

EFFECTIVENESS OF A STRUCTURED TEACHING PROGRAMME ON THE KNOWLEDGE AND SKILL REGARDING CPR AMONG GNM STUDENTS OF A SELECTED INSTITUTE OF NURSING IN MANGALORE

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ABSTRACT

CPR is a combination of rescue breathing and chest compressions. If someone is not breathing or if their heart is ceased beating, CPR can restore the circulation of oxygen-rich blood to the brain. Every nurse should know how and when to administer CPR because when performed correctly, it can save a life. A study was conducted to assess the student nurse's knowledge and skill before and after a structured teaching program regarding CPR. A quasi-experimental one-group pre-test post-test design was used for the study. The sample consists of 30 subjects. Student nurses were selected by simple random sampling technique. After the pre-test and assessment of skill by observational checklist, an STP was administered, and CPR is demonstrated to the subjects. On the seventh day, the post-test was conducted with the same questionnaire and observational checklist. The collected data were analyzed by using descriptive and inferential statistics. The mean post-test knowledge ($\bar{x}_2=25.3$) and skill ($\bar{x}_2=19$) scores obtained by the subjects were higher than the mean pre-test knowledge ($\bar{x}_1=17$) and skill ($\bar{x}_1=9.67$) scores. Also, the mean scores were higher in all areas in the post-test. Paired 't' test was done and was found highly significant. There was a significant difference between the mean pre-test and post-test knowledge scores ($t_{29}=2.61$, $p<0.001$) and the mean pre-test and post-test skill scores ($t_{29}=2.61$, $p<0.001$). Findings of the study showed that the knowledge and skill scores of student nurses were very less before the introduction of STP and demonstration of CPR. The STP enhanced them to gain more knowledge and demonstration enhanced them to gain more skill regarding CPR. Hence, STP and demonstration of CPR was an effective strategy for providing information and improving the knowledge and skill of student nurses, which was well appreciated and accepted by student nurses.

Key words: CPR; Student nurses; Knowledge; Effectiveness; Structured Teaching Programme.

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Article Info

Received 12/04/2021; Revised 20/05/2021
Accepted 24/05/2021

INTRODUCTION

CPR is a triumph of medicine but also is frequently performed in vain. It is a young science; the term "CPR" was first publicized less than 50 years ago. The roots of resuscitation, however, extend back centuries, with a gradual course of evolution that has been periodically impeded by rejection of inadequate techniques, curiously slow adoption of proven interventions, and even a cyclic process of abandonment and subsequent rediscovery. Examining the history of

resuscitation is an essential first step to understanding and following the evolution to modern practices [1].

Cardiopulmonary resuscitation is an important lifesaving first aid skill, practiced throughout the world. It is the only known effective method of keeping someone who has suffered cardiac arrest alive long enough for definitive treatment to be delivered (usually defibrillation and intravenous cardiac drugs) [2]. In 1954, James Elam was the first to demonstrate experimentally that cardiopulmonary resuscitation (CPR) was a sound



technique, and together with Dr. Peter Safar he demonstrated its superiority to previous methods. Peter Safar wrote the book ABC of resuscitation in 1957. In the U.S., it was first promoted as a technique for the public to learn in the 1970s [3].

Cardiopulmonary resuscitation (CPR) is an essential skill taught within undergraduate nursing programmes. At the author's institution, students must pass the CPR objective structured clinical examination (OSCE) before progressing to second year. However, some students have difficulties developing competence in CPR and evidence suggests that resuscitation skills may only be retained for several months. This has implications for practice as nurses are required to be competent in CPR. Therefore, further opportunities for students to develop these skills are necessary [4].

CPR is indicated for any person who is unresponsive with no breathing, or who is only breathing in occasional agonal gasps, as it is most likely that they are in cardiac arrest. If a person still has a pulse, but is not breathing (respiratory arrest), artificial respirations may be more appropriate. In those with cardiac arrest due to trauma CPR is considered futile but still recommended [5]. Despite considerable efforts to improve the treatment of cardiac arrest, most reported survival outcome figures are poor. If patient outcomes are to improve, evaluation of the contribution of all potential risk factors and interventions is essential. Such evaluation has been hindered by the lack of accurate data on structure, process, and outcome of care, in part due to the lack of uniformity in defining and reporting results [6].

At least 3,50,000 people will suffer cardiac arrest each year in the United States, 1 every 90 seconds. Many will then undergo cardiopulmonary resuscitation (CPR) by bystanders and emergency medical services in a desperate attempt to restore life. Numerous studies reports that most of these efforts will not succeed. Prolonged anoxia, the inability to restore spontaneous circulation, neurological devastation, and other complications combine to limit survival. Nonetheless, thousands will surmount these obstacles and resume normal lives [7].

The investigator's experience, discussion with the colleague and experts helped to realize that CPR among student nurses is an essential skill to be taught completely during their course. If the students are educated and are skillful in performing CPR, we can control the incidence of death due to cardiac arrest to a great extent. Many studies also indicate the need of performing CPR in time on patients with cardiac arrest to save life. Therefore, the investigator decided to undertake the study to assess the effectiveness of structured teaching programme on knowledge and skill regarding CPR among III year GNM students of a selected School of Nursing in Mangalore.

Objectives of the Study

1. To assess the mean pre- and post-test knowledge score regarding CPR among III-year GNM students as measured by structured knowledge questionnaire.
2. To assess the mean pre and post-test skill score regarding CPR among III-year GNM students as measured by an observation checklist.
3. To determine the effectiveness of structured teaching programme regarding CPR among III-year GNM students in terms of gain in mean post-test knowledge and skill score.

Hypotheses

All hypotheses will be tested at 0.05 level of significance.

- H1: The mean post-test knowledge scores of III-year GNM regarding CPR will be significantly higher than their mean pre-test knowledge scores on CPR.
- H2: The mean post-test skill scores of III-year GNM regarding CPR will be significantly higher than their mean pre-test skill scores on CPR.

MATERIALS AND METHOD

A quasi-experimental one-group pre-test post-test design was used for the study. The sample consists of 30 subjects. Student nurses were selected by simple random sampling technique. A formal written permission was obtained from the authorities of the selected institute for conducting the research study by the investigator before the collection of the data. The confidentiality of their identity and responses was assured in order to ensure their co-operation and prompt responses. An informed consent was taken from the student nurses. The tools used were Observational checklist and Demographic variables. The content validity of same was done by giving the tools to seven experts in the field of nursing and tools were in English language. Prior to the study the investigator is certified in ACLS and BLS of AHA. After the pre-test and assessment of skill by observational checklist, a Structured Teaching Programme was administered, and CPR is demonstrated to the subjects. On the seventh day, the post-test was conducted with the same questionnaire and observational checklist. The collected data were analyzed by using descriptive and inferential statistics. The investigator did not face any problems during the data collection procedure.

RESULTS

Data collected were analyzed and presented under the following headings.

Section I: Effectiveness of STP in terms of gain in mean posttest knowledge and skill scores

Data in table 1 and figure 1 show that 86.67% of the samples had good knowledge in the post test score ranging between 66-100% and 13.33 percent had average score ranging between 34-65%, whereas in the pretest



100% of the sample had average knowledge score ranging between 34- 65%.

It is evident from Table 2 that the mean post-test knowledge score (25.3) is higher than the mean pre-test knowledge scores (17) and mean percentage (53.12)

Data presented in the table 2 and figure 2 show that the mean percentage knowledge scores of the pre-test is highest (71.67%) in the area of precautions, sequence and equipment's used for CPR and lowest (34%) in the area regarding after care of the patient; whereas the mean percentage of the post-test knowledge score in the area of precautions, sequence and equipment's used for CPR is 85 % and in the area of after care of the patient is 81.33 %. Mean difference between possible percentage gain and actual percentage gain was calculated and found to be least in precautions, sequence and equipment's used for CPR (13.33%). The maximum gain (47.33%) was in after care of the patient after CPR. Hence the mean percentage score of the post-test was higher than pre-test knowledge scores in all areas.

Data in Table 4 and Figure 3 show that majority of the subjects (56.67%) scored ranging >66% in the post-test as compared to pre-test whereas (46.67%) scored average and 53.33%, were poor. This indicates that there is considerable gain in skill scores in the post-test.

It is evident from Table 5 that the mean post-test skill score (19) is higher than the mean pre-test skill scores (9.67) and the mean percentage (34.54)

Data presented in the table 6 and figure 4 show that mean percentage skill scores of the pre-test is highest (37.03) in the area of use of AED and lowest (30%) in the area of opening airway and providing ventilation; whereas the mean percentage of the post-test skill score of the area of use of AED is 67.03% % and the area of opening airway and providing ventilation is 46.66 %. Mean difference between possible percentage gain and actual percentage gain was calculated and found to be least in the area of opening airway and providing ventilation precautions (16.66%). The maximum gain (44.67%) was in the area of chest compressions. Hence the mean

percentage skill score of the post-test was higher than the mean pre-test skill scores in all areas.

Section II: Significant difference of mean pre-test and post-test knowledge and skill scores regarding CPR.

In order to find out the significance difference between the mean pre-test and post-test knowledge scores a paired 't' test was computed, and the data is presented in Table 7.

To test the statistical difference a null hypothesis was stated:

H01: There will be no significant difference between the mean pre-test and post-test knowledge scores of the 3RD year GNM students regarding CPR at 0.05 level.

Data in Table 7 show that the mean post-test knowledge score (25.3) was higher than the mean pre-test knowledge scores (17). The computed 't' value (15.88) is higher than the tabled value ($t_{29} = 2.26$ at $p < 0.05$ level of significance). Hence the null hypothesis is rejected, and research hypothesis is accepted. The findings show that STP was highly effective in increasing the knowledge of nursing students regarding CPR.

In order to find out the significance difference between the mean pre-test and post-test skill scores a paired 't' test was computed and the data is presented in Table 8.

To test the statistical difference a null hypothesis was stated:

H01: There will be no significant difference between the mean pre-test and post-test skill scores of the 3rd year GNM students regarding CPR at 0.05 level.

Data in Table 8 shows that the mean post-test skill score (19) was higher than the mean pre-test skill score (9.67). The computed 't' value (19.73) is higher than the tabled value ($t_{27} = 2.26$ at $p < 0.05$ level of significance). Hence the null hypothesis is rejected, and the research hypothesis is accepted. The findings show that the observational checklist was highly effective in increasing the skill of subjects regarding CPR.

Table 1: Grading of Pre-Test and Post Test Knowledge Score of Student nurses N=30

Level of knowledge	Range of Score	Percentage of Subjects	
		Pre test	Post test
Good (22-32)	66-100%	0	86.67%
Average (12-21)	34-65%	100%	13.33%
Poor (0-11)	0-33%	0	0

Table 2: Mean, range, Standard Deviation and mean percentage score of pre-test and post-test knowledge scores N=30

Area	Range	Mean	SD	Mean Percentage
Pre-test	15-20	17	1.59	53.12
Post-test	19-28	25.3	2.64	79.06

Maximum possible score= 32



Table 3: Area-wise mean percentage and mean gain of pre-test and post-test knowledge scores N= 30

Area	Max. score	Pre-test		Post-test		Mean	
		Mean	Mean %	Mean	Mean %	Actual gain %	Possible gain %
Definition, purpose, and indication for CPR	5	3.5	69.33	4.43	88.66	19.33	30.67
Precautions, sequence, and equipment's used for CPR	6	4.3	71.67	5.1	85	13.33	28.33
Performing CPR on an adult	16	7.16	45	11.67	72.9	27.9	55
After care of the patient	5	1.7	34	4.06	81.33	47.33	66

Maximum possible score=32

Table 4: Grading of Pre Test and Post Test Skill Score of Students N=30

Grading of skill	Percentage score	Percentage of Subjects	
		Pre-test	Post-test
Good (19-28)	66-100%	0	56.67%
Average (10-18)	34-65%	46.67%	43.33%
Poor (0-9)	0-33%	53.33%	0

Table 5: Mean, range, Standard Deviation and mean percentage score of pre-test and post-test skill scores N=30

Area	Range	Mean	SD	Mean percentage
Pre-test	7-13	9.67	1.58	34.54
Post-test	16-23	19	1.79	67.86

Maximum possible score= 28

Table 6: Area-wise mean percentage and mean gain of pre-test and post-test skill scores N= 30

Area	Max. score	Pre-test		Post-test		Mean	
		Mean	Mean %	Mean	Mean %	Actual gain %	Possible gain %
Assessment	6	2	33.33	4.26	71.11	37.78	66.67
Chest compression	8	2.79	34.91	6.36	79.58	44.67	65.09
Opening airway and providing ventilation	5	1.5	30	2.33	46.66	16.66	70
Use of AED (automated external defibrillator)	9	3.33	37.03	6.03	67.03	30	62.97

Maximum possible score=28

Table 7: Significance difference between the mean pre-test and post-test knowledge scores N=30

Group	Mean knowledge score	Mean difference	SD of difference	't' Value	Inference
Pre-test	17	-8.33	2.98	15.88	Significant
Post-test	25.3				

Max. Score 32 (t29=2.26, p< 0.05)

Table 8: Significance difference between the mean pre-test and post-test skill scores N=30

Group	Mean knowledge score	Mean difference	SD of difference	't' Value	Inference
Pre-test	9.67	9.33	2.59	19.73	Significant
Post-test	19				

Max. Score 28 (t29=2.26, p< 0.05)



Figure 1: Bar diagram showing the pre and post test knowledge score of student nurses

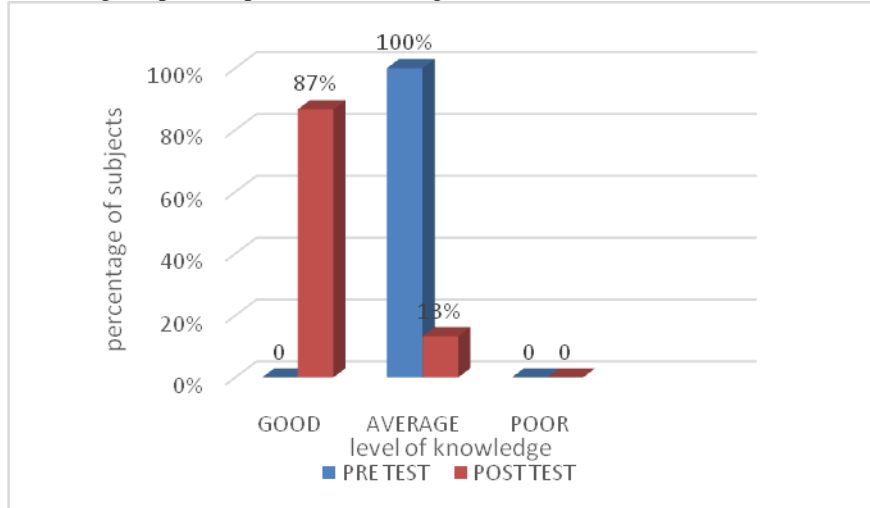


Figure 2: Pyramid diagram showing area-wise pre-test and post-test knowledge scores of student nurses

- Area 1: Definition, purpose, and indication for CPR
- Area 2: Precautions, sequence and equipment's used for CPR
- Area 3: Performing CPR on an adult
- Area 4: After care of the patient

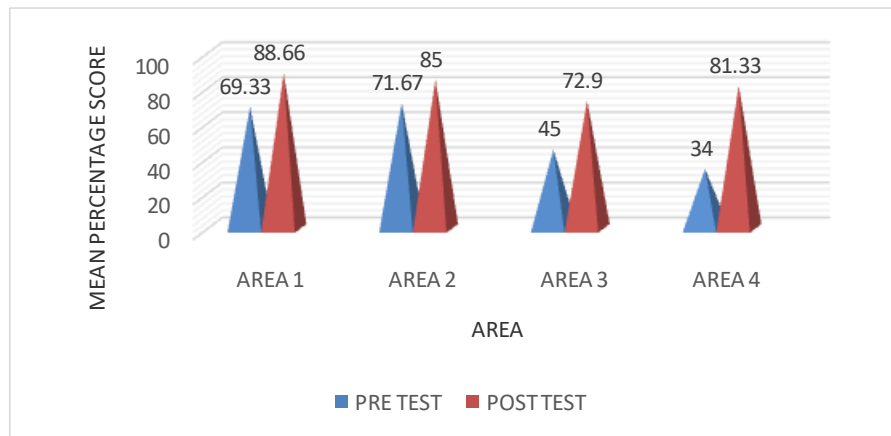


Figure 3: Bar diagram showing the pre and post test skill scores of student.

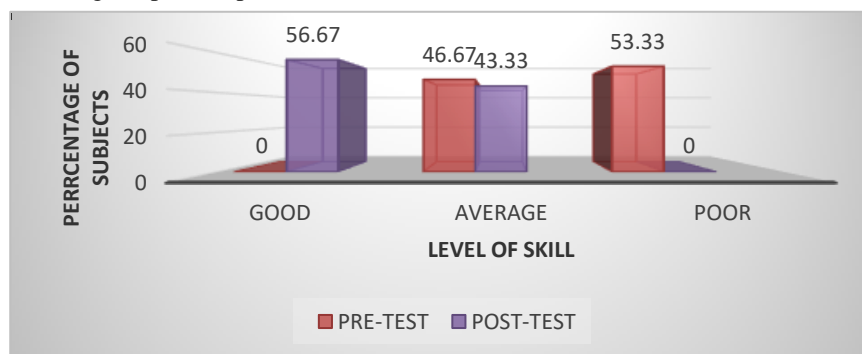
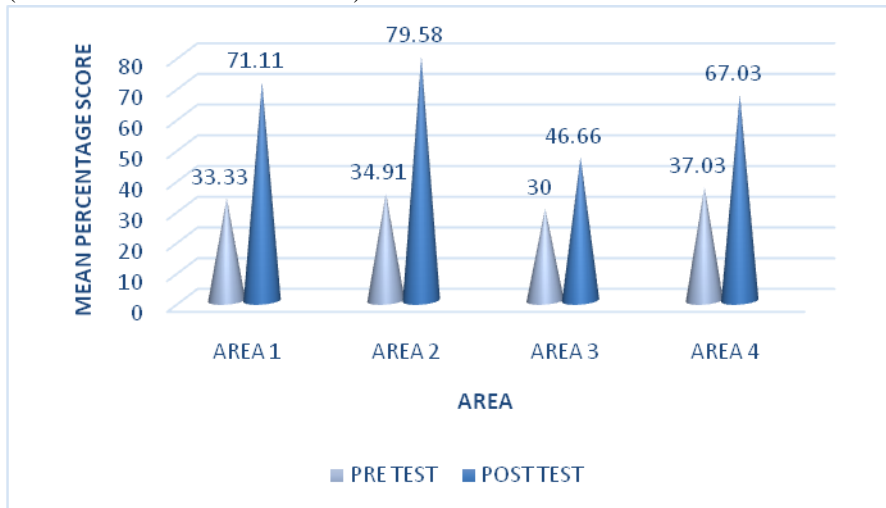


Figure 4: Conical Diagram Showing Area-Wise Pre-Test And Post-Test Skill Scores Of Student nurses

Area 1: Assessment
 Area 2: Chest compressions
 Area 3: Opening airway and providing ventilation.
 Area 4: Use of AED (automated external defibrillator)



DISCUSSION

Pre-test and post-test knowledge scores of the student nurses ranged from 15-20 and 19-28 respectively. In post-test, majority of the subjects (86.67%) had good knowledge scores (percentage of score: 66-100) as compared to the pre-test knowledge scores in which no one had good knowledge score and 100% (Percentage of score: 12-21) had average knowledge score. The mean post-test knowledge score (25.3) was higher than the mean pre-test knowledge score (17) suggesting that the STP helped in improving the knowledge of student nurses regarding CPR. The mean percentage of post-test knowledge score were (79.06%) higher than the mean percentage of pre-test knowledge score (53.06%).

A study on the effectiveness of the structured teaching programme regarding cardiopulmonary resuscitation among undergraduate students at selected college of Dehradun showed that the mean post test score (25.80±3.0) was higher than pre-test mean score (13.18±3.3). Arbitrary score revealed that, in pre-test majority of the (undergraduate) UG students had (60.65%) Average knowledge, most of the UG students had (36.06%) poor knowledge, only (3.27%) had the good level of knowledge. Where in post-test, maximum students had very good knowledge (62.92%), most UG students had 36.06% good knowledge and only 1.63% had average knowledge which showed that the knowledge had increased after administration of (STP), Calculated t value was 19.327 and found highly significant at p<0.001 [8]

The areas wise mean percentage of post-test knowledge scores (88.66%) were highest in the areas of definition, purpose and indication for CPR. There was gain (47.33%) in knowledge in all areas and maximum

knowledge was in the area of after care of the patient. Therefore, it can be inferred that STP was effective in increasing the knowledge of student nurses. A significant difference between the mean post-test (25.3) and mean pre-test (17) knowledge scores of student nurses regarding CPR was found to be highly significant (t=15.88, p<0.05), suggesting that structured teaching programme was effective in improving the knowledge scores of student nurses.

Majority of policemen were having poor existing knowledge regarding CPR. The mean difference between post-test and pre-test knowledge was 9.73 and standard deviation difference was 2.017. The ‘t’ value obtained was 14.2155 and is significant at the 0.05 level. This implies that the knowledge level had improved after structured teaching programme. Besides, a highly positive correlation also exists between knowledge and practice (r = 0.86443) [9].

A significant difference between the mean post-test (19) and mean pre-test (9.67) skill scores of student nurses regarding CPR was found to be highly significant (t=19.73. p<0.05), suggesting that STP and observational checklist used to demonstrate CPR was effective in improving the skill scores of student nurses.

The findings of the present study are supported by a study conducted at Hassan to assess the effectiveness of structured teaching programme on knowledge and skill of cardiopulmonary resuscitation among 60 staff nurses. A structured knowledge questionnaire and an observational checklist were used to measure the knowledge and skill of both control and experimental group in the study. In relation to the findings



of the study in pre test, experimental as well as control group nurses were having average 40% knowledge and 36.4% on CPR. In post test after implementation of STP and demonstration to the experimental group of staff nurses, the results show that an average of 80% in knowledge and 82.7% in skill which indicate the STP was effective. Correlation between the knowledge and skill in the post test experimental group was 0.65 and $p=0.001$ [10]

Limitations

1. Generalization of the findings was restricted because of limited sample size and selection of one School of Nursing.
2. The structured knowledge questionnaire was used for data collection, which restricted the amount of information that could be obtained from the student nurses.

Recommendations

Based on the study findings the following recommendations have been made for further study:

1. A study could be replicated on a large sample, thereby findings can be generalized.
2. A comparative study could be conducted in different settings to find out the effectiveness of STP.
3. An experimental study could be replicated with a control group.
4. A study could be conducted on large group and different setting and students from various colleges.
5. A study could be conducted to assess the long-term effects of structured teaching programmes in their future service field.
6. A comparative study could be undertaken to evaluate different teaching strategies, self-instructional module

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(SIM), peer evaluation and education by student nurses.

7. A follow up study of STP could be carried out to find out the effectiveness in terms of retention of knowledge and skill.

CONCLUSION

The study was conducted to assess the student nurse's knowledge and skill before and after a structured teaching program regarding CPR. Findings of the study showed that the knowledge and skill scores of student nurses were very less before the introduction of STP and demonstration of CPR. The STP enhanced them to gain more knowledge and demonstration enhanced them to gain more skill regarding CPR. Hence, STP and demonstration of CPR was an effective strategy for providing information and improving the knowledge and skill of student nurses, which was well appreciated and accepted by student nurses.

CONFLICT OF INTEREST

There were no conflicts of interest reported.

ACKNOWLEDGMENTS

The author grateful to his efficient Guide, Rev.Sr. Ann Rose D' Almeida, M. Sc. Nursing, Professor and Head of the Department of Medical Surgical Nursing, Athena College of nursing Mangalore for her constant guidance, scrutinizing skills and support during the study. She has made a sincere effort in molding the investigator's row thinking by providing valuable suggestions and making this project a fruitful and successful learning experience.



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