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AWARENESS AND SKILLS IN DEFIBRILLATOR USE AMONG STAFF IN NICVD AT THE CIVIL HOSPITAL, HYDERABAD, SINDH, PAKISTAN

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Abstract

OBJECTIVE: To evaluate the knowledge, skills, and significance of cardiopulmonary resuscitation (CPR) regarding the use of a defibrillator among staff members working in the cardiology department.

METHODOLOGY: A Descriptive cross-sectional study based on the purposive sampling technique was used. Total of 162 participants, including doctors, nurses, and technicians with at least one year of training in cardiology settings. Version 22 of SPSS and AMOS were used for the data analysis.

Results: Doctors demonstrated higher awareness than nurses and technicians, with significant differences in their understanding of the correct way to abbreviate an AED. 13.3% of doctors administered 150 joules, followed by nurses (5%), technicians (21.4%), and 63.3% of doctors administered 200 joules, followed by nurses (70%) and technicians (42.9%). 23.3% of doctors administered 350 joules, followed by nurses (25%) and technicians (35.7%).

Conclusion: This study showed that overall awareness and knowledge about the use of defibrillators among staff working in the cardiology department were poor. Doctors had more awareness about the use of defibrillators compared to nurses and technicians.

Keywords: Cardiopulmonary Resuscitation (CPR), Defibrillator, NICVD, Knowledge, Skills and Hospital.

INTRODUCTION:

Cardiac arrest remains one of the main causes of death worldwide. Ventricular fibrillation is the first sign of cardiac arrest that further worsens into asystole. [1]Cardiopulmonary resuscitation (CPR) is an emergency procedure to ensure the blood flow of brain and other vital organs by restoring the

rhythmic contractions of failing heart. [2] Cardiopulmonary resuscitation (CPR) is an essential skill for health care professionals. In most developed countries, the training of cardiopulmonary resuscitation (CPR) is mandatory for health care workers, but the public also has to get cardiopulmonary resuscitation training for the workplace requirement. Most of the doctors in tertiary care settings lacked knowledge about the use of defibrillators. [3] Up to 76% of patients present with VF (ventricular fibrillation) in cardiac arrest.[4]

Defibrillation is a medical technique that conducts a direct current impulse of energy to the heart through the chest that depolarizes the heart. It recovers the regular conduction and corrects tachycardia. [5] AEDs are made in such a way that they can easily be operated by non-health care professionals and used in the general public, schools and workplaces to provide defibrillation before medical help is sought. In defibrillation trials, the survival rate has been seen to be higher where there is an AED available. Other studies have confirmed more than (47.6% to 53.0%) than the projected total average rate of survival (7.9%), using a range of plans in which AEDs were used that were not seen by healthcare professionals.[13]

A study discovered that 59% of participants had knowledge of basic cardiopulmonary resuscitation and 69% had knowledge and skill of defibrillators regarding the use of pads. 24% of doctors knew the types of defibrillators. Doctors working in anesthesia, intensive care units, and emergency departments were more knowledgeable than other doctors working in other health departments. Similarly, doctors working in paediatric emergencies and critical units were also more knowledgeable than their partners working in other paediatric units.[7]

A study conducted on currently receiving training of anesthesiology emphasized to learn the cardiopulmonary resuscitation and defibrillations with seventy percent of participants having knowledge about accurate figure of chest compressions and 30 % performing successful compressions.73% of participants delayed performing the next step because of uncertainty.[6] Furthermore, 65.6%–75.8% of doctors were unaware of the new guidelines for revised depth and rate of chest compression. While 96.55% knew about BLS and CPR and could tell the abbreviation too, 56.5% could not tell about the Automated External Defibrillator and its abbreviation, and 91.6% of doctors preferred CPR over defibrillation. The knowledge of half of the members was average when evaluated. They felt it was easy to do CPR in an emergency situation, and they also indicated that BLS should also be part of the medical curriculum. [9]While the benefits of AED are more accessible to the public from the public access evidence. [10]

It is essential that a health care professional recognize about the handling of emergency situations they come across on a daily basis. Various studies have been done to assess the BLS knowledge and skills among health care professionals, which mainly highlight the importance of emergency care for patients.[11]

Furthermore, the skills for CPR are not satisfactory and were poor in assessing the pulse, the mask with bag valve, and managing the rhythm of the cardiac cycle with a defibrillator in patients. [12]

In cardiac arrest, the first priority should be given to defibrillation in order to increase the survival chances. Yet the use of a defibrillator is the main factor in restoring cardiac rhythm in patients. Early defibrillation, early CPR, and early emergencies can increase the chances of survival for patients. Psychomotor skills and knowledge must be demonstrated by learners along with psychomotor skills and knowledge.[13]

METHODOLOGY

Study population:

A descriptive cross-sectional study design was carried out on 162 participants, including doctors, nurses, and technicians, after obtaining their consent and having at least one-year training in cardiology settings using the non-probability purposive sampling technique (this technique does not require any frame or list of the total population but approaches information-rich participants until a sample is obtained) that selected eligible participants who were present on duty and had skills in AED and CPR until the sample was completed.

Study setting: This study was conducted at the National Institute of Cardiovascular Diseases (NICVD) in Hyderabad.

Data Collection and analysis: A structured questionnaire consisting of demographic variables and questions related to awareness and use of defibrillators was explained to the participants and filled out by them. The raw data were analysed and edited in MS Excel, and then entered in SPSS version 22. Frequency and percentage were calculated for assessing the knowledge, skills, and significance of cardiopulmonary resuscitation (CPR) about the use of a defibrillator among staff working in the cardiology department, and the chi-square test was used. A p-value of less than 0.05 was considered statistically significant.

RESULTS

In this study, male participants were 61.1% and female participants were 38.9%; the mean age of participants was 34 years, with a standard deviation of 4.3 years. All the participants were from urban hospitals. 37% of participants had MBBS qualifications or were doctors; similarly, 37% were nurses, with 21% being generic nurses, 22.2% being post-RN BScNs, 1.9% being MSc nurses, and 25.9% being technicians. 55.6% of staff had five years of service, followed by 35% from six to ten years' service and 9.3% from eleven to twenty years' service. 45.7% of staff were working at CCU emergency, 35.8% at the cardiac ward, and 18.5% at the cardiac catheterization lab.

Table.01: use of defibrillator

Variables		Doctors	Nurses	Technicians	Total	P-Value
Have you ever used defibrillator?	Yes	52(86.7%)	47(78.3%)	34(81.0%)	133(82.1%)	<0.01
	No	8(13.3%0	13(21.7%)	8(19.0%)	29(17.9%)	
Is defibrillator your first choice to restore the rhythm in VT/ VF?	Yes	56(93.3%)	37(61.7%)	27(64.3%)	120(74.1%)	< 0.001
	No	4(6.7%)	23(38.3%)	15(35.7%)	42(25.9%)	
If yes, then how many joules?	150 joules	8(13.3%)	3(5.0%)	9(21.4%)	20(12.3%)	< 0.001
	200 joules	38(63.3%)	42(70.0%)	18(42.9%)	98(60.5%)	
	350 joules	14(23.3%)	15(25.0%)	15(35.7%)	44(27.2%)	= 0.03

86.7% of doctors had ever used a defibrillator, and 93.3% had used it as their first choice to restore the rhythm in VT or VF. 78.3% of nurses had ever used a defibrillator, and 61.7% had used it as their first choice, whereas 81% of technicians had ever used one and 64.3% had used it as their first choice. These proportions were statistically significant (p =< 0.001).

13.3% doctors gave 150 joules followed by nurses (5%), technicians (21.4%), 63.3% of doctors gave 200 joules followed by nurses (70%) and technicians (42.9%).

Furthermore 23.3% doctors gave 350 joules followed by nurses (25%) and technicians (35.7%) and showed significant differences (p = 0.03)

Table.02: What first thing you should do when preparing defibrillator for use?

Characteristics	Doctors	Nurses	Technicians	Total	P-Value
Turn on defibrillator	50(83.3%)	42(70.0%)	9(21.4%)	101(62.3%)	
Deliver a shock	0(0.0%)	1(1.7%)	13(31.0%)	14(8.6%)	P <0.001
Stand clear	5(8.3%)	9(15.0%)	15(35.7%)	29(17.9%)	
Begin 1 and half minute of CPR	5(8.3%)	8(13.3%)	5(11.9%)	18(11.1%)	

62.3% of participants said they would turn on the defibrillator, 8.6% said to deliver a shock, 17.9% said they would stand clear, and 11.1% said that they would begin one and a half minutes of CPR, which was found significant (P <0.001).

Table.03: During CPR which intervention is the most important in saving patients' lives?

Characteristics	Doctors	Nurses	Technicians	Total	P-Value
Intubation	13(21.7%)	11(18.3%)	5(11.9%)	29(17.9%)	
Resuscitation drugs	11(18.3%)	21(35.0%)	14(33.3%)	46(28.4%)	< 0.001
Defibrillation	31(51.7%)	25(41.7%)	9(21.4%)	65(40.1%)	
Not sure	5(8.3%)	3(5.0%)	14(33.3%)	22(13.6%)	

21.7% of doctors said intubation is the most important intervention in saving patients' lives, followed by resuscitation drugs (18.3%), defibrillation (51.7%), and nurses reported it as intubation (18.3%), resuscitation drugs (35%), defibrillation (41.7%), and technicians reported it as intubation (11.9%), resuscitation drugs (33.3%), and defibrillation (21.4%), and these proportions were found significant ($p < 0.001$).

DISCUSSION:

The present study was conducted to check the skills and knowledge about the use of defibrillators among health care workers. 162 participants participated in the study. 54 participants were medical doctors, 54 were nursing staff, and 54 were paramedical technician students who took part. In this study, male participants were 61.1% and female participants were 38.9%; the mean age of participants was 34 years, with a standard deviation of 4.3 years. Another study reported a mean age of 34.9 7.4 years for the study group that had poor knowledge of AED and BCLS.[14]

The study used a standard 30-questionnaire questionnaire for assessing knowledge, which contained questions about the abbreviations of AED, BLS, and ACLS, the sequence of steps evaluated with resuscitation techniques with regards to maintenance of airway breathing and circulation in conscious patients of various age groups, and the techniques for removal of foreign bodies if any were impacted.[11]

In this study, Doctors revealed more awareness than nurses and technicians, with significant differences at p values of 0.05, and knowledge about the correct abbreviation of AED among doctors, nurses, and technicians showed a significant difference ($p < 0.001$). Another study reported doctors having more knowledge about basic life support than nurses.[11]

For baseline data regarding awareness of using technology for the lifesaving of patients with cardiac arrest, which is rising day by day, it is very important to calculate its frequency on a priority basis to identify the level of competency of working staff so that the lives of more patients can be saved.

The frequency of attending training of AED and BCLS training among doctors, nurses and technicians were not found significant. Doctors showed high level of confidence in using AED on cardiac patients compared to nurses and technician and had significant differences (< 0.001), supported by another study. [15, 16] However, fear of legal liability was the major obstacle among health care providers in deciding whether to use AEDs on cardiac patients.[17, 18]

A study reported insufficient knowledge of CPR and AED [19]. Nurses with more information had little anxiety about the use of a defibrillator. But 64% of nurses were worried about whether or not the AED would function. However, nurses need more training about AEDs and CPR that would encourage them to use them more effectively. [20] Another study showed many of the nurses had poor knowledge and skills regarding to AED[21].Another study reported difficulty in use of hands free defibrillator electrodes paAED, [21] . Per demonstration.[22] rity f health care professionals use defibrillator as first celectrodeestor the rhythm in vt/vf with significant differences (p =< 0.001).The majority studies also validate our findings.[23,24]

In the present study, required joules were given to patients as per protocol by health care workers, which are supported by other studies.

CONCLUSIONS:

This study showed that overall awareness and knowledge about the use of defibrillators among staff working in the cardiology department were poor. Doctors had more awareness about the use of

defibrillators compared to nurses and technicians. AED is compulsory among health care workers as they run into such conditions every day and will facilitate their high level of saving lives. The strength of the study is that awareness and knowledge about the use of defibrillators among staff working at the NICVD civil hospital in Hyderabad have been studied for the first time.
The weakness of this study is that it used purposive sampling that limits the generalization of findings to other populations, but this study is very significant because it provides baseline data about the level of awareness and skills of health care workers, particularly about competency in operating defibrillators because cardiac facilities have been established and upgraded throughout Sindh. By identifying the workers level of competency at the local level, this study would contribute to the design of continuous ongoing trainings and formulating effective plans for implementation of CPR and AED at the community level.

Recommendations

- More AED and BCLS training should be arrange on regular basis.
- Only BCLS trained staff should be appointed at cardiology department.
- Certificate of working staff must be valid.

Conflict of Interest: There are no conflicts of interest between the authors to disclose.

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Data Sharing Statement: The data supporting the study's findings will be made available upon request from the corresponding author. The data is not accessible to the general public due to ethical and/or privacy considerations.

AUTHOR CONTRIBUTIONS

Aisha Saleem: Conceptualization, methodology, data collection, results,
Almas Ashraf: Introduction, methodology, editing, formatting
Gobind Rai: Analysis, discussion, conclusion

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