

# Effectiveness of Simulation Teaching Regarding CPR among Secondary School Teachers

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## ABSTRACT

### BACKGROUND

Oxygen is an essential constituent for plants and animals. Before birth the foetus receives oxygen from placenta. Dysfunction of heart is one of the leading causes of death among people residing in developed countries. For most of the patients with cardiac arrest, advanced emergency care support is not available in developing countries; whereas, in developed countries, professionals will arrive immediate at the place within 10 min. The objective of the study was to evaluate the existing knowledge and skills related to CPR in secondary school teachers. We also investigated the effectiveness of simulation-based teaching on CPR among secondary school children.

### METHODS

We performed one group pre- and post-test study on selected secondary school teachers with a samples size of 60 and used 20-item questionnaire with skill checklist.

### RESULTS

The mean value of pre-test and post-test results among secondary school teachers' in level of knowledge was 6.05 and 10.33, standard deviation was 2.79 and 1.38, The mean difference values were  $4.28 \pm 3.1$ . The mean value of pre-test and post-test of secondary school teacher in the level of practices was 2.85 and 3.91, standard deviation was 0.54 and 0.90, The mean difference was  $1.06 \pm 1.08$ .

### CONCLUSIONS

Simulation teaching of CPR in secondary school teachers was effective.

### KEY WORD

Effectiveness, Simulation Teaching, CPR, Secondary School Teachers

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## BACKGROUND

Each and every adult and child deserve basic human needs that are essential for their life. Oxygen is an essential constituent for plants and animals. Before birth even the foetus inhales oxygen through placenta. Plants give oxygen by photosynthesis to the environment.<sup>1</sup>

In developed countries medical professionals will arrive almost immediately at the place of incident within 10 mins. They will perform necessary CPR and provide oxygen to the patient in order to rescue him. As responsible instructors they should share their experience and skill about CPR to the learners in such a way that, the learners can perform it in the same skilful manner. CPR might emphatically affect the small and brief duration soon after cardiac arrest in people to stay alive.<sup>2</sup>

Cardiopulmonary resuscitation is the only essential and effective method of giving CPR in between 6-7 mins after the inadequate flow of blood throughout the patient's body. Medical help will arrive within 6-7 mins, but giving CPR until help arrives is the most important step of restarting the functions of the heart so it helps for full recovery.

We wanted to evaluate the existing knowledge and skills related to CPR in secondary school teachers. We also wanted to investigate the efficiency of simulation-based teaching with regard to CPR among secondary school children.

## METHODS

In the present study, one group each of pre-test and post-test research design was used. This study was conducted in selected schools of Wardha city.<sup>4,5,6,7,8,9,10,11</sup> The investigator found the setting appropriate to conduct the study because adequate numbers of secondary school teachers were available who could be taken for the study, as the target population for this study includes secondary school teachers. In the current study the variables were categorized into independent and dependent variables. We considered simulation teaching on cardiopulmonary resuscitation as independent variable whereas knowledge and skills of secondary school teachers as dependent variables. Sample size of 60 was included in the study and 20 item questionnaires with skill checklist on CPR were used to collect the data. The tool was validated by 12 experts of the child health nursing departments from various nursing colleges.

### Inclusion Criteria

1. Secondary school teachers who taught 7<sup>th</sup>, 8<sup>th</sup> & 9<sup>th</sup> standard classes.
2. Teachers who were willing to participate.

### Exclusion Criteria

1. Teachers who were not available at the time of study.
2. Teachers who were handicapped.
3. Teachers who had attended previous teaching programs.

### Three Sections of Structured Questionnaire

1. Section A: Consisted of demographic variables of the secondary school teachers who participated in the study.
2. Section B: Consisted of 20 multiple choice questions to assess the effectiveness of simulation teaching on cardiopulmonary resuscitation among secondary school teachers. A blueprint was prepared.
3. Section C: A checklist consisting of five steps on simulation regarding CPR among secondary school teachers.

### Scoring Pattern

#### Knowledge Regarding CPR

- Score 1 was given for correct answer.
- Score 0 was given for wrong answer.
- Knowledge was graded as poor, average, good and excellent based on the knowledge scores.

#### Skill Checklist Regarding CPR

- Skill was assessed by skill checklist of yes and no options.
- Score 0 was given for No answer and 1 for Yes.
- Skill was graded from poor, average, good and excellent based on the skill scores.

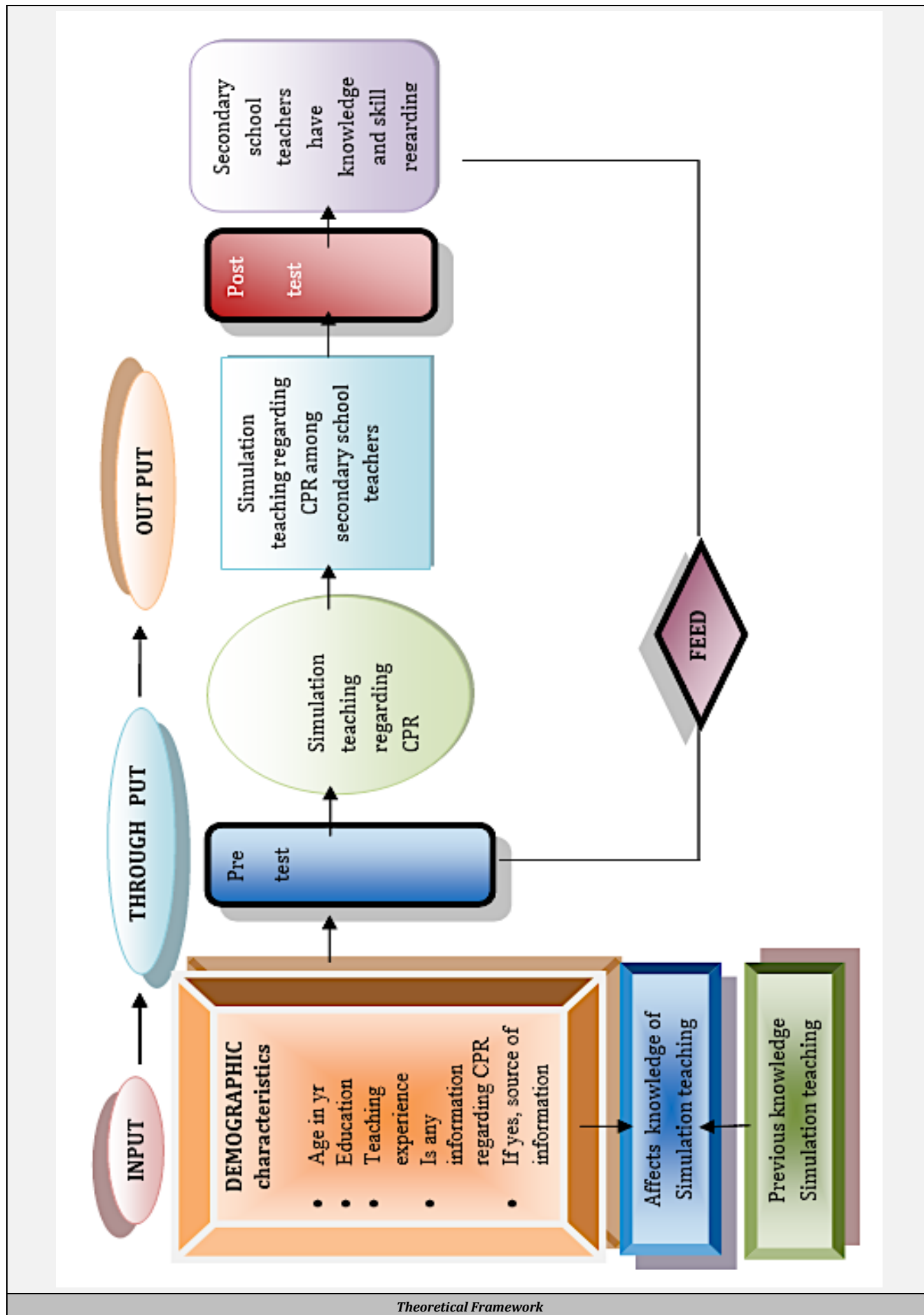
### Organization of Findings

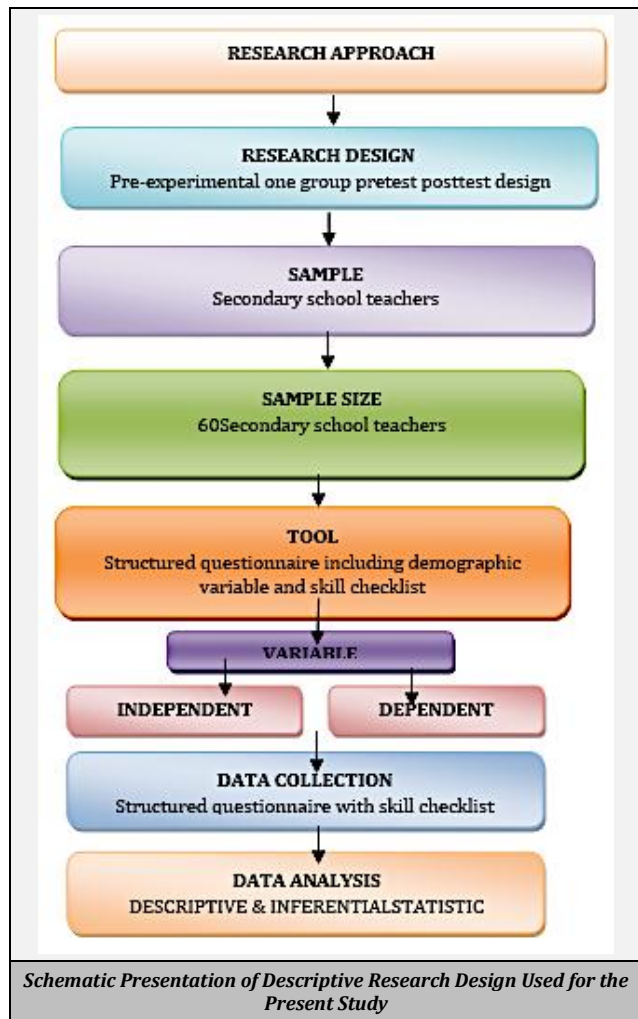
The analysis and interpretation of the observations are given in the following sections:

- **Section A:** Distribution of secondary school teachers with regards to demographic variables.
- **Section B:** Assessment of existing level of knowledge and skills regarding CPR among secondary school teachers.
- **Section C:** Efficiency of simulation teaching on knowledge and skill regarding CPR among secondary school teachers
- **Section D:** Association of level of knowledge and skills regarding CPR among secondary school teachers with their selected demographic variables.

### Statistical Analysis

The collected data was analysed in terms of appropriate descriptive and inferential statistical measures and tests.





## RESULTS

This section deals with percentage wise distribution of secondary school teachers with regard to their demographic characteristics. A convenient sample of 60 subjects was drawn from the study population, who were from selected secondary schools.

### Section A

The below table shows that 25% of the secondary school teachers were in age group of 21-25 years, 31.70% were in age group of 26-30 years, 28.30% were in the age group of 31-35 years and 15% were 36 years and above. 26.70% of the secondary school teachers were graduates, 33.30% of them were postgraduates, 21.70% of them were educated up to M. Phil and 18.30% of them were educated up to Ph. D. 23.30% of the secondary school teachers were having teaching experience of 1-2 years, 25% of them had 3-4 years, 40% of them had teaching experience of 5-6 years and 11.70% of them had teaching experience of 6 years and above. <sup>12-25</sup>

23.30% of the secondary school teachers were having information from media, 26.70% from internet, 30% had information through workshop and 20% of them had information from relatives. 53.30% of the secondary school

teachers had information regarding CPR and 46.67% of them did not have any information regarding CPR. <sup>26-33</sup>

Demographic Variables	No. of Teachers	Percentage (%)
<b>Age(yrs.)</b>		
21 - 25 years	15	25.0
26 - 30 years	19	31.7
31 - 35 years	17	28.3
36 years and above	9	15.0
<b>Education</b>		
Graduate	16	26.7
Postgraduate	20	33.3
M. Phil	13	21.7
Ph. D	11	18.3
<b>Teaching Experience(years)</b>		
1 - 2 years	14	23.3
3 - 4 years	15	25.0
5 - 6 years	24	40.0
6 years and above	7	11.7
<b>Information regarding CPR</b>		
Yes	32	53.33
No	28	46.67
<b>Source of information</b>		
Media	14	23.3
Internet	16	26.7
Workshop	18	30.0
Relative	12	20.0

**Table 1. Distribution of Secondary School Teachers According to Their Demographic Characteristics**

### Section B

#### Assessment with the Existing Levels of Knowledge Regarding Simulation Teaching on CPR among Secondary School Teachers

The 51.67% of the schoolteachers had poor level of knowledge score, 41.67% had average level of knowledge score and 6.67% of the secondary school teachers had excellent level of knowledge score in pre-test. Minimum knowledge score in pre-test was 1 and the maximum knowledge score was 13. Mean knowledge score was  $6.05 \pm 2.79$  and mean percentage of knowledge score was  $30.25 \pm 13.97$ .

#### Assessment with the Existing Level of Skill Score Regarding CPR among Secondary School Teachers

The 23.33% of the schoolteachers in pre-test had average level of skill score, 68.33% had good level of skill score and 8.33% of the secondary school teachers in pre-test had excellent level of skill score. Minimum skill score in pre-test was 2 and maximum skill score was 4. Mean skill score was  $2.85 \pm 0.54$  and mean percentage of skill score in pre-test was  $57 \pm 10.93$ .

#### Assessment with the Post-Test Level of Knowledge Regarding Simulation Teaching on CPR among Secondary School Teachers

The 66.67% of the secondary school teachers in post-test had average level of knowledge score, 33.33% had good level of knowledge score. Minimum knowledge score was 9, maximum knowledge score was 15 and the mean knowledge score was  $10.33 \pm 1.38$  and mean percentage knowledge score was  $51.66 \pm 13.97$ .

#### Assessment with the Post-Test Level of Skill Score Regarding Simulation Teaching on CPR among Secondary School Teachers

The 6.67% of the secondary school teachers in post-test had average level of skill score, 25% had good level of skill score.

Minimum skill score was 2 and maximum skill score was 5. Mean knowledge score was  $3.91 \pm 0.90$  and mean percentage skill score in post-test was  $78.33 \pm 18.14$ .

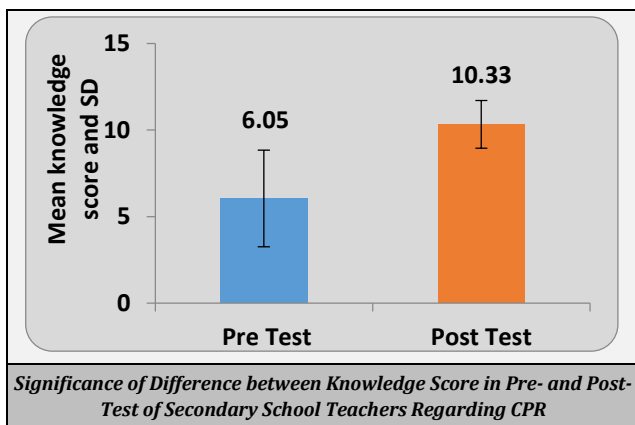
**Section C**

**Efficiency of Simulation Teaching Regarding CPR among Secondary School Teachers**

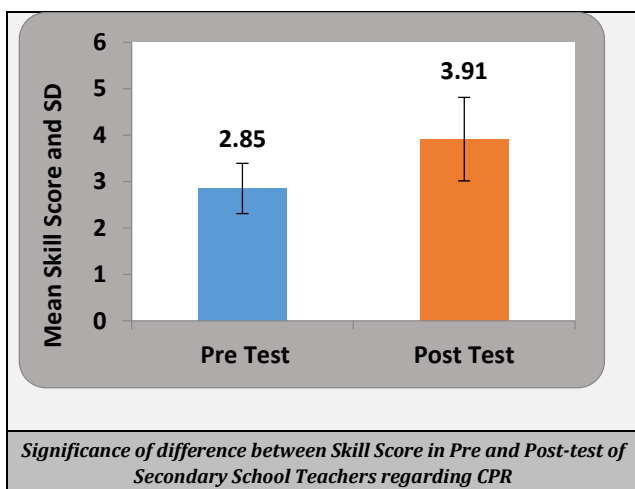
The mean score of pre-test and post-test of secondary school teachers was 6.05 and 10.33 respectively, and standard deviation was 2.79 and 1.38. The mean difference value was  $4.28 \pm 3.16$  and t-value was 10.47. The calculated 't' value was much higher than the tabulated value at 5% level of significance for overall knowledge score of secondary school teachers which is statistically acceptable level of significance. n=60.

Overall	Mean	SD	Mean Difference	t-value	P-Value
Pre-Test	6.05	2.79	$4.28 \pm 3.16$	10.47	0.0001
Post-Test	10.33	1.38			

*Table 2.0 Efficiency of Simulation Teaching Regarding CPR among Secondary School Teacher*



The comparison of pre-test and post-test skill scores of secondary school teachers regarding simulation teaching of CPR. The mean score of pre-test and post-test of secondary school teachers was 2.85 and 3.91 respectively, standard deviation was 0.54 and 0.90. The mean difference values  $1.06 \pm 1.08$  are compared and student's paired 't' test is 7.60 applied at 5% level of significance. The tabulated value for n=60-1 i.e. 59 degrees of freedom was 2.00.



**Section D**

**Association of Post-Test Knowledge Score Regarding Simulation Teaching on CPR in Relation to Age**

There was no statistically significant association between knowledge score of schoolteachers regarding simulation teaching on CPR and their age. The tabulated 'F' value was 2.76 (df=3, 56) higher than 'F' value of 2.32 and 'p' value of 0.084.

**Association of Post-Test Knowledge Score Regarding Simulation Teaching on CPR in Relation to Education**

There was no statistically significant association between knowledge score of secondary school teachers regarding simulation teaching on CPR and their educational level. The tabulated 'F' value was 2.76 (df=3, 56) higher than 'F' value of 1.05 and also 'p' value of 0.37

**Association of Post-Test Knowledge Score Regarding Simulation Teaching on CPR in Relation to Teaching Experience**

There was a statistically significant association between knowledge score of secondary school teachers regarding simulation teaching on CPR and their teaching experience (in number of years). The tabulated 'F' value was 2.76 (df=3, 56) which is less than the calculated 'F' value i.e. 4.02 at 5% level of significance. Also, the calculated 'p' value was 0.011 which was less than the acceptable level of significance i.e. 'p' = 0.05. Hence it is interpreted that teaching experience (in number of years) of secondary school teachers is statistically associated with their post-test knowledge score.

**Association of Post-Test Knowledge Score Regarding Simulation Teaching on CPR in Relation to Knowledge Regarding CPR**

There was no significant difference in mean knowledge scores of secondary school teachers regarding the simulation teaching on CPR and their knowledge of CPR. The tabulated 't' value was 2.00 (df = 58) higher than 't' value of 0.68.

**Association of Post-Test Knowledge Score Regarding Simulation Teaching on CPR in Relation to Source of Information**

There was no statistically significant association between the knowledge score of secondary school teachers regarding simulation teaching on CPR and their source of information. The tabulated 'F' value was 2.76 (df = 3.56) higher than the 'F' value of 1.10.

**Association of Post-Test Skill Score Regarding Simulation Teaching on CPR in Relation to Age**

There was no statistically significant association between skill score of secondary school teachers regarding simulation teaching on CPR and their age. The tabulated 'F' value was 2.76 (df=3,56) higher than the 'F' value of 0.11

### **Association of Post-Test Skill Score Regarding Simulation Teaching on CPR in Relation to Education**

There was no statistically significant association between skill score of secondary school teachers regarding simulation teaching on CPR and their educational level. The tabulated 'F' value was 2.76 (df=3, 56) higher than the calculated 'F' value i.e. 0.59.

### **Association of Post-Test Skill Score Regarding Simulation Teaching on CPR in Relation to Teaching Experience**

There was no statistically significant association between skill score of secondary school teachers regarding simulation teaching on CPR and their teaching experience (in number of years). The tabulated 'F' value was 2.76 (df=3, 56) higher than 'F' value of 0.38.

### **Association of Post-Test Skill Score Regarding Simulation Teaching on CPR in Relation to Skill Regarding CPR**

There was no significant difference in mean skill scores of secondary school teachers regarding simulation teaching on CPR and their skill regarding CPR. The tabulated 't' value was 2.00 (df=58) higher than the 't' value of 1.24.

### **Association of Post-Test Skill Score Regarding Simulation Teaching on CPR in Relation to Source of Information**

There was no statistically significant association between skill score of secondary school teachers regarding simulation teaching on CPR and their source of information. The tabulated 'F' value was 2.76 (df=3, 56) higher than the calculated 'F' value of 0.72.

## DISCUSSION

In the present study aimed to assess the efficiency of simulation teaching on CPR among secondary school teachers, researchers found that the level of knowledge score in pre and post-test was 6.05 % and 10.33% respectively. The level of skill score in pre and post-test was 12.85% and 3.91% respectively, and hence the simulation teaching on CPR among secondary school teachers was effective.<sup>34-42</sup>

A study was conducted regarding basic CPR program for high school students (PROCES). The results from the pilot program is in Spanish (2005). They administered 20 questions test before and after the program. Students were 14 years old in 38%, 15-year olds in 38% and 16 years or more in 24%.

Before the resuscitation program, the mean mark (20 points) was 8.5 (2.4). After the program, the mark improved up to 13.5 (3.2) ( $p < 0.001$ ). Participants who had previously taken a first aid course or were in the 4<sup>th</sup> course, obtained significantly better marks than the rest. These differences disappeared after program completion. Students rated the theoretical part as 7.9 (1.1), the skill part as 8.2 (1.2) and emergency physician's classes as 8.4 (1.1). Conclusion of the study was that, the basic CPR program is a useful tool for teaching and improving teenagers' knowledge and skills in

basic CPR with no exceptions associated with teenagers' characteristics.

### **Implications**

#### **Implication for Nursing Practices**

Nurses should enhance their professional knowledge. The finding of the study can be used to bring about awareness among the nurses regarding CPR. This improvement in safe practices of CPR can help reduce child mortality throughout the country. It can contribute towards the preparation of a unit's protocol. It can be useful for the future generations to improve their knowledge. The nurses at their level can also plan a teaching course for junior staff nurses regarding simulation teaching on CPR.<sup>43</sup>

#### **Implication for Nursing Education**

The nurse educators can use the simulation teaching to teach the students as well as the peripheral level health workers and parents to improve their knowledge and attitude towards simulation teaching on CPR. The institutes of nursing education should play an active role in conducting education programmes, workshop and continue the programmes to educate nursing personnel of the school regarding simulation teaching on CPR. The nurse educators can target the nurses and multipurpose health workers in the community areas. Continuing nursing education programs along with training of trainer's programs can be organized to help them in imparting education on simulation teaching on CPR. It can be used as a training module for educating the parents too.

#### **Implication for Nursing Research**

Based on the present study, further research can be conducted related to simulation teaching on CPR. Nursing research will help to know the nurses' role in developing knowledge of the people and developing the attitude related to simulation teaching on CPR. Researches need to be conducted to bring awareness about simulation teaching on CPR to the parents and teachers.

#### **Implication for Nursing Administration**

Nursing administration should take active part in policy making, developing, validating, approving protocols, procedures and standing orders concerning simulation teaching for teachers in selected schools. They should concentrate on proper selection, placement and effective utilization of the nurses in all areas, giving room for creativity, interest and ability in providing simulation teaching on CPR. In the required areas they must provide innovations opportunities and trials for emerging trends in the simulation teaching in fostering care. An ongoing education programme on educative role of the nurses along with good supervision of nursing care service would motivate nurses to carry out the role in day-to-day nursing care. Efficient administrators can help in dissemination of research-based knowledge through organization of in-service education program. Nursing administration should encourage and conduct various types of

health education programs regarding simulation teaching on CPR in the community as well as in schools.<sup>44</sup>

### CONCLUSIONS

Simulation teaching on CPR was found to be effective in improving the knowledge and skill of secondary school teachers.

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