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A STUDY TO ASSESS THE EFFECTIVENESS OF TEACHING PROGRAMME ON KNOWLEDGE AND SKILLS REGARDING AUTOMATED EXTERNAL DEFIBRILLATION (AED) AMONG STAFF NURSES IN SELECTED HOSPITALS OF JALANDHAR, PUNJAB

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ABSTRACT

Introduction: *Defibrillation is a definitive treatment for life-threatening cardiac arrhythmias, ventricular fibrillation and pulse less ventricular tachycardia. Defibrillation consists of delivering a therapeutic dose of electrical energy to the affected heart with a device called a defibrillator. This depolarizes a critical mass of the heart muscle, terminates the arrhythmia, and allows normal sinus rhythm to be reestablished by the body's natural pacemaker, in the sinoatrial node of the heart. The current statistics of the cardiac emergency prevalence, indispensible role of defibrillator in managing the emergency conditions and the lack of proper knowledge and skill in handling defibrillators necessitates the focus in to the proposed study.*

Material and method: *A one group pre-test post-test pre experimental design has been used to attain the objectives of the present study. Total sample for the study used were 50 staff nurses selected by convenient sampling technique. Three tools were used to collect the data in the study i.e. demographic data, structured knowledge questionnaire and skill rating scale. The data was collected from subject in selected hospital of Jalandhar, after explaining them the purpose of study.*

Results: *The present study revealed that overall mean knowledge score obtained by the staff nurses in pre test was 14.42 with standard deviation 2.40 where as the overall mean knowledge score obtained by the subjects in the post-test was 20.70 with standard deviation 2.87.*

The present study revealed that overall mean skill score obtained by the subjects in pre test was 24.70 with standard deviation 3.14 where as the overall mean skill score obtained by the subjects in the post-test was 50.62 with standard deviation 4.49.

Conclusion: *The improvement means score for overall knowledge was 6.28 with the calculated 't' value 22.50. The improvement means score for overall skill was 25.92 with the calculated 't' value 33.45.*

Thus it indicates that there is a significant difference between the pre test and post test knowledge and skill scores. Therefore the structured teaching programme is effective in increasing the knowledge and skill level of staff nurses.

It is concluded from the study that there is a significant difference between the pre test and post test knowledge and skill scores. Therefore the structured teaching programme is effective in increasing the knowledge and skill level of staff nurses regarding Defibrillation and AED.

KEY WORDS: *Defibrillation, AED, Knowledge, Skill, Staff Nurses*

INTRODUCTION

Defibrillation is a definitive treatment for life-threatening cardiac arrhythmias, ventricular fibrillation and pulse less ventricular tachycardia. Defibrillation consists of delivering a therapeutic dose of electrical energy to the affected heart with a device called a defibrillator. This depolarizes a critical mass of the heart muscle, terminates the arrhythmia, and allows normal sinus rhythm to be reestablished by the body's natural pacemaker, in the sino-atrial node of the heart.[1]

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Defibrillators can be external, trans venous, or implanted, depending on the type of device used or needed. Some external units, known as Automated External Defibrillators (AEDs), automate the diagnosis of treatable rhythms, meaning that lay responders or bystanders are able to use them successfully with little, or in some cases no training at all.[1]

The AED is highly specific and sensitive in recognizing the shockable and non-shockable rhythms. The shockable rhythms are ventricular tachycardia (VT) and ventricular fibrillation (VF). The non-shockable rhythms are pulseless electrical activity (PEA) and asystole. Therefore, it is essential to quantify and qualify the cardiac rhythms while patients experience cardiac arrest to further justify the employment of AED in hospital setting.[2]

Cardiac arrhythmias are some of the conditions which carry life threatening risks leading to heart failure or death, where early actions can play a great role in bringing back a patient from the clutches of death.[3]

NEED OF THE STUDY

Heart attack is the third commonest cause of death next to only cancer and road accidents in India. Every year 2.5 million people suffer from coronary artery disease & 1.5 million die of it in India. It is estimated that by 2025 every one out of four heart attacks in the world will be an Indian.[4]

The American heart association (2005) reported that the chance of survival decreases from 7% to 10% for every minute that passes without defibrillation when a shock able rhythm is present. When shock is delivered within 3-5 min, the survival rate of sudden cardiac arrest secondary to ventricular fibrillation can range from 48-74%.The correlations between delaying defibrillation and survival are further strengthened from findings of initial survival rates of nearly 100% when a shock for ventricular fibrillation was delivered within 1-2 min after cardiac arrest in an in-patient setting.[5]

The current statistics of the cardiac emergency prevalence, indispensible role of defibrillator in managing the emergency conditions and the lack of proper knowledge and skill in handling defibrillators necessitates the focus in to the proposed study.

Taniguchi T, Omi W, Inaba H. found that more than 90% of nurses and medical students declined to perform AED defibrillation because they did not know what an AED is and/or how to use it; 57% refused to defibrillate because they did not know how to use one correctly.[6]

It is essential that all health care professionals and students are regularly trained in the practice of defibrillation. In most cases of cardiac arrest, the chances of a favorable outcome depended not only on efficient BLS, but also on the early defibrillation. In a hospital environment, the first responders are most likely to be members of the nursing staff. The potential advantage of these personal being able to perform early defibrillation, as well as BLS is considerable.

OBJECTIVES OF THE STUDY

1. To assess the pre test level of knowledge and skill among the staff nurses regarding Automated External Defibrillation
2. To assess the post test level of knowledge and skill among the staff nurses regarding Automated External Defibrillation
3. To assess the effectiveness of teaching programme among staff nurses regarding Automated External Defibrillation.
4. To compare the mean pre-test and post-test score of knowledge and skill regarding Automated External Defibrillation among staff nurses.
5. To determine the association between pre test post test level score of knowledge and skill with selected demographic variables.

MATERIALS AND METHODS

Research design

A one group pre-test post-test pre experimental design has been used to attain the objectives of the present study.

Research setting

The present research study was conducted in selected hospitals of Jalandhar, Punjab.

Variables

Independent Variable: Structured teaching programme on Automated External Defibrillation.

Dependent Variables: Staff Nurse's knowledge and skill on Automated External Defibrillation.

Socio demographic variables: Age, Gender, professional qualification, Work Experience, In-service education, Previous knowledge about AED, Previous exposure to cardiac emergencies and performed Defibrillation in past.

Conceptual framework

A conceptual framework deals with concepts assembled together by virtue of their relevance and the research problem which provides a certain frame of reference for clinical practice, research and education.[7] Conceptual frame work selected for this study was based on general system theory as capsulated by Von Ludwig Bertalanffy: in this theory main focus is on the discrete parts and their interrelationship.

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Target population
The target population of the present study was the staff nurses working at selected Hospital of Jalandhar, Punjab. Once the eligibility of sample was established, written informed consent was obtained by.

Sample size
The sample for the present study composed of 50 staff nurses working at selected Hospital of Jalandhar, Punjab.

Sampling Technique
Convenient sampling technique was adopted to select the samples for the present study at selected Hospital of Jalandhar, Punjab based on inclusion criteria to collect data.

Inclusion and Exclusion Criteria
Inclusion criteria
1. Staff Nurses who are willing to participate in the study.
2. Both male and female Staff Nurses are included.

Exclusion criteria
1. Staff Nurses who are not responding to questionnaire.
2. Staff Nurses who are not available at the time of data collection.

Description and development of tools
Data tools are the devices that a researcher uses to collect data.
The tool consist of demographic profile and a self administered closed ended, structured questionnaire to assess the knowledge of staff nurses regarding automated external defibrillation and rating scale to assess the skill of staff nurses regarding automated external defibrillation.
The tool consist of three parts.

Part A - Demographic variables
Consists of items seeking information regarding socio-demographic characteristics of staff nurses such as age, gender, professional qualification, work experience, in-service education, previous knowledge about AED, previous exposure to cardiac emergencies and performed defibrillation in the past.

Part B – Knowledge items on Defibrillation and automated external defibrillation
The structured questionnaire is used for knowledge it consists of 30 knowledge items which contain:
Part I: Items related to general information about heart 1-13
Part II: Items related to defibrillation and automated external defibrillation.14-30

Scoring of the Items
There were 30 knowledge items. Each item has three options with one accurate answer. The score for correct response to each item was "one" and for incorrect response was "zero". Thus for 30 items maximum obtainable scores were 30 and minimum was zero.
To find out the association between the selected socio-demographic variables and knowledge scores, respondents are categorized into five groups as below:

Part C – Skill aspect on automated external defibrillation.
The rating scale is used for Skill aspect on automated external defibrillation. It consists of 15 practice items on automated external defibrillation.

Scoring system for Nurses Skills:
Each item has five responses i.e.
1. Always
2. Frequently
3. Sometimes
4. Rarely
5. Not at all

Always has 4 point, frequently has 3 point, sometimes has 2 points, rarely has 1 point, and not at all has 0 point.
The total score of nurses' skills was calculated and classified as follows:

Construction of the Teaching Programme:
The structured teaching programme was developed based on the previous assessment of nurses knowledge and skills, available resources and review of relevant literature.

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RESULTS

Table- 1: Frequency and Percentage Distribution of Socio-Demographic Characteristics of Staff Nurses.

Sr. No.	Socio-Demographic characteristics	Frequency (f)	Percentage (%)
1.	Age group		
	a. < 25 years	12	24%
	b. 26 - 35 years	13	26%
	c. 36 - 45 years	16	32%
	d. > 46 years	09	18%
2.	Gender		
	a) Male	06	12%
	b) Female	44	88%
3.	Professional qualification		
	a) GNM	39	78%
	b) Basic BSc Nursing	04	8%
	c) Post Basic BSc nursing	07	14%
4.	Work experience		
	a) < 1 years	24	48%
	b) 1 - 3 years	17	34%
	c) 4 – 6 years	06	12%
	d) > 6 years	3	6%
5.	In service education		
	a) Attended	13	26%
	b) Not attended	37	74%
6.	Previous knowledge about AED		
	a) Knowledge	11	22%
	b) No knowledge	39	78%
7.	Previous exposure to cardiac emergency		
	a) Exposure	13	26%
	b) No exposure	37	74%
8.	Performed Defibrillation in past		
	a) Never	42	84%
	b) Once	4	8%
	c) More than once	2	2%
	d) Seen not performed	2	2%

Table- 2:Comparison of mean pre and post test level score of knowledge among staff nurses

Level of Knowledge	Maximum score	Pretest			Posttest			Mean difference	"t" value
		Mean	Mean %	SD	Mean	Mean %	SD		
General Information about Heart	13	6.22	47.84	±1.57	8.54	65.69	±1.84	2.32	6.823
Defibrillation and AED	17	8.20	48.23	±1.81	12.16	71.52	±2.20	3.96	9.801
Total	**30**	**14.42**	**48.06**	**±2.40**	**20.70**	**69.00**	**±2.87**	**6.28**	**22.50**

Maximum knowledge score = 30
Minimum knowledge score = 0

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Table 2 depicted the Comparison of mean pre and post test level score of knowledge among staff nurses. It showed that total mean pre test knowledge score before administering the structured teaching programme was 14.42 and total mean post test score was 20.70 after administering the structured teaching programme with mean difference of 6.28 and computed "t" value 22.50.

Table – 3: Comparison of mean pre and post test level score of skill among staff nurses

LEVEL OF SKILL	Maximum score	Pretest			Posttest			Mean difference	"t" value
		Mean	Mean %	SD	Mean	Mean %	SD		
Defibrillation and AED	60	24.70	41.16	±3.14	50.62	84.36	±4.49	25.92	33.452

Maximum score of skill = 60
Minimum score of skill = 0

Table 3 depicted the Comparison of mean pre and post test level score of skill among staff nurses. It showed that total mean pre test knowledge score before administering the structured teaching programme was 24.70 and total mean post test score was 50.62 after administering the structured teaching programme with mean difference of 25.92 and computed "t" value 33.452.

Table – 4: Association of Pre Test level of knowledge Scores with Socio-demographic Variables

Socio-Demographic characteristics	Frequency (f)	Level of knowledge					χ^2	Table value	df	P Value
		Excellent	Good	Average	Poor	Very poor				
Age group							4.19	5.35	6	0.651NS
1) < 25 years	12	0	2	7	3	0				
2) 26 - 35 years	13	0	1	9	3	0				
3) 36 - 45 years	16	0	1	10	5	0				
4) > 46 years	09	0	1	3	5	0				
Gender							12.1	12.42	2	0.002*
1) Male	06	0	3	2	1	0				
2) Female	44	0	2	27	15	0				
Professional qualification							5.68	5.98	4	0.224NS
1) GNM	39	0	2	24	13	0				
2) Basic BSc Nursing	04	0	1	2	2	0				
3) Post Basic BSc nursing	07	0	2	3	1	0				
Work experience							4.91	5.35	6	0.556NS
1) < 1 years	24	0	2	12	10	0				
2) 1 - 3 years	17	0	1	11	5	0				
3) 4 – 6 years	06	0	1	4	1	0				
4) > 6 years	3	0	1	2	0	0				
In service education							10.1	10.59	2	0.004*
1) Attended	13	0	4	8	1	0				
2) Not attended	37	0	1	21	15	0				
Previous knowledge about AED							12,1	12.42	2	0.002*
1) Knowledge	11	0	4	6	1	0				
2) No	39	0	1	23	15	0				

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knowledge										
Previous exposure to cardiac emergency							4.56	4.61	2	0.102NS
1) Exposure	13	0	3	8	2	0				
2) No exposure	37	0	2	21	14	0				
Performed Defibrillation in past							38.8	22.46	6	0.000*
1) Never	42	0	0	26	16	0				
2) Once	4	0	2	2	0	0				
3) More than once	2	0	2	0	0	0				
4) Seen not performed	2	0	1	1	0	0				

Ns-Not significant *Significant at p≤0.05 level

Table 4 depicted the Association of pre test knowledge score with socio demographic variables of staff nurses. The study showed that there was significant association between pre-test level of knowledge and only one of the demographic variables. Performed defibrillation in the past chi square value (38.8) is more than its table value (22,46).Whereas, there was no association between pre-test level of knowledge score with other demographic variables such as age, gender, professional qualification, work experience, in service education, previous knowledge, previous exposure to cardiac emergencies.

Table – 5: Association of Pre Test level of skill Scores with Socio-demographic Variables

Socio-Demographic characteristics	Frequency (f)	level of knowledge					χ^2	Table value	df	P Value
		Excellent	Good	Average	Poor	Very poor				
Age group							5.37	5.35	6	0.498 NS
1) < 25 years	12	0	4	3	5	0				
2) 26 - 35 years	13	0	3	5	5	0				
3) 36 - 45 years	16	0	2	5	9	0				
4) > 46 years	09	0	1	1	7	0				
Gender							1.13	1.39	2	0,568 NS
1) Male	06	0	2	2	2	0				
2) Female	44	0	8	12	24	0				
Professional qualification							4.78	4.67	4	0.311 NS
1) GNM	39	0	6	10	23	0				
2) Basic BSc Nursing	04	0	2	1	1	0				
3) Post Basic BSc nursing	07	0	2	3	2	0				
Work experience							11.90	11.62	6	0.063*
1) < 1 years	24	0	2	4	18	0				
2) 1 - 3 years	17	0	4	7	6	0				
3) 4 – 6 years	06	0	3	2	1	0				
4) > 6 years	3	0	1	1	1	0				
In service							21.8	13.82	2	0.000*

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education										
1) Attended	13	0	8	4	1	0				
2) Not attended	37	0	2	10	25	0				
Previous knowledge about AED							18.40	13.82	2	0.000*
1) Knowledge	11	0	7	3	1	0				
2) No knowledge	39	0	3	11	25	0				
Previous exposure to cardiac emergency							13.00	13.82	2	0.001*
1) Exposure	13	0	7	3	3	0				
2) No exposure	37	0	3	11	23	0				
Performed Defibrillation in past							23.70	22.46	6	0.001*
1) Never	42	0	4	12	26	0				
2) Once	4	0	2	2	0	0				
3) More than once	2	0	2	0	0	0				
4) Seen not performed	2	0	2	0	0	0				

Ns-Not significant *Significant at p≤0.05 level

Table 5 depicted the Association of pre test skill score with socio demographic variables of staff nurses. The study showed that there was significant association between pre -test level of skill and six of the demographic variables. Age chi square value (5.37) is more than its table value (5.35), professional qualification chi square value (4.78) is more than its table value (4.67), work experience chi square value (11.90) is more than its table value (11.62), in service education chi square value (21.8) is more than its table value (13.82), previous knowledge about AED chi square value (18.40) is more than its table value (13.82), Performed defibrillation in the past chi square value (23.70) is more than its table value (22.46).
Whereas, there was no association between pre -test level of skill score with other demographic variables such as gender and previous exposure to cardiac emergencies.

DISCUSSION

Pre-test level score of knowledge and skill among staff nurses regarding Automated External Defibrillation.

The findings of the study showed that majority of staff nurses (58%) were having average level of knowledge followed by poor level of knowledge (32%) and least having good level of knowledge (10%).

It showed that mean pre-test level score of knowledge regarding Defibrillation and AED was 8.20 (48.23%) and mean pre-test level score of knowledge regarding General information about Heart was 6.22 (47.84%) and total score was 14.42 (48.06%).

The findings of the study showed that mean pre-test level score of skill regarding Defibrillation and AED was 24.7 (41.16%)

Post test level of knowledge and skill among the staff nurses regarding Automated External Defibrillation

The findings of the study showed that mean post-test level score of knowledge regarding Defibrillation and AED was 12.16 (71.52%) and mean post-test level score of knowledge regarding General information about Heart was 8.54 (65.69%) and total mean score was 20.70 (69.00%).

The findings of the study showed that mean post-test level score of skill regarding Defibrillation and AED was 50.62 (84.36%)

Effectiveness of structured teaching programme regarding Automated External Defibrillation among staff nurses.

The present study reveals that overall mean knowledge score obtained by the staff nurses in pre test was 14.42 with standard deviation 2.40 where as the overall mean knowledge score obtained by the subjects in the post-test was 20.70 with standard deviation 2.87.

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The present study reveals that overall mean skill score obtained by the subjects in pre test was 24.70 with standard deviation 3.14 where as the overall mean skill score obtained by the subjects in the post-test was 50.62 with standard deviation 4.49.

The improvement means score for overall knowledge was 6.28 with the calculated 't' value 22.50. Thus it indicates that there is a significant difference between the pre test and post test knowledge scores. Therefore the structured teaching programme is effective in increasing the knowledge level of staff nurses.

The improvement means score for overall skill was 25.92 with the calculated 't' value 33.45. Thus it indicates that there is a significant difference between the pre test and post test skill scores. Therefore the structured teaching programme is effective in increasing the skill level of staff nurses.

Association between pre test post test level score of knowledge and skill with selected demographic variables

The study showed that there was significant association between pre-test level of knowledge and only one of the demographic variables. Performed defibrillation in the past chi square value (38.8) is more than its table value (22.46).

The study showed that there was significant association between pre -test level of skill and six of the demographic variables. Age chi square value (5.37) is more than its table value (5.35), professional qualification chi square value (4.78) is more than its table value (4.67), work experience chi square value (11.90) is more than its table value (11.62), in service education chi square value (21.8) is more than its table value (13.82), previous knowledge about AED chi square value (18.40) is more than its table value (13.82), Performed defibrillation in the past chi square value (23.70) is more than its table value (22.46).

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CONFLICT OF INTEREST

Authors declare no conflict of interest.

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