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An evaluative study: Effectiveness of planned health teaching regarding adult cardiopulmonary resuscitation among basic b.sc. Nursing students, Odisha

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Abstract

Background: Cardiopulmonary Resuscitation (CPR) is a lifesaving skill essential for nurses who often encounter cardiac arrest situations. Lack of adequate knowledge and training affects the quality of CPR.

Aim: To evaluate the effectiveness of a structured teaching programme (STP) on knowledge regarding adult CPR among 2nd-year B.Sc. Nursing students.

Methods: A quasi-experimental one-group pre-test post-test design was adopted. Forty-two students were selected using simple random sampling. A structured questionnaire consisting of 30 MCQs was used to assess knowledge before and after the STP.

Results: Pre-test results showed 33% had average, 62% good, and 5% very good knowledge. Post-test results showed 71% had well and 29% had very good knowledge. The mean difference between pre- and post-test scores was 11.35, indicating significant improvement.

Conclusion: The structured teaching programme was highly effective in improving knowledge related to adult CPR.

Keywords: CPR, nursing students, structured teaching programme, knowledge, cardiac arrest

Introduction

Knowledge about basic life support is mandatory for healthcare professionals. This study aims to evaluate the knowledge among nursing students who have completed their course and have enrolled for internship. Regular BLS courses are necessary to improve the knowledge among them and to prepare them to respond to a medical emergency.

By educating laymen, survival after cardiac arrest can increase in society. It is difficult to reach the entire population with CPR training. However, if 15% of the population knows how to perform CPR, an increase in short and long- term survival in patients suffering a cardiac arrest could be seen. To educate youth is a way to reach parts of the population. This study aimed to investigate the effect of a CPR intervention for youth [1].

Perioperative cardiac arrest is associated with a high mortality rate. This work aimed to study its prognostic factors for risk mitigation by means of care management and planning. A database of 380,919 surgeries was reviewed, and 150 POCAs were curated. The main outcome was mortality prior to hospital discharge [2].

In hospital cardiac arrest occurs in over 290 000 adults each year in the United States. Cohort data from the United States indicate that the mean age of patients with in-hospital cardiac arrest is 66 years, 58% are men, and the presenting rhythm is most often 81% non-shockable. The cause of the cardiac arrest is most often cardiac 50-60%, followed by respiratory insufficiency15-40% [3].

A study on quality of cardio pulmonary resuscitation during in hospital crdiac arrest. The main objective of this study is to measure multiple parameters of in-hospital CPR quality and to determine compliance with published American Heart Association and international guidelines. The sample consisted of 67 patients who were experienced in-hospital cardiac arrest at the University of Chicago Hospitals, Chicago. The result of this study indicates that the importance of high-quality CPR suggests the need for rescuer feedback and monitoring of CPR quality during resuscitation effort [4].

A protective study getting a handle on the number of sudden cardiac arrests is a bit ticker. If one looks only at death certificates the figure is 456,000 per year. I think a more realistic figure is 155,000, the number of sudden deaths in which emergency medical services are called and attempt to resuscitate the individual. This lower figure gives a more realistic picture of the number of persons who are potentially "resuscitable" from cardiac arrest [5].

A cohort study of 32 children with near drowning, admitted in RIMS Hospital, Manipur during January 2007 to December 2008 revealed that near drowning accounted for 0.9% of total paediatric hospital admissions. CPR at the sense of rescue and appropriate respiratory and cardiovascular support on arrival, 31 (96.9%) cases had intact survival only 1 (3.1%) had mild neurological squeal at the time of discharge [6].

Resuscitation is a technique used by professional health care staff, as well as members of the public. It is essential for all health care professionals to be able to perform basic life support, and training for staff and students who are commonly involved with resuscitation attempts must take place on a regular basis. If a cardiac arrest occurs in the

community, the patient must be moved onto a hard surface and placed on his or her back, quickly make the environment appropriate for performing life-saving procedures [7].

Mechanical chest compression during CPR with Auto Pulse or LUCAS devices has not improved survival from cardiac arrest. Cohort studies suggest risk of excess damage. LUCAS does not cause significantly more serious or life-threatening visceral damage than manual CC [8].

A study to assess the knowledge and personal experience with CPR among students. This study shows that 75.9% of dentist had received information about basic CPR but only 66% had the current concept of performing it and only 12% had received practical training in basic CPR. 1 in 10 dentists had seen patients suffering from cardiopulmonary arrest in their practice. The level of knowledge was significantly higher among faculty dental practitioner compared with local dental practitioner. In addition a positive linear correlation was found between educational level and knowledge level [9].

A study regarding knowledge of CPR among the public by telephone questionnaire survey in Hongkong. Telephone interview method was used for this study. Study was conducted among 357 people; approximately 12% had received CPR training. CPR knowledge in Hongkong was poor, even among the previously trained and especially with regard to circulatory maintenance. The most common reason for not taking CPR training was lack of time. Intensified educational efforts and exploration of new approaches to improve this first stage in the chain [10].

A study was conducted regarding the effectiveness of planned teaching programme on knowledge and practice of Basic Life Support among high school students in Bangalore. The research design used for the study was quasi- experimental design. The sample consisted of 40 rural high school students. The study was conducted in rural high school of Bangalore and the subjects were selected through simple random sampling technique. They showed that the majority (87.5%) of the students had inadequate knowledge and 100% had poor practice. The planned teaching programme facilitated them to update their knowledge and practice related to Basic Life Support. Hence, the planned teaching programme is an effective teaching strategy to improve knowledge and practice of sample on BLS [11].

Methodology

Study Design

This study adopted a evaluative research approach, Quasi-experimental, One-group pre-test–post-test.

Study Setting

College of Nursing, VIMSAR, Burla, Sambalpur, Odisha. Classroom setting for pre-test, STP, and post-test.

Study duration

The study was conducted from 26.11.2022. Total study duration: September 2022 – November 2022

Sampling Method

In this study simple random sampling technique is used.

Sample size

A total of 42 students were included in this study. The sample size was determined using Yamane's formula.

According to Yamene's formula

$n = N/ (1+ N e^2)$

Here n= Sample size, N = Population size, e = Percentage of error i.e. 0.05

Inclusion Criteria

- Degree students aged 18–23 years.
- Studying in College of Nursing, VIMSAR, and Burla.
- Able to read and write English.
- Present during data collection.
- Willing to participate the all session.

Exclusion Criteria

- Not willing to participate
- Chronically ill or absent during data collection
- Unable to take interest in answering the questionnaire

Description of the tools

Data were collected using three tools

Tool-1: Self-structured socio-demographic questionnaire the variables affecting cardio pulmonary resuscitation. The socio-demographic tool consisted of seventeen items related to cardio pulmonary resuscitation among nursing students (Age, Sex, Qualification, Source of information, Religion, Number of times CPR performed, etc.).

Tool-2: Structured Knowledge Questionnaire, 30 MCQs, One correct answer per item, Maximum score: 30. Scores classified as: Very good: 25–30, Good: 19–24, Average: 13–18, Poor: 0–12

Tool validation

Content validity: Reviewed by 5 experts (1 medical professionalism, 4 nursing professionalism). The tools demonstrated strong reliability, with Cronbach's α. values of. 91. Pre-testing (tryout) done in hospital for clarity, ambiguity, and timing.

Study variables

Demographic variables: Age, gender, qualification, source of CPR knowledge, previous exposure to CPR

Independent Variable: Structured Teaching Programme (STP) on adult CPR

Dependent Variable: Knowledge score of nursing students

Data collection procedure

Data collection is the systematic gathering of information relevant to the research objectives. The data for the present study were collected after obtaining formal administrative permission and informed consent from the participants. Prior to data collection, written permission was obtained from the Principal of the selected College of Nursing, VIMSAR, Burla, Sambalpur, and Odisha. Ethical clearance was ensured and informed written consent was taken from each participant after explaining the purpose of the study. Confidentiality and anonymity of the participants were maintained throughout the study.

The data collection was carried out on 26/11/2022. The investigator personally collected the data from second-year Basic B.Sc. Nursing students using a structured questionnaire.

The data collection procedure was conducted in three phases

Phase I: Pre-test

The pre-test was conducted to assess the baseline knowledge regarding adult cardiopulmonary resuscitation.

A structured self-administered questionnaire consisting of 30 multiple-choice questions was distributed to the students. Adequate time (30–40 minutes) was provided to complete the questionnaire. No teaching or discussion regarding CPR was done before the pre-test.

Phase II: Implementation of Structured Teaching Programme

Immediately after the pre-test, a structured teaching programme on adult cardiopulmonary resuscitation was administered by the investigator to the same group of students. The teaching session was conducted using lecture-cum-discussion method with audiovisual aids.

Phase III: Post-test

The post-test was conducted after the implementation of the structured teaching programme using the same structured questionnaire. The post-test was administered to evaluate the effectiveness of the planned teaching programme in improving the knowledge of the students regarding adult CPR.

Description of the intervention (structured teaching programme)

The structured teaching programme (STP) was designed by the investigator based on review of literature, American Heart Association (AHA) guidelines, and expert opinion. The programme aimed to improve the knowledge of second-year Basic B.Sc. Nursing students regarding adult cardiopulmonary resuscitation.

The structured teaching programme included the following content

1. Introduction to CPR
2. Anatomy and physiology of the heart
3. Definition and causes of cardiac arrest
4. Signs and symptoms of cardiac arrest
5. Importance of early CPR
6. Indications and contraindications of CPR
7. Updated adult CPR guidelines (CAB sequence)
8. Steps of adult CPR: Checking responsiveness, Calling for help, Chest compressions, Airway and breathing
9. Complications of CPR
10. Summary and clarification of doubts

Teaching Method: Lecture-cum-discussion, Use of charts and audiovisual aids

Duration: Total duration: 45–60 minutes

Evaluation: Evaluation was done using a structured questionnaire during the post-test to assess improvement in knowledge.

Ethical considerations

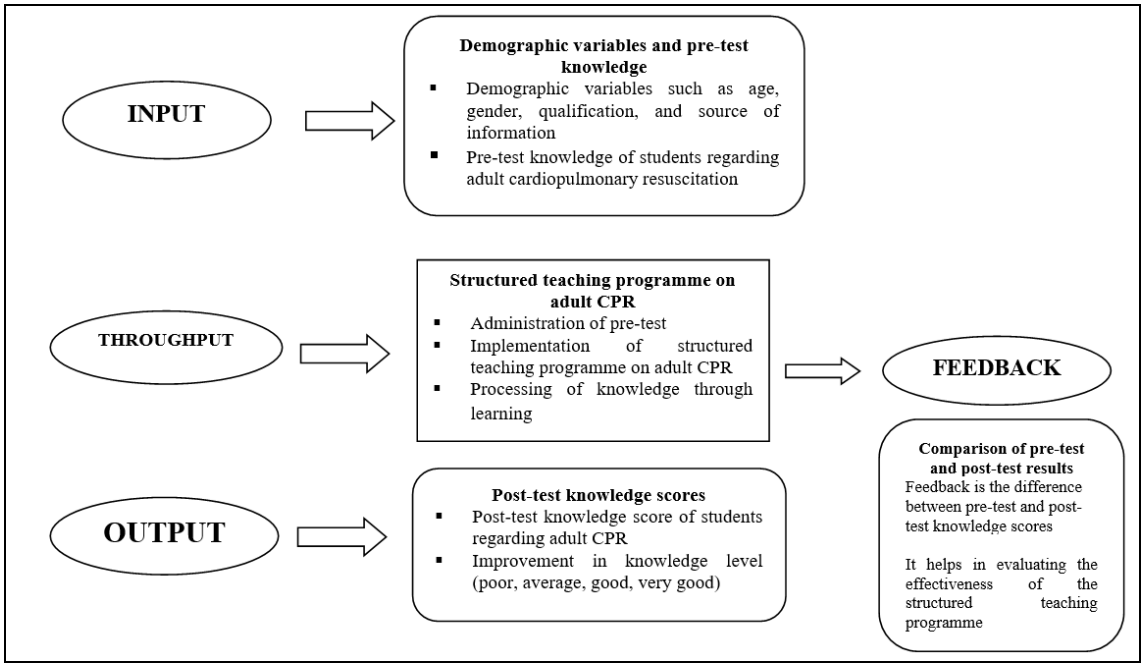
Ethical approval was obtained from the Institutional Ethics Committee of the Institute of Medical Odisha. Permissions were also secured from the principal of the college, the head of the department, and relevant staff.

Statistical Analysis

SPSS version 21 was used for data analysis. Demographic information and baseline characteristics were summarized using descriptive statistics, including mean values, standard deviations, and frequency counts. The data will be collected and analyzed with descriptive and inferential statistical techniques. Mean difference (Effectiveness = Post-test − Pre-test). The demographic variables will be analyzed by using frequency and percentage. The frequency tables will be formulated for all significant information.

Theoretical framework

A conceptual framework is a logical structure of concepts that provides direction to the study and helps in understanding the relationship between variables. This is based on J.W. Kenny's Open System Model. According to this model, a system consists of input, throughput, output, and feedback. The system is open and interacts with the environment. It explains the relationship between teaching (input), learning process (throughput), and learning outcomes (output). It is suitable for educational intervention studies. It allows evaluation through feedback



Conceptual framework- J.W. Kenny's Open System Model

Results

Table 1: Distribution of subjects based on sociodemographic variables. (N =42)

Sl. No	Sociodemographic Variables	Frequency (f)	Percentage (%)
1.	Age a) 18- 19 b) 20- 21 c) 22- 23	 7 29 6	 16 69 15
2.	Gender a) Male b) Female c) Others	 4 38 -	 10 90 -
3.	Educational Qualification a) +2 b) +3 c) GNM d) Others	 28 - - 14	 66 - - 34
4.	Source of knowledge a) Class study b) Practical experience c) Books d) Others	 38 - 4 -	 91 - 9 -

The above table-1 revealed that Frequency (F) and percentage (%) distribution of patients according to age, gender, educational qualification, source of knowledge.

Table 2: Analysis of the Level of Knowledgge among Basic B.Sc Nursing 2nd Year Students Regarding Adult CPR. (N =42)

Knowledge	Pre-test (STP)		Post-test (STP)	
	Frequency(f)	Percentage (%)	Frequency(f)	Percentage (%)
Very good (81-100%)	2	5%	12	29%
Good (61-80%)	26	62%	30	71%
Average (41-60%)	14	33%	-	-
Poor (0-40%)	-	-	-	-

The data presented in table-2 revealed that the assessment of knowledge levels during the pre-test revealed that the majority of the participants (62%) had good knowledge, while 33% had average knowledge and only 5% demonstrated very good knowledge. None of the participants fell under the poor knowledge category. In contrast, the post-test findings showed a marked improvement in knowledge levels following the Structured Teaching Programme (STP). A majority of the participants (71%) attained good knowledge, and 29% achieved very good knowledge. Notably, none of the participants remained in the average or poor knowledge categories in the post-test, indicating the effectiveness of the Structured Teaching Programme in enhancing participants' knowledge.

Table 3: Area wise distribution of Pre-test and post- test knowledge score on subscale among college of nursing students. (N =42)

Sl No	Area Wise	Pretest				Posttest			
		No. of items	Mean	Standard Deviation	Mean %	No. of items	Mean	Standard Deviation	Mean %
1	Knowledge regarding cardiac arrest	10	27	4.02	64.28	10	30.9	3.48	73.57
2	Knowledge regarding adult CPR	20	29.2	2.59	69.52	20	32.65	2.56	77.73

The area-wise analysis of knowledge scores showed an improvement from pre-test to post-test following the Structured Teaching Programme. In the area of knowledge regarding cardiac arrest, which consisted of 10 items, the pre-test mean score was 27 with a standard deviation of 4.02, yielding a mean percentage of 64.28%. After the intervention, the post-test mean score increased to 30.9 with a reduced standard deviation of 3.48, and the mean percentage improved to 73.57%.

Similarly, in the area of knowledge regarding adult cardiopulmonary resuscitation (CPR), which comprised 20 items, the pre-test mean score was 29.2 with a standard deviation of 2.59 and a mean percentage of 69.52%. In the post-test, the mean score increased to 32.65 with a standard deviation of 2.56, and the mean percentage rose to 77.73%. These findings indicate a notable improvement in knowledge across both areas following the Structured Teaching Programme.

Table 4: Evaluate the effectiveness of structured teaching programme. (N=42)

Knowledge assessment	Mean	Mean difference	Standard deviation
Pre-test	52.2	(63.55-52.2)=11.35	6.61
Post-test	63.55		6.04

The above table reveals, student's knowledge score after administration of structured teaching programme. Difference between pre-test and post-test score was analysed using mean difference with 11.35.

Table 5: Association of determinants of level of knowledge and sociodemographic variables in the subjects. (N=42)

Sl no	Demographic data	Chi- square	df	P value	Level of significance
1	Age	5.99	2	**0.053***	**Significant**
2	Gender	3.84	1	0.169	Non-significant
3	Qualification status	3.84	1	**0.011***	**Significant**
4	Source of knowledge	5.99	2	0.558	Non-significant

The data presented in table-4 revealed that In the above table it is seen that the association between selected demographic variables and knowledge level was analyzed using the chi-square test. The findings revealed that age showed a statistically significant association with knowledge level ($\chi^2 = 5.99$, df = 2, p = 0.053), whereas gender did not show a significant association ($\chi^2 = 3.84$, df = 1, p = 0.169). Qualification status was found to have a statistically significant association with knowledge level ($\chi^2 = 3.84$, df = 1, p = 0.011), indicating that educational status influenced knowledge levels. In contrast, source of knowledge did not demonstrate a significant association with knowledge level ($\chi^2 = 5.99$, df = 2, p = 0.558). Overall, the results indicate that age and qualification status was significantly associated with knowledge level, while gender and source of knowledge were not significantly associated.

Discussion

A total of 100 students underwent the three hours training programme, ranging in age from 14-19 years. Of these, 44% were female and 56% were males. 70% of students perform model CPR steps and 75% all AED stapes. Students scored better in chest compression performance, particularly the parameter achieving the adequate release of CC, Correct CC depth, correct hand positioning. [12]

A study by on survival and neurological outcome alter cardio pulmonary resuscitation with four different chest compression ventilation ratios. The objective was to determine 24 hours survival and neurological outcome. The result shows that there was no statistically significant difference in 24 hours survival among 4 groups. There were significant differences in 24 hour Neurological function, as evened by using the swine cerebral performance category scale. [13]

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Implications of the Study

Improves emergency response skills. Enhances patient survival through proper CPR. Emphasizes the need for regular CPR training in the curriculum. Encourages skill-based practical sessions. Administrators should organize periodic CPR training workshop. Should motivate staff and students for continuous learning. Provides a baseline for future studies. Can be replicated on larger samples or with skill assessment.

Limitation

Limited to B.Sc. Nursing 2nd year students only. Knowledge assessed but practice not evaluated due to time constraints. Limited duration of study. Small sample size.

Conclusion

The structured teaching programme significantly improved the knowledge of 2nd-year B.Sc. Nursing students regarding adult CPR. This shows that regular educational interventions are necessary to enhance preparedness to manage cardiac emergencies effectively.

Funding

Self

Conflicts of interest

There are no conflicts of interest for the writers.

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Ethics Approval

The research committee endorsed the identified problem and goal of the study. Approval for conducting study from Institutional Ethics Committee of Institute of Medical Sciences.

Data Availibility

The data is available and can be accessed with a reasonable request.

Abbiriviation

CPR: Cardiopulmonary Resuscitation, STP: Structured Teaching Programme, AHA: American Heart Association, BLS: Basic Life Support, VIMSAR: Veer Surendra Sai Institute of Medical Sciences and Research

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