.0%	16	32.0%
6.	**Educational status of mother**				
	No formal education	12	24.0%	18	36.0%
	Primary education	18	36.0%	15	30.0%
	Higher secondary education	9	18.0%	17	34.0%
	Graduate and above	11	22.0%	0	0.0%
7.	**Occupation status of father**				
	Unemployed	14	28.0%	30	60.0%
	Self- employed	11	22.0%	11	22.0%
	Govt. employee	16	32.0%	6	12.0%
	Private employee	9	18.0%	3	6.0%
8.	**Occupation status of mother**				
	Housewife	22	44.0%	22	44.0%
	Self- employed	18	36.0%	20	40.0%
	Govt. employee	8	16.0%	5	10.0%
	Private employee	2	4.0%	3	6.0%
9.	**Monthly income of family**				
	<10,000	0	0.0%	1	2.0%
	10,001 – 20,000	0	0.0%	12	24.0%
	20,001 – 30,000	22	44.0%	18	36.0%
	>30,001	28	56.0%	19	38.0%
10.	**Belongs to**				
	Rural	32	64.0%	33	66.0%
	Urban	18	36.0%	17	34.0%
11.	**Source of information**				
	Mass –media	14	28.0%	18	36.0%
	Health personnel	15	30.0%	16	32.0%
	Peer groups	21	42.0%	10	20.0%
	Others	0	0.0%	6	12.0%

Table 4.1 shows frequency and percentage distribution of subjects in both groups according to their socio-demographic variables. The majority of participants in both the groups are between 20-21 (46%) in experimental group and 18-19 years (48%) in control group. Most of the participants were unmarried and most participants belongs to joint family. Half of the participants educational status of father was graduate and above and educational status of mother had more primary education. Most of the occupation status of father were Gov. employee, whereas most of the mothers were housewife. The majority had monthly income above 30,001, residing in rural areas and 42% of participants source of information were peer-groups.

Section II

Assess the pre-test level of knowledge score regarding telemedicine among nursing students.

Table-4.2: Showing frequency & percentage distribution of pre-test experimental and pre-test control group of knowledge scores. **(N=100)**

Criteria measure of knowledge score		
Category score	Pre-experimental	Pre-control
Good (21-30)	22(44%)	11(22%)
Average (11-20)	28(56%)	39(78%)
Below Average (0-10)	0(0%)	0(0%)
Maximum:30		
Minimum:0		

In the experimental group, 44% of participants had good knowledge and 56% were in the average category, with none in the below average range. In the control group, only 22% scored in the good category, while the majority (78%) were in the average range. No participants fell into the below average category.

Table-4.3: Comparison of descriptive statistics between pre-test experimental and pre-test control group of knowledge. **(N=100)**

	Descriptive Statistics	Mean	Mean %	Median	Range	SD
PRE	Experimental	20.26	67.53	20	16	4.818
	Control	19.66	65.53	19	16	3.847

Maximum=30

Minimum =0

Table 4.3 revealed that in Experimental Group the mean score was 20.26 with a standard deviation of 4.818, showing moderate knowledge with some variability. The median was 20, scores ranged from 13 to 29, and the mean percentage was 67.53%. In Control Group the mean score was 19.66 with a standard deviation of 3.847, slightly lower than the experimental group. The median was 19, with scores ranging from 13 to 29, and the mean percentage was 65.53%.

Table-4.4: Showing frequency & percentage distribution of post-test knowledge score in experimental and control group. **(N=100)**

Post-test knowledge score		
Criteria measure	Experimental Group (n=50) f (%)	Control Group (n=50) f (%)
Good (21-30)	49(98%)	11(22%)
Average (11-20)	1(2%)	39(78%)
Below Average (0-10)	0(0%)	0(0%)
Maximum:30		
Minimum:0		

Table 4.4 shows that in the experimental group, 98% of participants scored in the good category and only 2% were in average, with none in the below average category- showing a high level of effectiveness of the intervention. Whereas in the control group, only 22% reached the good level, while a majority (78%) remained in the average category, with no improvement to match the experimental group's gains.

Table-4.5: Comparison of descriptive statistics between post-test experimental & post-test control group of knowledge. **(N=100)**

	Descriptive statistics	Mean	Mean %	Median	Range	SD
POST	**Experimental**	25.90	86.33	26.5	7	1.446
	Control	19.70	65.67	19	15	3.660

Maximum=30

Minimum =0

Table 4.5 showing in experimental group the mean score was **25.90** with a low standard deviation (**1.446**), indicating consistently high performance. The median score was **26.5**, with scores ranging from **20 to 27.** The mean percentage was **86.33%,** reflecting the strong impact of the intervention. Whereas in control group the mean score was **19.70** with a higher standard deviation (**3.660**), showing more variability. The median score was **19**, with scores ranging from **14 to 29**. The mean percentage was **65.67%,** indicating no substantial improvement.

Section- III

Evaluate the effectiveness of structured teaching program on knowledge regarding telemedicine among nursing students.

Table-4.6: Showing comparison within the group with paired & unpaired t test of knowledge scores.

(N=100)

	Knowledge score				Paired t test	
	Pre-test		Post-test			
Group	**Mean**	**SD**	**Mean**	**SD**	**df**	**'t'**
Experimental Group (n=50)	20.26	4.818	25.90	1.446	49	8.067*
Control Group (n=50)	19.660	3.847	19.70	3.660	49	0.096[NS]
Unpaired t Test df	98		**df**	98		
't'	0.688[NS]		**'t'**	11.139*		

Maximum= 30   Significant at P<0.05 level
Minimum= 0   NS- Non significant

This table depicts the comparative analysis of knowledge scores between the experimental and control groups using unpaired t-test, with the maximum possible score being 30 and the minimum 0. In experimental group the mean knowledge score increased significantely from 20.26 (SD= 4.818) to 25.90 (SD = 1.446). this shows that the result was highly significant ($t = 8.067$, $p < 0.001$), indicating the intervention was effective. Whereas in control group there was no significant change in the knowledge score (Pre: 19.660, Post: 19.70, $t = 0.096$, $p = 0.924$), showing no impact without intervention.

In Pretest Comparison no significant difference between groups ($t = 0.688$, $p = 0.546$), indicating they were similar before intervention. Whereas in post-test comparison a highly significant difference was observed ($t = 11.139$, $p < 0.001$), with the experimental group scoring much higher than the control group.

Section-IV

Association between level of knowledge regarding telemedicine among nursing students and their selected socio-demographic variables.

Table-4.7: Table showing association of knowledge score regarding telemedicine among nursing students with their selected socio-demographic variables.

(N=50)

Demographic variable			Association of knowledge score with demographic variables (post knowledge) control group			
Sr.no.	**Variables**	**Good**	**Average**	**df**	**χ^2**	**P value**
1.	**Age (in years)**					
	18-19	4	20	3	3.431	0.330[NS]
	20-21	4	15			
	22-23	3	3			
	24 and above	0	1			
2.	**Religion**					
	Hindu	7	33	2	4.136	0.126[NS]
	Muslim	2	1			
	Sikh	2	5			
3.	**Marital status**					
	Married	1	2	1	0.239	0.625[NS]
	Unmarried	10	37			
4.	**Family type**					
	Nuclear family	2	19	2	3.285	0.193[NS]
	Joint family	5	11			
	Extended family	4	9			
5.	**Educational status of father**					
	No formal education	1	4			
	Primary education	2	8	3	0.340	0.952[NS]
	Higher secondary education	5	14			
	Graduate and above	3	13			
6.	**Educational status of mother**					
	No formal education	4	14	2	0.059	0.971[NS]
	Primary education	3	12			
	Higher secondary education	4	13			

7.	**Occupational status of father**					
	Unemployed	7	23	3	13.869	0.003*
	Self- employed	0	11			
	Govt. employee	1	5			
	Private employee	3	0			
8.	**Occupational status of mother**					
	Housewife	5	17	3	4.077	0.253[NS]
	Self- employed	3	17			
	Govt. employee	1	4			
	Private employee	2	1			
9.	**Monthly income of family**					
	<10,000	1	0	3	6.549	0.088[NS]
	10,001 – 20,000	2	10			
	20,001 – 30,000	6	12			
	>30,001	2	17			
10.	**Belongs to**					
	Rural	7	26	1	0.035	0.851[NS]
	Urban	4	13			
11.	**Soirce of information**					
	Mass –media	5	13	3	2.150	0.542[NS]
	Health personnel	4	12			
	Peer groups	2	8			
	Others	0	6			

Significant (*): at P<0.05 level

Table represents the association between the post-test knowledge scores on telemedicine and selected socio-demographic variables among the participants in the control group. Occupational status of father (p= 0.003) indicating that the father's occupational status significantly influences the knowledge score. The variable was significant at $p \leq 0.05$. Whereas, no significant association was found between age, religion, marital status, family type, educational status of father or mother, occupational status of mother, monthly income of family, belongs to and the source of information with the p value >0.05.

DISCUSSION

The discussion of the findings of present study in accordance with the objectives of the research problem. The findings of the study have been discussed with reference to the results obtained by the investigator. The knowledge of nursing students regarding telemedicine was assessed in relation to age, religion, marital status, family type, educational status of father and mother, occupational status of father and mother, socio economic status of the family, residential area, and source of information regarding telemedicine.

The pre-test scores revealed that a majority of the nursing students had below average knowledge about telemedicine, indicating a significant knowledge gap in this area. However, post-test scores showed a marked improvement in knowledge, with most students moving to the average to good knowledge category. This clearly suggests that the structured teaching programme was effective in enhancing the understanding of telemedicine concepts, applications, benefits, and limitations among the nursing students.

These findings are consistent with those of a similar study conducted by **Patel (2020)**, who evaluated the impact of an educational intervention on knowledge regarding telemedicine among final-year B.Sc. Nursing students. In their study, the mean knowledge scores increased significantly after the intervention, and the authors concluded that structured educational sessions were instrumental in enhancing awareness and readiness to adopt telemedicine in future practice.

CONCLUSION

The major finding of the study revealed that in experimental group the mean knowledge score increased significantely from 20.26 (SD= 4.818) to 25.90 (SD = 1.446). this shows that the result was highly significant (t = 8.067, p < 0.001), indicating the intervention was effective. Whereas in control group there was no significant change in the knowledge score (Pre: 19.660, Post: 19.70, t = 0.096, p = 0.924), showing no impact without intervention. In Pretest Comparison no significant difference between groups (t = 0.688, p = 0.546), indicating they were similar before intervention. Whereas in post-test comparison a highly significant difference was observed (t = 11.139, p < 0.001), with the experimental group scoring much higher than the control group.

RECOMMENDATIONS

Based on the findings, the following recommendations were offered for future research.
  i. The study can be replicated on a large sample to validate and generalize its findings.
 ii. Similar study can be conducted in a different nursing college.
iii. The comparative study can be conducted among two nursing college students.
 iv. International study can be planned among staff nurses, Doctors and community health workers regarding telemedicine.

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