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"Assessing the Effectiveness of Cardiopulmonary Resuscitation Demonstrations among Junior College Students".

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KEYWORDS

CPR;
Education;
Effectiveness;
Knowledge;
Skills

ABSTRACT:

Introduction: Cardiopulmonary resuscitation (CPR) is a crucial lifesaving technique, especially important given the rising incidence of cardiac arrests

Objectives: This study aims to evaluate the effectiveness of CPR demonstrations on the knowledge and skills of junior college students.

Methods: A quasi-experimental, one-group pretest-posttest design was employed, involving 100 junior college students selected via simple random sampling. The study utilized a structured questionnaire and an Objective Structured Clinical Examination (OSCE) checklist to assess knowledge and skills.

Results: Pretest assessments revealed that 72% of participants had poor knowledge and skills regarding CPR, while 28% demonstrated average competency. Following the demonstration, 80% exhibited excellent skills, indicating significant improvement ($p < 0.001$).

Conclusions: The findings underscore the importance of CPR training and its effectiveness in enhancing the skills and knowledge of college students, advocating for broader implementation in educational settings.

1. Introduction

Cardiopulmonary resuscitation is a lifesaving technique for victims of sudden cardiac arrest. Recently, there has been a significant increase in the number of cardiac arrests worldwide, making it a major public health issue. The significance of early CPR and CPR education for the students has been emphasized to enhance the survival rate of out-of-hospital arrest patients. Thus, mandatory education for college students might be important. CPR education in colleges has been supported by the World Health Organization (WHO).[1]

CPR consists of the use of chest compressions and artificial ventilation to maintain circulatory flow and oxygenation during cardiac arrest (see the images below). Although survival rates and neurological outcomes are poor for patients with cardiac arrest, early appropriate resuscitation—including early defibrillation when needed—and appropriate implementation of post–cardiac arrest care led to improved survival and neurological outcomes.[2]

CPR is a way to save the life of someone who is in cardiac arrest (when their heart can't pump blood) by attempting to restart their heart. It's a fairly simple technique that anyone can learn. The key part of CPR is chest compressions, which keep blood flowing to vital organs until a regular heartbeat returns. Giving breaths of oxygen brings more oxygen into the person with cardiac arrest.[3]

Sudden cardiac arrest (SCA) is a medical emergency. If not treated immediately, it causes sudden

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cardiac death. With fast and appropriate medical care, survival is possible. SCA is classified as in-hospital and out-of-hospital. CPR is an evolving lifesaving technique of modern medicine that comprises a series of lifesaving actions that improve the survival rates following SCAs.[4]

Successful CPR usually leads to a positive outcome after sudden cardiac arrest. Hence knowledge and skills among the medical and paramedical staff regarding CPR becomes very important.

According to statistics nearly 7.5 lakh people die of sudden cardiac arrests every year in India. On an average, a victim begins to suffer irreversible brain damage four minutes after the cardiac arrest takes place and if no CPR administered.[5]

The survival rate of CA was more than three times higher when bystander CPR was conducted compared to individuals who did not receive CPR.[6]

CPR is a lifesaving intervention for cardiac arrest. However, survival depends in part to the quality of CPR delivered. High-quality CPR provides 10-30% normal blood flow to the heart and 30%-40% of normal blood flow to the brain. The inefficiency of CPR identifies the need for delivery of the highest quality CPR possible. The recovery of the patient depends on the quality of cardiopulmonary resuscitation. The need to provide knowledge and skills regarding CPR to nurses is essential to ensure optimal implementation of CPR to patients who experience cardiac arrest.[7]

Several authors described the problem of poor performance in CPR, even when provided by medical professionals. Numerous investigations have reported the problem of poor skills retention after various CPR courses. Studies reporting the need for improvement of resuscitation techniques led to the recent changes in BLS and ALS algorithms. Dangers of Sudden Cardiac Arrests (SCA) that can lead to death of an individual within a few minutes. As per WHO census statistics mortality due to cardiac arrest approximately 4280 out of every one lakh people die every year from SCA in India alone. After a cardiac arrest there are four to six minutes before brain death and death occur. Chances of survival reduce by 7-10 percent with every passing minute. It is a silent epidemic. Cardiac arrest is reversible if the victim is administered prompt and appropriate emergency care. This generally involves administration of CPR, shock treatment to the chest to reset the heart's rhythm (defibrillation) and advanced life support. In India the annual incidence of sudden cardiac death accounts for 0.55 per 1000 population. The survival rate of a sudden cardiac arrest is almost less than 1%. SCAs constitutes 40-45% of cardiovascular deaths and out of this almost 80% are due to heart arrhythmia disturbances or arrhythmia.[8]

CPR competency is considered a fundamental skill for health care workers. In the wider community, it is an expectation that knowledge and competence in CPR is at a high standard in nursing education. Participation in both successful and unsuccessful CPR is one of the most stressful situations that the nursing students have to deal with after their registration. A thorough knowledge and competency (skill) help them to perform CPR to the patient's whenever is needed.[9]

According to the American Heart Association, more than 350,000 out of hospital cardiac arrest occurred in 2016 and sadly 88%of people who suffered with cardiac arrest outside the hospital died. This data is enough to explain the need of learning CPR knowledge and skills. Brain death occurs within 3 to 5 minutes after the cardiopulmonary arrest. CPR effectively keeps blood flowing and provides oxygenated blood to brain and other vital organs of the body, giving the victim a better chance for recovery. The main need of CPR study is to learn to maintain blood circulation, open airways and provide artificial breathing. It provides basic life support till the medical and advanced life support arrives.[10]

Effective bystander cardiopulmonary resuscitation can double or triple survival rate. The American Heart Association noted that nearly 70 percent of lay people may feel unable to respond during a cardiac emergency because they do not know how to provide CPR. It is a manual procedure that ensures that the heart is still beating and the lungs are delivering oxygen to the blood in the event of absent beats. This procedure makes sure that the heart and brain are receiving an adequate supply of oxygen.[11]

2. Methods

Objectives of the study were: 1. To assess effectiveness of demonstration regarding cardiopulmonary resuscitation on knowledge and skills among college students. 2. To find out the association of knowledge and skills with demographic variables. This study involved collection of data from college students in the target population. Sampling was done using simple random

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sampling method. Quantitative Research approach was used & a sample of 100 students qualifying inclusion

criteria were involved in the study. A structured demographic questionnaire was developed to collect data on demographic variables. The questionnaire was administered after obtaining their consent through face-to-face interviews.

Tool was developed in alignment with the research objectives; it included a demographic Performa and an OSCE checklist. Tool was sent out to experts for obtaining content validity. Inter-rater reliability was used to assess reliability of the tool.

Tool consisted of demographic variables & an OSCE (Objective structured clinical examination) Checklist:

Part 1: Consist of demographic variables of students in the study i.e. Age, Previous knowledge, source of information, Assisted cardiopulmonary resuscitation.
Part 2: Objective structured clinical examination (OSCE) /checklist
Scoring: Score 1 was given for correct step & score 0 was given for wrong step

The pilot study was conducted from 26th April 2024 to 3rd May 2024 as per laid down criteria on 10 subjects. Pilot study was done successfully & feasibility assessment was also done.

The researcher introduced themselves to the subjects and obtained consent from participants. Data was collected from each subject using socio-demographic Performa and Pretest was done using OSCE checklist. Data analysis involved descriptive statistics to summarize the demographic characteristics of the study population and level of competency of performing CPR. Inferential statistics, such as chi-square tests or logistic regression, were used to identify factors associated with knowledge & skill of performing CPR and explore relationships between variables.

3. Results

Table 1: Description of samples (college students) based on their personal characteristics in terms of frequency and percentage N=100

Demographic variable	Freq	%
Age		
16-18 ears	0	0%
19-20 ears	51	51%
20+ years	49	49%
Gender		
Male	0	0%
Female	100	100%
Previous knowledge		
Yes	10	10%
No	90	90%
Source of information		
Teaching	0	0%
Media	6	6%
Internet	4	4%
Demonstration	0	0%
Skills regarding CPR		
Yes	1	1%
No	99	99%

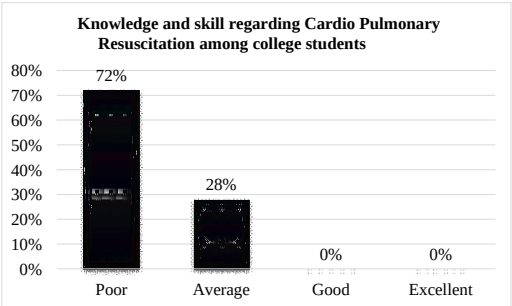

Figure 1. Level of Knowledge and skill regarding cardio pulmonary resuscitation among college students in selected college

72% of the college students had poor knowledge and skills and 28% of them had average

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knowledge and skills regarding cardio pulmonary resuscitation

Table 2: Effectiveness of Demonstration regarding Cardio Pulmonary Resuscitation among College students in selected College N=100

Knowledge	Pretest		Posttest	
	Freq	%	Freq	%
Poor	72	72%	0	0%
Average	28	28%	0	0%
Good	0	0%	20	20%
Excellent	0	0%	80	80%

Table 2 shows that, in pretest, 72% of the college students had poor knowledge and skills and 28% of them had average knowledge and skills regarding cardio pulmonary resuscitation. In posttest, 20% of the college students had good knowledge and skills and 80% of them had excellent knowledge and skills regarding cardio pulmonary resuscitation. This indicates that the knowledge and skills among college students improved remarkably after Demonstration regarding Cardio Pulmonary Resuscitation.

Table 3: Paired t-test for the effectiveness of Demonstration regarding Cardio Pulmonary Resuscitation among College students in selected College N=100

	Mean	SD	T	df	p-value
Pretest	1.7	1.1	39.4	99	0.000
Posttest	7.0	0.6			

Table 3 shows that paired t-test for the effectiveness of demonstration regarding Cardio Pulmonary Resuscitation on knowledge and skills among College students in selected College. Average knowledge and skills score in pretest was 1.7 which increased to 7 in posttest. T-value for this test was 39.4 with 99 degrees of freedom. Corresponding p-value was small (less than 0.05), the null hypothesis is rejected. Average knowledge and skills score in posttest was significantly higher than that in pretest. It is evident that the demonstration is significantly effective in improving the knowledge and skills among college students regarding Cardio Pulmonary Resuscitation.

Table 4: Knowledge and skills item analysis

Step	Pretest		Posttest	
	Freq	%	Freq	%
Step 1	19	19%	94	94%
Step 2	1	1%	95	95%
Step 3	3	3%	92	92%
Step 4	34	34%	75	75%
Step 5	45	45%	89	89%
Step 6	23	23%	76	76%
Step 7	7	7%	88	88%
Step 8	40	40%	92	92%

Table 4 shows the frequency and percentage of the correctly followed each step by college students. For each step, the frequency and percentage increased in posttest remarkably. This indicates that the knowledge and skills among college students improved remarkably after demonstration regarding CPR.

Figure 2: % Compliance to each step by the college students

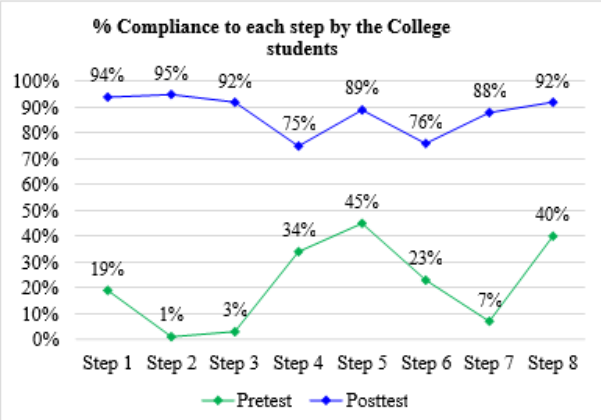

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Table 5: Fisher's exact test for the association between Knowledge and skills with demographic variable

Demographic variable		Knowledge		p-value
		Average	Poor	
Age	19-20 years	13	38	0.658
	20+ years	15	34	
Previous knowledge	Yes	3	7	1.000
	No	25	65	
Skills regarding CPR	Yes	27	72	0.280
	No	1	0	

Table 5 shows that all the p-values were large (greater than 0.05), none of the demographic variables was found to have significant association with the knowledge and skills among college students regarding Cardio Pulmonary Resuscitation

4. Discussion

A similar study was conducted on knowledge regarding CPR Second Year GNM students of Desh Bhagat University School of Nursing, Mandi Gobindgarh, Punjab with the aim of assessing the effectiveness of structured teaching programme on knowledge regarding cardio pulmonary resuscitation. Pre-experimental research design was used for the present study. A sample of 50 students of GNM 2nd year were selected by non- probability purposive sampling technique. The data was collected by using self-structured questionnaire regarding CPR among GNM students. The data was analysed in terms of objectives of the study using descriptive and inferential statistics in terms of frequency, percentage distribution, mean, Standard Deviation 't' value, and chi-square. As per percentage distribution of student according to age and gender it was found that Maximum students were in 21 yrs (64%) followed by, in 20yrs (20%) in above 21 years (12%) and in 19 yrs (4%) included in age group. Majority of students were females (82%) and only (18%) were male students. As per religion and area of residence Most of the students were belonging to Sikh religion (90%), (6%) were Hindu and (4%) were Muslim. Maximum students were living in rural area (72%) and only (28%) were living in urban area. In post-test maximum (70%) of the subjects had good knowledge score followed by subjects who had average knowledge score (30%) regarding CPR. The Knowledge score was calculated by't' test and the value was 3.42. It was concluded that STP was effective as evidence by the results as the difference between pretest and post-test knowledge score regarding cardio pulmonary resuscitation. The knowledge and skills of GNM students can be improved through STP after Post-test. [12]

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