

EFFECTIVENESS OF SKILL TRAINING PROGRAMME (STP) ON CARDIOPULMONARY RESUSCITATION [CPR] ON KNOWLEDGE AND SKILL AMONG STUDENTS OF SELECTED COLLEGES IN MANGALORE

Seetha.Thottuvelil¹ and Larissa Martha Sams²

¹Department of Medical Surgical Nursing, Laxmi Memorial College of Nursing, Mangalore, Karnataka 575002, India.

²Principal & HOD, Medical Surgical Nursing, Laxmi Memorial College of Nursing, Mangalore, Karnataka 575002, India.

ABSTRACT

A quasi experimental, one group pre-test post-test design was used for the study. Using simple random sampling technique, 30 college students were selected and the data was collected by administering structured knowledge questionnaire and an observational checklist on cardiopulmonary resuscitation. After collecting data, skill training programme (STP) was administered to the subjects and on 8th day post-test was conducted using the same questionnaire and the observational checklist. The collected data was analyzed using descriptive and inferential statistics. Knowledge level of the students regarding cardiopulmonary resuscitation showed that in pre-test majority (60%) of the college students had poor knowledge whereas in the post-test score all of them had good knowledge on cardiopulmonary resuscitation. The skill level of students regarding cardiopulmonary resuscitation showed that in the pre-test majority (90%) of the college students had poor skill, and none of the sample had good skill in performing cardiopulmonary resuscitation where as in post-test all of them had good level of performance on cardiopulmonary resuscitation. There was a significant positive correlation between level of knowledge and skill score of students towards Cardiopulmonary resuscitation ($r_{(1)}=0.73$, $p<0.05$). The study also found that the post- test knowledge and skill score was not significantly associated with any of the demographic variables under study.

Key words: Effectiveness, Knowledge, Skill training programme, Cardiopulmonary resuscitation, College students.

Corresponding Author

Seetha.Thottuvelil
Email:- sitha.senoy@gmail.com

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INTRODUCTION

Cardiopulmonary resuscitation is an important life saving 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). 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 [1]. There were some techniques to keep people alive developed in

the 18th century, but it was well in to the 20th century before Elam and Safar discovered and published the truly effective method known as CPR [1]. Cardiopulmonary Resuscitation is combination of rescue breathing and chest compression delivered to the victims thought to be in cardiac arrest. When in cardiac arrest, the heart stops pumping blood. CPR can support a small amount of blood to the heart and brain to 'Buy time' until normal heart function is restored [2].

Cardiopulmonary resuscitation is the first assistance given to the collapsed person and is aimed at the prevention of further harm. The correct CPR measures can reduce suffering, be instrumental in speeding up subsequent recovery, prevent permanent disability and



even save life. First few minutes following injury is called the golden time. Many complications and events that occur during this period, can convert a simple injury to death if unattended. It is important to act and react during the golden time to reduce mortality and morbidity [3].

The American Heart Association released its 2010 CPR guidelines followed for lay persons and the focus for CPR is on good quality chest compressions. Now the steps are C-A-B; the chest compression comes first, only then to focus on airway and breathing. No looking, listening, and feeling but is an action, no assessment; push at least 2 inches deep on the chest. At that rate, 30 compressions should take 18 seconds. The American Heart Association estimated that in the world among the overall population in the incidence of death due to cardiac arrest varies between 0.2 to 0.4 percent per year. Approximately 460,000 people die from heart disease annually either in a emergency department or reaching a hospital [4]. Majority of death was due to coronary artery disease and most are sudden cardiac death. Remarkable progress has been made in resuscitation from cardiac arrest over the last 50 years. WHO estimates the 60% of world cardiac arrest patients will be Indian by 2010. Nearly 50% CVD deaths in India occur below the age of 70 compared with just 20% in the west. In Karnataka 20% of adult population in urban areas and 5% population of rural areas suffers from heart disease [5].

H₁:

A study showed that by the skill training programme knowledge and skills to perform CPR increased the practical skill of students and it was beneficial to skill training for students in order to reduce death among patients due to cardiac arrest [2].

Various studies [6,7,8,9] suggested that in out-of-home cardiac arrest, bystanders, lay persons or family members attempt CPR in between 14% and 45% of the time, with a median of 32%. This indicates that around a third of out-of-home arrests have a CPR attempt made on them. However, the effectiveness of this CPR is variable, and the studies suggest only around half of bystander CPR is performed correctly. A recent study⁷ has shown that members of the public who have received CPR training in the past lack the skills and confidence needed to save lives. These experts believe that better training is needed to improve the willingness to respond to cardiac arrest.

There is a clear correlation between age and the chance of CPR being commenced, with younger people being far more likely to have CPR attempted on them prior to the arrival of emergency medical services. It was also found that CPR was more commonly given by a bystander in public than when an arrest occurred in the patient's home, although health care professionals are responsible for more than half of out-of-hospital resuscitation attempts. This is supported by further research, which suggested that people with no connection to the victim are more likely to perform CPR than a member of their family. There is also a correlation between the cause of arrest and the likelihood

of bystander CPR being initiated. Lay persons are most likely to give CPR to younger cardiac arrest victims in a public place when it has a medical cause; victims in arrest from trauma, exsanguinations or intoxication are less likely to receive CPR [2].

Statement of the Problem

Effectiveness of skill training programme [STP] on cardiopulmonary resuscitation [CPR] on knowledge and skill among students of selected colleges in Mangalore

Objectives

To determine the existing level of knowledge and skill of college students on CPR.

To determine the effectiveness of skill training programme [STP] on CPR among college students.

To find out the relationship between post-test knowledge level and post-test skill on CPR among college students.

To find out the association of post-test knowledge level of college students with demographic variables

To find out the association of post-test skill level of college students with demographic variables.

Hypothesis

All hypotheses will be tested at 0.05 level of significance.

There is a significant difference between mean pre-test and mean post-test knowledge scores of students on CPR.

There is a significant difference between mean pre-test and mean post-test skill scores of students on CPR

There is a significant relationship between mean post-test knowledge and mean post-test skill scores regarding CPR among the college students.

There is a significant association of the mean post-test knowledge scores of students regarding CPR with selected demographic variables.

There is a significant association of the mean post-test skill of college students with demographic variables.

MATERIALS AND METHODS

A quasi experimental, one group pre-test post-test design was used for the study. Simple random technique with lottery method without replacement will be used to select the sample. After getting the ethical clearance, the study was conducted in selected college students at Mangalore. Subjects were selected according to the selection criteria. Informed consent was obtained from the sample. Demographic proforma, structured knowledge questionnaire and an observational checklist on cardiopulmonary resuscitation were administered to 30 selected college students. Both descriptive and inferential statistics were used for data analysis.

RESULTS

Section A. Description of demographic characteristics of sample



This section describes the characteristics of the sample which provides the background information of the subjects and has been presented in the form of frequency and percentage in Table 1.

Data in Table 1 show that majority [60%] of sample were in the age group of 18-20 years and the remaining [40%] belonged to the age group of 21-22 years. Majority of the sample were females [60%]. Majority of the sample [80%] had not received any information on CPR. Majority of the sample [83.37%] didn't have previous knowledge regarding CPR. All the students [100%] are studying BBM course.

Section B: Description of knowledge of college students regarding CPR

Knowledge of 30 college students was assessed by using structured knowledge questionnaire and analyzed by using descriptive statistics and is presented in table 2.

The data presented in Table 2 and Figure 4 shows that in the pre-test majority [60%] of the college students had poor knowledge, whereas in the post-test all students had good knowledge.

H_{01} :

Data in Table 3 show that apparently the post-test knowledge score range (21-30) was higher than pre-test knowledge range (4-15). The data also depicts that the mean post-test knowledge score (27.43 ± 1.89) was higher than the mean pre-test knowledge score (8.53 ± 3.59).

The data in Table 4 and Figure 5 shows that in all areas the mean post-test knowledge score was higher than the mean pre-test knowledge scores.

Data in Table 5 shows that the mean percentage of pre-test score (32.66%) was highest in area of 'indication' and least in 'post procedure care' (25.33%) and mean percentage of post-test score was highest area of 'post procedure care' (90%) and least in area of 'steps' (84.16%).

Data in Table 5 also shows that the highest modified gain (86.60) was in the area of 'post procedure care' and least (78.64) is in the area of 'steps.'

The data presented in Table 6 and Figure 8 shows that in the pre-test majority of the college students [90%] had poor level of skill, whereas in the post-test majority of students [93.3%] had good level of skill in performing CPR.

Data in Table 7 shows that the post-test skill score range (15-22) was higher than pre-test skill range (2-11). The data also depicts that the mean post-test skill score (20.2 ± 1.57) was higher than the mean pre-test skill score (5.23 ± 1.82).

The data in Table 8 and Figure 9 shows that in all the areas mean post-test skill score was higher than the mean pre-test skill scores.

H_{02} :

Data in Table 9 show that mean percentage of pre-test skill score (60%) was highest in the area of 'observation' and least in 'ventilation' (15.58%); and the

mean percentage of post-test score was highest in 'ventilation' (93.3%) and least in 'airway' (91.5%).

The data in Table 9 also show that the highest modified gain (92.04) was in the area of 'ventilation' and least (80) in the area of 'observation.'

Section C: Effectiveness of Skill training programme (STP) on Cardiopulmonary resuscitation

This section deals with the effectiveness of the skill training programme in improving knowledge and skill on CPR. The effectiveness was assessed by comparing the pre-test and post-test knowledge and skill scores and the result has been presented in the following headings:

Comparison of pre-test and post-test knowledge scores of college students on Cardiopulmonary resuscitation

To find out the significance of difference between the mean pre-test and post-test knowledge scores, paired 't' test is used. In order to test the statistical difference between mean pre-test and post-test scores the following null hypothesis is formulated.

The mean post-test knowledge scores of college students on CPR will not be significantly higher than that of the mean pre-test knowledge score at 0.05 level of significance.

The data in Table 11 shows that the mean post-test knowledge score (27.43 ± 1.89) was significantly higher than the pre-test knowledge score (8.53 ± 3.59) ($t_{29} = 2.048$, $p < 0.05$). Hence the null hypothesis H_{01} is rejected and the research hypothesis H_1 is accepted.

Comparisons of area-wise mean pre-test and post-test knowledge scores

The significance difference between the mean pre-test and post-test knowledge scores in different areas of cardiopulmonary resuscitation has been presented in Table 11.

Data in Table 11 shows that the mean post-test knowledge score in all areas was higher than the mean pre-test knowledge score ($t_{29} = 2.048$, $p < 0.05$). This suggests that the skill training was effective in increasing the knowledge of students.

Comparison of pre-test and post-test skill scores of college students regarding Cardiopulmonary resuscitation

To find out the significance of difference between the mean pre-test and post-test skill scores, paired t-test was used. In order to test the statistical difference or significance between the mean pre-test and post-test score, the following hypothesis was formulated.

The mean post-test skill scores of college students on CPR will not be significantly higher than that of the mean pre-test skill score at 0.05 level of significance.

The data in Table 12 show that the mean post-test skill scores (20.2 ± 1.57) was significantly higher than the



pre-test knowledge score (5.23±1.82) ($t_{29}=2.048, p<0.05$). Hence the null hypothesis H_{0_2} is rejected and the research hypothesis H_{1_2} is accepted.

Comparison of area-wise pre-test and post-test skill scores

The significant difference between the mean pre-test and post-test skill scores in different areas of cardiopulmonary resuscitation has been presented in Table 13.

Data in Table 13 show that the mean post-test skill score in all areas was higher than the mean pre-test skill score. This suggests that the skill training programme was effective in increasing the skill of college students.

Section E: Correlation between knowledge and skill among college students regarding cardiopulmonary resuscitation

To test the correlation between the knowledge and skill among college students on CPR the following null hypothesis was formulated:

H_{0_3} : There will be no significant relationship between the mean knowledge scores and mean skill scores of college students on CPR at 0.05 level of significance.

Karl Pearson correlation coefficient was computed in order to find the correlation between knowledge level and skill score of college students on CPR; $r=0.73$ indicates a positive correlation between knowledge and skill. The data presented in Table 14 also shows that there was a positive and a significant correlation between the level of knowledge and skill score of college students regarding CPR ($r_{(29)}=0.355, p<0.05$) Thus null hypothesis H_{0_3} was rejected.

To find out the association between post-test knowledge score and selected demographic variables Chi square test was used. In order to test the statistical significance between post-test knowledge score and selected demographic variable the following null hypotheses was formulated.

H_{0_4} : There is no significant association of the post-test knowledge scores of college students regarding CPR with selected demographic variables.

The data presented in Table 15 show that no significant association was found between post-test knowledge scores and age, gender, Information about CPR, source of information, and group of the students.

Association of post-test skill scores with selected demographic variables

The chi-square test was used to find the association of skill of college students with selected demographic variables

The following null hypothesis H_{0_5} is stated:

H_{0_5} : There is no significant association of post-test skill score with selected demographic variables

The data presented in Table 16 show that no significant association was found between post-test skill scores and age, gender, Information about CPR, source of information, and group of students.

LIMITATIONS

- As no standardized tools were available; the investigator prepared a tool for the purpose of the study.
- No attempt was made to follow up the retention of knowledge and skill after the post-test period.

RECOMMENDATIONS

- A similar study can be conducted on a larger sample to validate and generalise the findings.
- A comparative study between different groups of people could be conducted in community areas to find out the effectiveness of STP.
- A study could be conducted to assess the long-term effects of skill training programmes in their future service field.
- A study can also be conducted to assess the attitude of people on CPR.
- Follow-up studies can be conducted at several points to determine retention.

Table 1. Frequency and percentage distribution of sample according to demographic variables

N=30

Sl. No.	Demographic variable	Frequency [f]	Percentage [%]
1.	Age (in years)		
a.	18-20	18	60
b.	21-22	12	40
c.	23-24	-	-
d.	25-26	-	-
2.	Gender		
a.	Male	12	40
b.	Female	18	60
3.	Information about CPR anywhere?		
a.	Yes	6	20
b.	No	24	80



4.	If yes, source of information?		
a.	Mass media [TV, newspaper]	5	83.30
b.	Contact with health personnel	1	16.66
c.	Information from others	-	-
5.	Which group of students		
a.	Arts [BA branch]	-	-
b.	B.Com	-	-
c.	BBM	30	100

Table 2. Frequency and percentage distribution of knowledge of college students

N=30

Level of knowledge	Range	Pre-test		Post-test	
		Frequency [f]	Percentage [%]	Frequency [f]	Percentage [%]
Poor	0-10	18	60	-	-
Average	11-21	12	40	0	0
Good	22-31	0	0	30	100

Table 3. Range, Mean, Median, standard deviation and mean percentage of pre-test and post-test knowledge

N=30

	Range	Mean	Median	Standard deviation	Mean%
Pre-test	4-15	8.53	7	3.59	27.51
Post-test	21-30	27.43	28	1.89	91.43

Table 4. Area-wise mean standard deviation of pre-test and post-test knowledge scores

N=30

Area	Max. score	Pre-test			Post-test		
		Mean	SD	Mean%	Mean	SD	Mean%
Indication	6	1.96	1.72	32.66	5.23	0.80	87.16
Assessment	10	2.50	1.17	25.00	8.60	1.20	86.60
Steps	12	3.10	1.66	25.83	10.00	1.16	84.16
Post procedure care	3	0.76	0.75	25.33	2.70	0.52	90.00

Table 5. Area-wise mean percentage and mean gain of pre-test and post-test knowledge scores

N=30

Areas	Mean % scores		Mean possible gain (%)	Mean actual gain (%)	Modified gain
	Pre-test	Post-test			
Indication	32.66	87.16	67.34	54.50	*80.93
Assessment	25.00	86.60	75.00	61.60	*82.13
Steps	25.83	84.16	74.17	58.33	*78.64
Post procedure care	25.33	90.00	74.67	64.67	*86.60

* Modified gain=(mean actual/mean possible gain) × 100

Table 6. Frequency and percentage distribution of skill of college students

N=30

Level of skill	Range	Pre-test		Post-test	
		Frequency [f]	Percentage [%]	Frequency [f]	Percentage [%]
Poor	0-7	27	90.0	-	-
Average	8-15	3	10.0	2	6.6
Good	16-22	-	-	28	93.3

Table 7. Range, Mean, Median, standard deviation and mean percentage of pre-test and post-test skill

N=30

	Range	Mean	Median	Standard deviation	Mean%
Pre-test	2-11	5.23	5.0	1.82	17.44
Post-test	15-22	20.20	20.5	1.57	67.34



Table 8. Area-wise mean standard deviation of pre-test and post-test skill scores

N=30

Areas	Max. score	Pre-test			Post-test		
		Mean	SD	Mean%	Mean	SD	Mean%
Observation	3	1.80	0.58	60.00	2.76	0.34	92.00
Chest compression	8	1.53	1.14	19.12	7.13	0.66	89.12
Airway	2	0.43	0.61	21.50	1.83	0.29	91.50
Ventilation	9	1.43	1.22	15.80	8.4	0.95	93.30

Table 9. Area-wise mean percentage and mean gain of pre-test and post-test skill scores

N=30

Areas	Mean % scores		Mean possible gain (%)	Mean actual gain (%)
	Pre-test	Post-test		
Observation	60.00	92.00	40.0	32.0
Chest compression	19.12	92.00	80.8	70.0
Airway	21.50	91.50	78.5	70.0
Ventilation	15.58	93.30	84.2	77.5

* Modified gain=(mean actual/mean possible gain) × 100

Table 10. Mean, Mean difference and “t” value on pre-test and post-test knowledge scores

N=30

Parameters	Mean	SD	Mean difference	t value
Pre-test	8.53	3.59	18.9	20.88*
Post-test	27.43	1.89		

t₍₂₉₎=2.048, p<0.05 *Significant

Table 11. Area-wise mean, SD, mean, difference, and ‘t’ value of pre-test test and post-test knowledge scores

N=30

Area	Pre-test		Post-test		Mean difference	t value
	Mean	SD	Mean	SD		
Indication	1.96	1.72	5.23	0.80	3.27	10.70*
Assessment	2.50	1.17	8.66	1.22	9.99	18.11*
Steps	3.10	1.66	10.10	1.16	7.00	21.00*
Post procedure care	0.76	0.75	2.70	0.52	1.99	8.94*

t₍₂₉₎=2.048, p<0.05

*Significant

Table 12. Mean, Mean difference, SD and ‘t’ value of pre-test and post-test skill scores

N=30

Parameters	Mean	SD	Mean difference	t value
Pre-test	5.23	1.82	14.97	39.34*
Post-test	20.20	1.57		

t₍₂₉₎=2.048, p<0.05 *Significant

Table 13. Area-wise mean, SD, mean difference and ‘t’ value of pre-test and post-test skill Scores

N=30

Area	Pre-test		Post-test		Mean difference	t value
	Mean	SD	Mean	SD		
Observation	1.80	0.58	2.76	0.34	1.96	7.80*
Chest compression	1.53	1.14	7.13	0.66	5.60	26.29*
Airway	0.43	0.61	1.83	0.29	1.90	10.42*
Ventilation	1.43	1.22	8.40	0.95	6.97	20.95*

t₍₂₉₎=2.048, p<0.05

*Significant



Table 14. Correlation between knowledge and skill scores of college students

N=30

Correlation coefficient	df	P value
0.73	29	<0.05

$r_{(29)} = 0.355, p < 0.05$

Table 15: Chi-Square test showing association of post-test knowledge score with selected demographic variables

N=30

Sl. No.	Demographic variables	χ^2 value	df	Table value	Inference
1.	Age	0.39	1	3.841	Not significant
2.	Gender	0.27	1	3.841	Not significant
3.	Information about CPR	0.12	1	3.841	Not significant
4.	If yes, the source of information	0.39	1	3.841	Not significant
5.	Which group of students	-	1	3.841	Not significant

Table value $\chi^2_{(1)} = 3.841$

Table 16. Chi-Square test showing association of post-test skill score with selected demographic variables

N=30

Sl. No.	Demographic variables	χ^2 value	df	Inference
1.	Age	1.94	1	Not significant
2.	Gender	0.72	1	Not significant
3.	Information about CPR	0.82	1	Not significant
4.	If yes, the source of information	-	1	Not significant
5.	Which group of students	-	1	Not significant

$\chi^2_{(1)} = 3.841, p < 0.05$

Fig 4. Cone diagram showing the pre and post-test knowledge score of college students

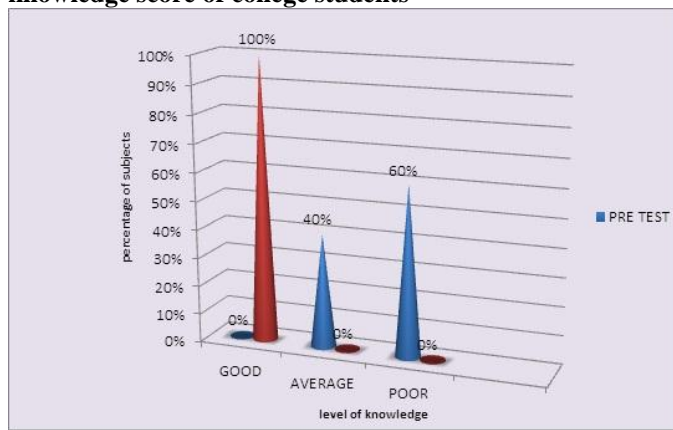


Fig 5. Bar diagram showing the pre-test and post-test knowledge score of college students regarding cardiopulmonary resuscitation

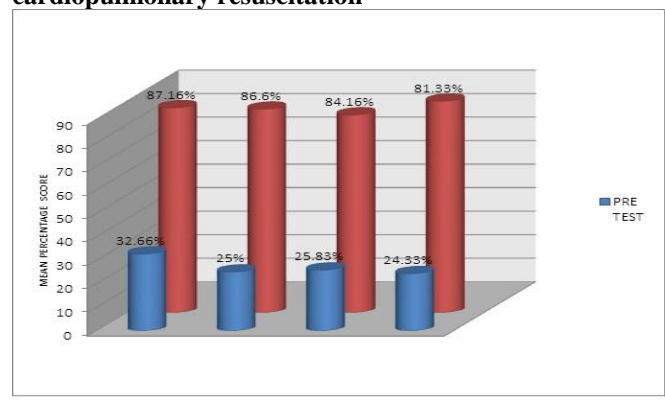


Fig 6. Cone diagram showing the pre and post-test skill scores of student

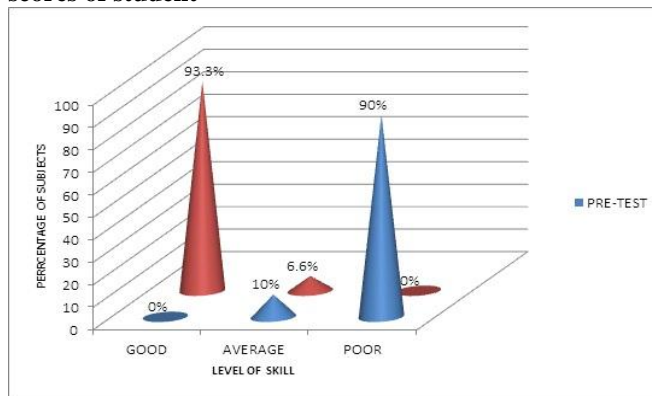
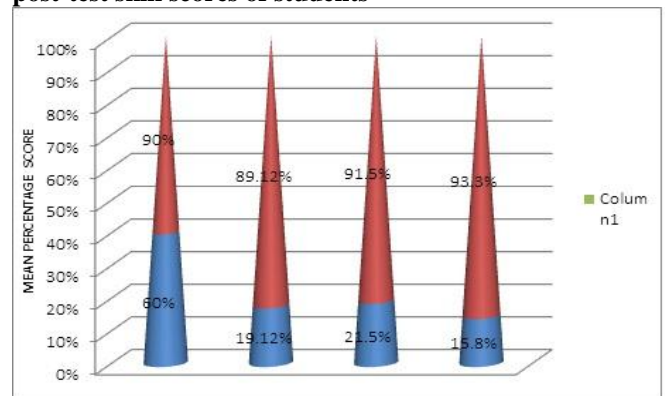


Fig 7. Cone diagram showing area-wise pre-test and post-test skill scores of students



CONCLUSION

Investigator's own experience, discussion with the colleague and experts helped the investigator to understand that college students needed to be equipped with skill on CPR during their course. If students are educated and are skilful in performing CPR, they can perform it in time of need and also teach others and this can help in decrease of cardiac arrest. Few occasions indicate the need of performing CPR in time on patients with cardiac arrest to save life. Therefore, the investigator decided to undertake the study on the effectiveness of skill training programme on knowledge and skill regarding CPR among students of selected colleges in Mangalore

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CONFLICT OF INTEREST

There were no conflicts of interest reported.

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