

Effectiveness of Demonstration Regarding Cardiopulmonary Resuscitation on Knowledge and Practice among Policemen

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Abstract: *The most important factor in an emergency is the amount of time lost before a patient reaches the hospital. It is not just how quickly a patient is shifted to the hospital, the manner of initial resuscitation in which the victim has undergone before shifting to healthcare setup also makes a big difference. Objectives- To assess the knowledge & practice scores of CPR technique among policemen before and after intervention. To find out the association between knowledge & practice scores with selected demographic variables. Methodology - Quantitative research approach and one group pre-test and post-test design was used. Non-probability convenient sampling method was used to select 50 policemen as a study subjects. Results- the mean knowledge score of subjects in pretest was 11.66 and in posttest was 19.38 and on overall mean practice score of subjects in pretest was 6.52 and in posttest was 14.56. There was co-relation of age and work experience with knowledge and there was co-relation of practice with age, education and work experience. Conclusion- equal positive response to the demonstration and teaching was found really useful to them, which will help them to take prompt decisions, perform cardiopulmonary resuscitation and save many lives of out-of-hospitals cardiac arrest victims.*

Keywords: Demonstration, Cardiopulmonary Resuscitation, Knowledge, Practice, Policemen

1. Introduction

The Nurse patient ratio is poor in Indian setup hence most of the time, are dependent on the caregivers to meet the basic needs of the patients. It is very often caregivers in hospital setup who are involved in care of patients. To provide proper care it is necessary for them to have adequate knowledge of how to perform nursing interventions as they lack nursing skills, knowledge in their own rights, knowledge of available help and its sources, coping skills and support systems. The nurse must assist the caregivers, prepare them to adjust adequately and help the patients to achieve the optimal level of function [1].

The most important factor in an emergency is the amount of time lost before a patient reaches the hospital. It is not just how quickly a patient is shifted to the hospital, the manner of initial resuscitation in which the victim has undergone before shifting to healthcare setup also makes a big difference. The initial few minutes following an emergency – be it a heart attack, stroke, accident or fits – are known as the ‘Golden Hour’ and truly so because, the quality of care provided during this period has a direct bearing on the final outcome in an emergency [2]. Cardiopulmonary resuscitation (CPR) is an emergency medical procedure for a victim of cardiac arrest or, in some circumstances, respiratory arrest. CPR is performed in hospitals or in the community by laypersons or by emergency response professionals. CPR is unlikely to restart the heart; its main purpose is to maintain a flow of oxygenated blood to the brain and the heart, thereby delaying tissue death and extending the brief window of opportunity for a successful resuscitation without permanent brain damage [3].

Learning is the addition of new knowledge and experience interpreted in the light of past knowledge and experience.

Teaching and learning is an integral part of nursing. Nurses have the responsibility to educate patients related to various aspects and keep themselves updated. Various teaching strategies are used to increase knowledge, such as lecturing, demonstration, discussion and self-education. These methods of self-education has an advantage over the others as the learner can educate himself at his own pace and it also stresses on rereading [4]. The planned teaching programme on non-curative care of terminally ill cancer patients was highly effective in improving the knowledge of care takers regarding non-curative care of terminally ill cancer patients [5]. The structured education programme was highly effective to improve the knowledge score and to improve the attitude score of subjects/ caregiver towards colostomy care of patient [6]. Study concluded that the structured education program on knowledge is effective as a teaching strategy [7]. The concept of educating the lay public in the techniques of resuscitation was advocated by Dr. Beck in the late 1950s, when he created a short teaching film in which he introduced were successfully resuscitated and in which he stated that “a massive teaching program is needed”[2].

2. Significance for the Study

Cardiac arrests are more common than you think, and they can happen to anyone at any time. Nearly 383,000 out-of-hospital sudden cardiac arrests occur annually, and 88 percent of cardiac arrests occur at home. The life you save with CPR is mostly likely to be a loved one. Four out of five cardiac arrests happen at home. The American Heart Association trains more than 12 million people in CPR annually, to equip Americans with the skills they need to perform bystander CPR [9].

Iwamura et al in their study concluded the effectiveness of CPR and encourage the participation of lay person by

providing instructions by telephone from an ambulance that is en route to the scene [10]. A number of strategies to improve CPR quality have been evaluated recently, during both pre-hospital and in-hospital cardiac arrest care. These strategies have included the use of real-time CPR sensing and feedback, the employment of physiologic monitoring such as end-tidal CO₂ measurement and the use of metronome prompting. The use of mechanical CPR devices to avoid the challenges of manual CPR performance has also represented a topic of great current interest. Additional approaches have focused on both pre-arrest training (e.g. high-fidelity simulation education and CPR refreshers) and post-arrest training (e.g. debriefing) [11]. Investigator believes that respondents who believed CPR could save a life, and highest intention to receive CPR training. Hence study was conducted to assess the Effectiveness of demonstration on cardiopulmonary resuscitation on knowledge and practice among policemen in selected police-stations in metropolitan city.

3. Literature Review

3.1 Cardiac Arrest

Cardiac arrest is characterized by abrupt loss of consciousness caused by lack of adequate cerebral blood flow. It is an event that uniformly leads to death in the absence of an active intervention, although spontaneous reversions occur rarely. Nationally over 80% of emergency victims in India do not receive proper medical attention during the golden hour and statistics indicate that 62% of those getting involved in emergencies are those belonging to the productive age group of 25 to 50 years, and for the country this is a major drain on the nation's most important resource, trained manpower [12].

There are 250,000 to 450,000 sudden cardiac arrests each year in the United States alone, but most deaths due to sudden cardiac arrest are in older adults. Of those sudden cardiac arrests, very few occur in young people, and only some of those young people die of sudden cardiac arrest [13]. The response to a cardiac arrest is driven by two urgent principles:

- (1) Restoring a spontaneous circulation as quickly as possible;
- (2) Maintaining continuous artificial circulatory support until return of a spontaneous circulation has been achieved.

To achieve these goals, the management strategy is divided into five elements:

- (1) Initial assessment and summoning an emergency response team;
- (2) Basic life support (BLS);
- (3) Early defibrillation by a first responder (if available);
- (4) Advanced life support; and
- (5) Post-cardiac arrest care

The initial elements can be applied by a broad array of responders, which includes physicians and nurses as well as paramedical personnel, emergency rescue technicians, and laypeople trained in bystander interventions. The

requirements for specialized knowledge and skills become progressively more focused as the patient moves through post-cardiac arrest management and into long-term follow-up care. These emergency response principles are intended for both in-hospital application and community-based responses. Several organizations promote the idea of a "chain of survival". The chain consists of the following "links". Early recognition - Early recognition that a cardiac arrest has occurred is key to survival - for every minute a patient stays in cardiac arrest, their chances of survival drop by roughly 10%. Early CPR - improves the flow of blood and of oxygen to vital organs - an essential component of treating a cardiac arrest. In particular, by keeping the brain supplied with oxygenated blood, chances of neurological damage are decreased. Early defibrillation - is effective for the management of ventricular fibrillation and pulseless ventricular tachycardia. If defibrillation is delayed the rhythm is likely to degenerate into asystole for which outcomes are worse. Early advanced care - Early Advanced Cardiac Life Support is the final link in the chain of survival [14].

3.2 Cardiopulmonary resuscitation (CPR)

Cardiopulmonary resuscitation (CPR) is a lifesaving technique useful in many emergencies, including heart attack or near drowning, in which someone's breathing or heartbeat has stopped. The American Heart Association recommends that everyone - untrained bystanders and medical personnel alike - begin CPR with chest compressions [15].

Cardiopulmonary resuscitation (CPR) is a series of life-saving actions that improve the chances of survival, following cardiac arrest. Successful resuscitation, following cardiac arrest, requires an integrated set of coordinated actions represented by the links in the Chain of Survival. The newest development in the CPR guideline is a change in the basic life support sequence of steps from "A-B-C" (Airway, Breathing, Chest compressions) to "C-A-B" (Chest compressions, Airway, Breathing) for adults. Also, "Hands-Only (compression only) CPR" is emphasized for the untrained lay rescuer. High-quality CPR is the cornerstone of a system of care that can optimize outcomes beyond return of spontaneous circulation (ROSC). There is an increased emphasis on physiologic monitoring to optimize CPR quality, and to detect ROSC [16].

3.2.1 Importance cardiopulmonary resuscitation

Hollenberg et al stated that cardiac disease is the most common cause of mortality in Western countries. Resuscitation of OHCA patients is based on the 'chain-of-survival' concept, including early (i) access, (ii) CPR, (iii) defibrillation, (iv) advanced cardiac life support and (v) post-resuscitation care. [17].

Resuscitation consists of the following steps:

1. Circulation: promoting artificial circulation by external cardiac compressions
2. Airway: maintaining an open airway
3. Breathing: providing artificial ventilation by rescue breathing
4. Defibrillation: restoring the heartbeat

Stiell et al found suboptimal compression depth in half of patients by 2005 guideline standards and almost all by 2010 standards as well as an inverse association between compression depth and rate. They found a strong association between survival outcomes and increased compression depth but no clear evidence to support or refute the 2010 recommendations of >50 mm. Although compression depth is an important component of cardiopulmonary resuscitation and should be measured routinely, the most effective depth is currently unknown[18].

Hong et al in their study concluded that the mean compression depth and the number of adequate compressions were greater for both the kneeling and footstool positions than for the standing position during 2 min of CPR. They recommend kneeling on a bed or standing on a footstool as the rescuer positions during hospital CPR on a bed[19].⁵³

In a study conducted by Rubertsson et al reported that among adults with out-of-hospital cardiac arrest, there was no significant difference in 4-hour survival between patients treated with the mechanical CPR algorithm or those treated with guideline-adherent manual CPR. The vast majority of survivors in both groups had good neurological outcomes by months. In clinical practice, mechanical CPR using the presented algorithm did not result in improved effectiveness compared with manual CPR[20].

3.3 Failure and complications of cardiopulmonary resuscitation

Wang, Zheng reported when cardiac arrest occurs, in about 1/3 patients may suffer from fracture of ribs as a result of the traditional method of cardiopulmonary resuscitation (CPR) with strong compression of the chest wall. Consequently, there would be a marked decrease in amplitude of chest compression and expansion, thus reducing the effect of CPR [21].

3.3.1 Importance of knowledge and practice of cardiopulmonary resuscitation among policemen

Davis, Mosesso evaluated a training program designed to train police first responders in the use of an automated external defibrillator (AED). One hundred seventy police officers previously trained to the level of first responders underwent a four-hour course to teach incorporation of the AED in their practice. The evaluation of police performance was assessed by written tests prior to, immediately after, and six months post initial training. Actual field use was evaluated by using separate data collection forms filled out at the time of the resuscitation by both police and EMS providers. The officers performed with few errors in AED operation, with the only problem areas being incorrect airway management and delay in performance of CPR to use the AED to reanalyze a non-shockable rhythm. The police results compared favorably with, and in some instances exceeded, those results. Police first responders trained in the use of AEDs performed at a level equivalent or superior to that in other reported studies. Future training strategies should stress proper integration of airway and CPR skills [22].

In the journal *Circulation* published by American Heart Association, Bohm et al sought to compare the 1-month survival rates among patients after out-of-hospital cardiac arrest who had been given bystander cardiopulmonary resuscitation (CPR) in relation to whether they had received standard CPR with chest compression plus mouth-to-mouth ventilation or chest compression only [23].

It is also reported that even if you haven't had training, you can do "hands-only" CPR for a teen or adult whose heart has stopped beating ("hands-only" CPR isn't recommended for children). "Hands-only" CPR uses chest compressions to keep blood circulating until emergency help arrives. If you've had training, you can use chest compressions, clear the airway, and do rescue breathing. Rescue breathing helps get oxygen to the lungs for a person who has stopped breathing. To keep your skills up, you should repeat the training every two years.

3.4 Statement of the Question

“Effectiveness of demonstration regarding cardiopulmonary resuscitation on knowledge and practice among policemen in selected police-stations in metropolitan city.”

3.5 Objectives of the Study

- To assess the existing knowledge & practice scores of CPR technique among policemen.
- To evaluate the effectiveness of teaching & demonstration program on CPR technique for policemen.
- To find out the association between knowledge & practice scores with selected demographic variables.

3.6 Operational definitions

1. **Effectiveness:** It refers to gain in knowledge and practice of CPR technique as determined by the significant difference between pre-test and post-test knowledge and practice scores.
2. **Demonstration:** It refers to systematically organised teaching strategy of half hour duration on cardiopulmonary resuscitation adult rescue, brief anatomy and physiology, meaning, definition, indications, contraindications, sequences, termination, and complications of CPR technique demonstration with the aid of CPR manikin and video show and return demonstration with the aid of CPR manikin.
3. **Cardiopulmonary resuscitation (CPR):** It refers to the act of life-saving measure consisting external cardiac compressions and mouth to mask ventilation which is demonstrated with the aid of manikin using one rescue method as measured by observational check list.
4. **Knowledge:** “Knowledge” refers to the correct response from the subjects on CPR using structured knowledge questionnaire.
5. **Practice:** “Practice” refers to the actual application of knowledge and practice of CPR which is assessed using observational checklist.
6. **Policemen:** it refers to police constables who are working in selected police stations and participating in the study.

4. Methodology

Research methodology involves the systematic procedure by the researcher which starts from the initial identification of programme to its final conclusion [8]

Research Approach- A quantitative research approach was used

Research Design- The research design selected for the study was pre-experimental one group pre-test post-test design.

Independent variable: The independent variable in this study was demonstration of cardiopulmonary resuscitation.

Dependent variable: The dependent variable in this study was the knowledge and practice among policemen after demonstration of cardiopulmonary resuscitation.

5. Setting of the Study

The investigator conducted the study at selected police stations in the meeting rooms and halls provided by the inspectors of the police stations in the Metropolitan City.

- **Sample**

In this study, samples were policemen working in selected police stations.

- **Sampling technique**

The sampling technique used in this study was non-probability convenient method.

- **Sample size**

The sample size was 50 policemen who fulfill the required inclusion and exclusion criteria.

6. Criteria for Sample Selection

Inclusion criteria

1. Policemen who were present during data collection.
2. Policemen who were willing to participate.
3. Policemen who were of constable grade.
4. Policemen who were within 18-58 years age group.
5. Policemen who were currently working in the field.
6. Policemen, who could read, write and comprehend Marathi and/or English.

Exclusion criteria

1. Policemen who had attended CPR program recently (within 6 months).
2. Policemen who were currently working as clerks, mechanical workers.
3. Policemen who were not well or sick.

Tool

The tool used for this study was

- 1) Structured knowledge questionnaire
- 2) Observation check list

Structured knowledge questionnaire contained 24 statements and observation checklist contained 20 statements. The scale was administered among the subjects before and after a demonstration of cardiopulmonary resuscitation.

Technique

1. Self reporting
2. Observation.

7. Description of the Tool

The objective of structured questionnaire was to assess the knowledge score of policemen on the following aspects.

Tool I – Structured knowledge questionnaire

Section A- Demographic data

Section B – Questionnaire

Structured multiple choice questionnaire was used.

Tool II- Observation check list

It had 20 items with two responses i.e. yes and no. With every action performed, was given a score of one (1) and zero (0) for not performing the desired action.

7.1 Data Collection Process

Prior to data collection, the investigator took permission from the respective authorities and study subjects. The investigator selected subjects who met the inclusion criteria. A pre-test in the form of questionnaire and observation check-list was administered. The investigator carried out a demonstration with the help of CPR manikin and video clip on the same day as intervention. The post-test was given on the eighth day using the same tools.

8. Findings and Discussion

8.1 Demographic data of the subjects

According to age, it was noted that majority of the subjects i.e. 84% of the subjects were in age group of 18-30 years, 6% of the subjects were in age group of 31-40, 4% of the subjects were in age group of 41-50 and 6% of the subjects were in age group of 51-58 years. According to sex/gender, majority i.e. 92 % of subjects were males and 8% were females.

According to education, 06% of subjects had completed SSC education, 46% had completed higher secondary education, 46% had completed graduation and only 2% had completed their post-graduation. According to work experience, majority, i.e. 80% of subjects had completed 1 to 5 years of police service, 06% of subjects had done less than 1 year of service, 06% had completed 6 to 11 years and 08% had completed more than 11 years of police service. According to previous information acquired regarding cardiopulmonary resuscitation, majority of subjects, i.e. 58% had not acquired any previous information regarding cardiopulmonary resuscitation, 24% of subjects had acquired previous information regarding cardiopulmonary resuscitation from book, 12% had acquired from video and only 06% had acquired from special training or workshop.

8.2 Assessment of the knowledge and practice of subjects regarding CPR

The data shows that in pre-test scores, majority, i.e. 90% of subjects had average knowledge score, 08% subjects had poor and 2% had good knowledge score regarding cardiopulmonary resuscitation before demonstration of CPR.

In pre-test, 50% subjects had poor practice score and 50% subjects had average practice score and none had good practice score regarding cardiopulmonary resuscitation before demonstration of CPR.

8.3 Effectiveness of teaching and demonstration on knowledge and practice of subjects regarding CPR

The data shows that knowledge score, majority 90% subjects had average, 08% subjects had poor and 2% had good knowledge score regarding cardiopulmonary resuscitation before demonstration of CPR and majority, i.e. 86% of subjects had good knowledge score and 14% subjects had moderate knowledge score after teaching and demonstration of CPR.

The tabulated 't' value for $n-1=49$ degrees of freedom was 2.00. The calculated value was 20.600 for knowledge. The calculated 't' value was much higher than the tabulated values at 0.05 level of significance, so null hypothesis (H_0) was rejected. This shows that there was a significant difference in the mean of pre and post test knowledge scores of the subjects. Therefore it was concluded that there was a significant difference at 0.05 levels with regard to knowledge of cardiopulmonary resuscitation among policemen, thus the null hypothesis (H_0) is rejected in case of knowledge.

The data shows that in pre-test, half (50%) of the subjects had average practice score regarding CPR technique and other half (50%) of them had poor practice regarding CPR technique. In post-test, majority i.e. 82% of subjects had good practice and 18% of them had average practice score about CPR technique.

The tabulated 't' value for $n-1=49$ degrees of freedom was 2.00. The calculated value was 25.692 for practice. The calculated 't' value was much higher than the tabulated values at 0.05 level of significance, so null hypothesis (H_0) was rejected. This shows that there was a significant difference in the mean of pre and post test practice scores of the subjects. Therefore it was concluded that there was a significant difference at 0.05 levels with regard to practice of cardiopulmonary resuscitation among policemen, thus the null hypothesis (H_0) is rejected in case of practice.

Hence, it is strongly interpreted that the demonstration on cardiopulmonary resuscitation was effective to increase the knowledge and practice of policemen. It was noted that there was significance change in knowledge of various aspects i.e. meaning, causes, signs and symptoms, recognition of cardiopulmonary arrest; meaning and indications, precautions, circulation, airway & breathing, complications & responsibilities in cardiopulmonary resuscitation and practice aspects i.e. responsiveness, compressions and airway and breathing, after demonstration of cardiopulmonary resuscitation among policemen.

Based on the finding of the study all the subjects showed an increase in the post test knowledge and practice scores, it could be stated that knowledge and practice through demonstration and planned teaching programme or any other education material could help to enhance the knowledge and

practice of cardiopulmonary resuscitation among policemen, this proves H_1 .

8.3.1 An analysis of data related to association between selected variables and knowledge of subjects regarding CPR

In order to find the relationship between knowledge and selected demographic variables, analysis of variance (ANOVA) tests. The study shows that there was significant association between pre-test knowledge score in relation to age and work experience, i.e. calculated significance value is 0.023 and 0.037 respectively, which were highly significant association. Other demographic variables i.e. sex/gender, education and previous information acquired regarding cardiopulmonary resuscitation were not showing any association between knowledge scores.

8.3.2 An analysis of data related to association between selected variables and practice of subjects regarding CPR.

In order to find the relationship between practice and selected demographic variables, analysis of variance (ANOVA) test was used. The study showed that there was significant association between pre-test practice score in relation to age, education and work experience i.e. calculated significance value is 0.017, 0.003 and 0.000 respectively, which were highly significant association. Other demographic variables i.e. sex/gender and previous information acquired regarding cardiopulmonary resuscitation did not show any association between practice scores.

9. Limitations

1. No standardized tools were available therefore the investigator prepared a tool for the purpose of the study.
2. The questionnaire with multiple choices must have prompted the policemen to give responses. Hence, the possibility of getting average or good score could be a chance factor in this study, which was a limitation of the tool.
3. Random sampling technique could not be used.
4. The study was confined to a small number of subjects which limits the generalization that can be made.
5. The study was not conducted with a control group.

10. Scope of Study

Nursing is a service oriented profession and it must advance and keep pace with the advancing technology, newer problems, evidence based practice and growing demands of consumers[5]. Nurses must educate the policemen on cardiopulmonary resuscitation by organizing demonstration and teaching sessions and by individual educational programs.

- Nurses have to develop instructional or demonstration module to educate policemen.
- The use of demonstration and planned teaching information material for policemen to supplement verbal information, increase knowledge and practice and satisfaction among the policemen.

Nursing Education

- Nurse educator has to pay more attention on training of policemen regarding cardiopulmonary resuscitation. So that they can impart appropriate knowledge to other policemen group.
- More emphasis has to be placed in the regular and periodical teaching or demonstration sessions on prompt and proper technical aspects of cardiopulmonary resuscitation.
- Students Nurses can be motivated to organize demonstration and teaching programs to enhance the knowledge and practice of policemen regarding cardiopulmonary resuscitation.
- Encourage the students nurse to participate actively in awareness of community in awareness campaign.
- Education is the key to the development of excellent nursing practice. With changing health care trend, nursing education must emphasize primary health care approach focusing on survival of out-of hospital cardiac arrest victims before they receive medical help. As the needs of society as well as profession are continuously changing newer components must be incorporated in the nursing curriculum. Nursing education must emphasize on education of policemen regarding cardiopulmonary resuscitation.
- The education curriculum must include imparting knowledge of cardiopulmonary resuscitation through the use of various audio visual aids and teaching strategies.
- Nursing teachers can use the result of the study as an informative illustration for the students. Nursing education should help in inculcating values and a sense of responsibilities in the students to educate the policemen regarding cardiopulmonary resuscitation.

Nursing Administration:

- Nurse administrative has to plan and organize training program for the policemen on cardiopulmonary resuscitation.
- Nurse administrator has to organize educational programs in the schools, police stations and community settings.
- Necessary administrative support has to be provided to conduct health educational workshops in police stations, schools, colleges and other community areas with appropriate A.V Aids, mass media, posters and role plays, drama and puppet show.
- The nurse administrators have a responsibility to provide policemen with substantive continuing education opportunities. This will enable them to update their knowledge and acquire special skills.

Nursing Research

Nursing research is an essential aspect of nursing as it uplifts the profession and develops new nursing norms and body of knowledge. Here, another research has been added to the nursing literature. Very few studies have been done on a similar basis. The research design, findings and the tool can be used as avenues for further research. A similar study can be conducted on large scale. An in depth study on the advanced aspects of cardiopulmonary resuscitation can be conducted. The finding of the study shows that majority of the policemen lack in knowledge about cardiopulmonary

resuscitation. Based on the findings the professionals and student nurses can conduct further studies on various aspects of cardiopulmonary resuscitation and its importance and impacts on health, community and surroundings in order to assess the knowledge of policemen. The study will motivate the beginners to conduct similar study in large scale and on a comparative basis it also motivates young and enthusiastic researchers to implement demonstration and teaching program activities and see its effectiveness.

11. Conclusion

During the study it was observed that, all the subjects were very conscious and interested to learn. The results of pre test of the study revealed that there is low level of knowledge and practice about CPR. In post test there is significant gain in knowledge and practice is seen. The results indicated that equal positive response to the demonstration and planned teaching was found really useful to them.

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