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RESEARCH ARTICLE

STUDY ON KNOWLEDGE OF CARDIAC ARREST AND ITS MANAGEMENT AMONG HEALTH CARE PROFESSIONAL STUDENTS IN CHENNAI AND KANCHIPURAM

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Cardiac Arrest, Knowledge, Management, Healthcare Professional Students, Cardiopulmonary Resuscitation, BLS, ACLS, PALS

Abstract

Background: Cardiac arrest is the most common cause of death worldwide, and early intervention with high quality BLS improves a victim's chances of survival. A patient in cardiac arrest is treated by early CPR and early defibrillation and administration of Emergency Drugs. Therefore, Every Health Care Professional student should be Knowledgeable about cardiac arrest and its management to save the precious life of patient.

Objective: To assess the Knowledge of Cardiac Arrest and its management among Health Care Professional Students and to educate and create awareness and Knowledge about Cardiac arrest and its management among Health Care Professional Students

Methodology: A cross sectional study conducted in Chennai and Kanchipuram, from July 9th 2022 to September 9th 2022. Permission was obtained from IEC; a well-organized questionnaire was executed with 23 items using the Google Forms. Pre-structured questions were pre-validated by Experts. Google form contains the details such as socio-demographic, knowledge and its management-based questions. The Completed data was collected, entered in excel sheet and the results was analyzed with the proper statistical method.

Results: According to the statistical analysis of data received, it results, only 4% (21 participants) of health care professional students have good knowledge about cardiac arrest and its management, only 36% (188 participants) of health care professional students have adequate knowledge about cardiac arrest and its management and 60% (316 participants) of health care professional students have inadequate knowledge about cardiac arrest and its management.

Conclusion: This study highly suggests that training programs, simulation-based trainings, seminars and Lecture, etc.... need to be organized to the health care professional students to make them gain knowledge about cardiac arrest and its management to save the precious lives.

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Introduction:-

Cardiac arrest is defined as the cessation of cardiac mechanical activity resulting in the absence of circulating blood flow, which can be the abrupt loss of heart function in an individual who may or may not have been diagnosed with heart disease. Heart stops pumping the blood to vital organs, depriving them of oxygen, and, if left untreated, results in death^[1]. It can come on suddenly or in the wake of other symptoms^[1,2]. It is often fatal if appropriate management aren't taken immediately. It may be caused by irregular heart rhythms called arrhythmias^[2,3]. Ventricular fibrillation is an arrhythmia commonly associated with cardiac arrest. The heart's lower chambers suddenly start beating chaotically and don't pump blood during ventricular fibrillation^[3,4]. Commonly cardiac arrests occur when a diseased heart's electrical system malfunctions, This malfunction causes an abnormal heart rhythm such as ventricular tachycardia or ventricular fibrillation^[2,5,6]. Some cardiac arrests are also caused by extreme slowing of the heart's rhythm (bradycardia)^[2]. Other causes of Cardiac Arrest are,

Scarring of the heart muscle tissues –

It may be the result of a prior heart attack or another cause. Scarred or enlarged heart from any cause is prone to develop life-threatening ventricular arrhythmias. The first six months after a heart attack is a high-risk period for sudden cardiac arrest in patients with atherosclerotic heart disease^[7].

Thickened cardiac muscle (cardiomyopathy) –

Damage to the heart muscle can be the result of high blood pressure, heart valve disease or other causes. A diseased heart muscle can make you more prone to sudden cardiac arrest, especially if the patient also has heart failure^[8].

Heart medications –

Under certain conditions, the stage for arrhythmias that cause sudden cardiac arrest. (Even, antiarrhythmic drugs that treat arrhythmias can sometimes produce ventricular arrhythmias even at normal doses. This is called a "proarrhythmic" effect.) Significant changes in blood levels of potassium and magnesium, Diuretics may also cause life-threatening arrhythmias and cardiac arrest^[9].

Electrolyte imbalance may also cause cardiac arrest, especially Hyperkalemia can lead to ventricular fibrillation, So Electrolyte level must be maintained^[10].

Electrical abnormalities –

These, including Wolff-Parkinson-White syndrome and Long QT syndrome, may cause sudden cardiac arrest in children and young people^[10].

Abnormalities of blood vessel –

These rare cases occur particularly in the coronary arteries and aorta. Adrenaline released during intense physical activity can trigger sudden cardiac arrest when these abnormalities are present^[11]. **Recreational drug use** – This can occur in otherwise healthy people^[11].

Main Signs of cardiac arrest are, **Sudden loss of responsiveness, No normal breathing, No carotid pulse and with or without Chest Pain.** Pulseless cardiac arrest can be produced by these four rhythms; ventricular fibrillation (VF), rapid ventricular tachycardia (VT), pulseless electrical activity (PEA), and asystole^[2]. Survival from these arrest rhythms requires both basic life support (BLS) and advanced cardiovascular life support (ACLS)^[4,12,13].

Cardiac arrest is the most common cause of death worldwide, and early intervention with high quality BLS improves a victim's chances of survival^[4,14,15]. A patient in cardiac arrest is treated by early CPR and early defibrillation and administration of Emergency Drugs^[3,16,17,18]. Steps in CPR, Locate the carotid pulse behind the trachea on the side of the neck. A pulse may be hard to detect. Therefore, an attempt to feel the pulse should only be performed for about 5-10 seconds, if a pulse cannot be distinctly detected, assume that there is no pulse^[3,19,20]. (Figure 1).

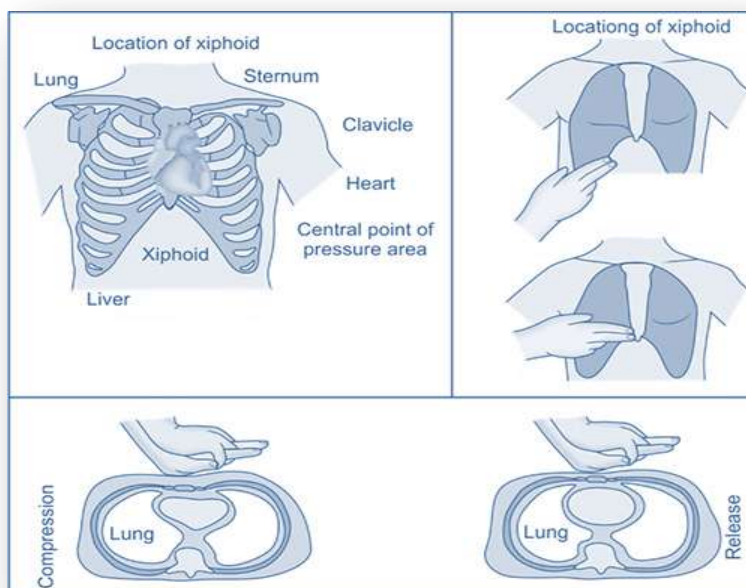


Figure 1

Fig. 1:- Represents the anatomical location of xiphoid process [Randall Benner, M.Ed., NREMT-P, Basic Life Support: Cardiopulmonary Resuscitation (CPR)]^[33]

Start alternating 30 chest compressions and 2 breaths, Open the victim's airway by slightly lifting the chin^[21,22], Place the heel of the right hand (Dominant Hand) on the bottom of the victim's breastbone and then place the heel of left hand on top of the right hand, The arms and shoulders are straight and begin the chest compressions hard and fast^[23,24,25]. According to 2021 CPR Guidelines, line of Survival sequence will be Compression – Airway -Breathing (CAB)^[3], (Figure 2).

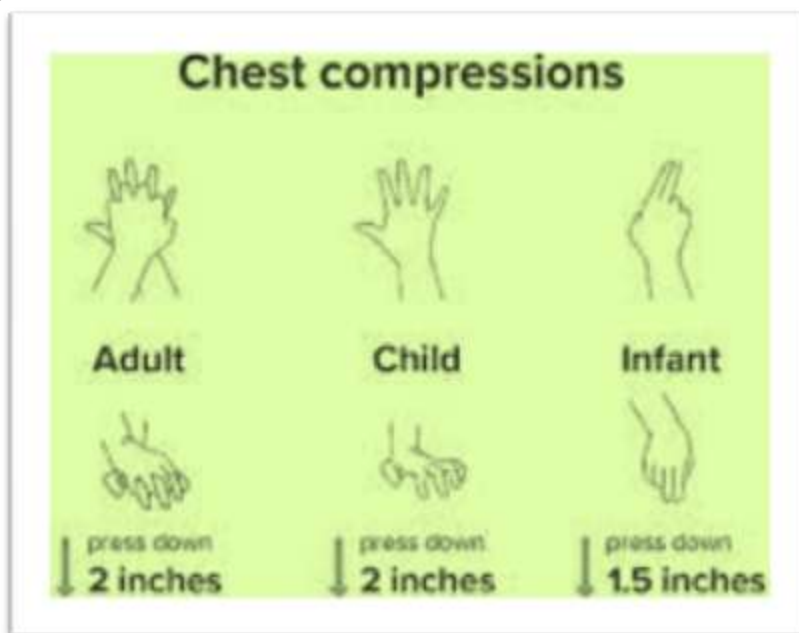


Figure 2

Fig. 2:- Represents hand placement and chest compression among adult, child and infants [Deborah Weatherspoon, Ph.D., MSN — By Amanda Barrell, CPR steps: A visual guide]^[34]

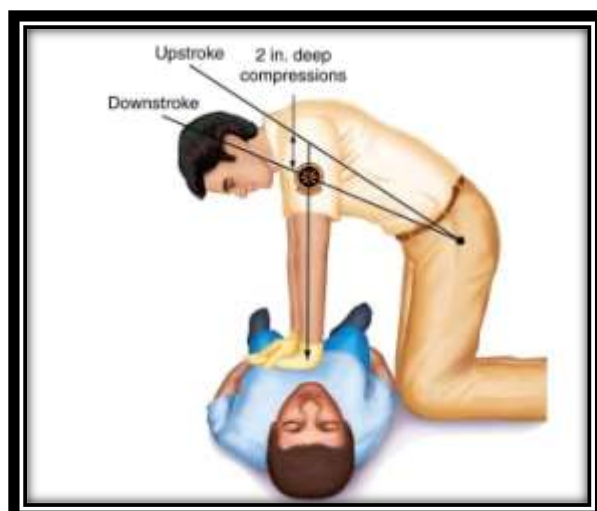


Figure 3

Fig. 3:-Represents proper hand placement position to perform CPR [Randall Benner, M.Ed., NREMT-P, Basic Life Support: Cardiopulmonary Resuscitation (CPR)]^[33]

Effective chest compressions will be at least 2 to 2.4 inches deep for adults, The chest compression depth for Infants and children up to puberty is 1/3 the depth of the chest, which is about 1.5 inches (4 cm) in infants and 2 inches (5 cm) in children up to puberty, Infants under one year of age (excluding newborns): two fingers in the center of the chest, just below the nipple line^[26,27], (Figure 3).

The frequency of chest compressions should be 100 to 120 per minute, Chest compressions below 75 compressions per minute are associated with a lower ROSC (return of spontaneous circulation) in the victim^[4,28,29]. The chest needs to fully expand between each compression to allow blood to flow into the victim's heart, leaning on the chest at any time during CPR is contraindicated, after 30 hard and fast chest compressions, tilt the head and chin to make sure the victim's airway is still open^[3,30]. If the victim appears to have a neck injury, perform a jaw thrust to open the airway by gently moving the jaw forward, perform round of 30 chest compressions followed by 2 breaths (each breath per second)^[31]. Defibrillator is used to assess the Cardiac rhythm and defibrillation should be performed quickly and as directed, If defibrillator can't be accessed, use Automated External Defibrillator (AED) to assess the Cardiac rhythm^[32], The AED analyzes the victim's heart rhythm and advises a therapeutic shock when appropriate. Administration of Emergency Drugs like Amiodarone, Lignocaine, Epinephrine, etc... can be used to manage the Cardiac arrhythmias and save the life of the Victim.

Therefore, Every Health Care Professional student should be Knowledgeable about cardiac arrest and its management to save the precious life of patient.

Objectives:-

1. To assess the Knowledge of Cardiac Arrest and its management among Health Care Professional Students
2. To educate and create awareness and Knowledge about Cardiac arrest and its management among Health Care Professional Students.

Methodology:-

Study Type:

Observational Questionnaire Based Research Study.

Study Design:

The target population selected was full-time undergraduate Health Care Professional students in Chennai and Kanchipuram.

Data collection:

1. The Study was conducted online in Chennai and Kanchipuram from July 9th, 2022, to September 9th, 2022. Permission was obtained from the Human Institutional Ethical Committee (IEC), MMCHRI, Kanchipuram, Approval Number (MMCH & RI IEC/UG/01/JUNE/22).
2. We designed and implemented an online data collection tool using Google Forms via(docs.google.com/forms). The questionnaire assesses knowledge and management of Cardiac Arrest, which is pre-designed and pre-validated by professional experts in the field.
3. A pilot study was conducted in offline among 10% of study population, after analysis of the results, The questionnaire was approved as standardized questionnaires by the profession experts in the field.
4. Google forms include socio-demographic details such as name, age, gender, year of study and course of the study, Institution name and Place, Informed Consent in one part and next section contains 23 Questions to check the knowledge of the students on cardiac arrest and its management.
5. Participants were asked to select the appropriate option, for each correct response 2 marks will be given, total score was converted into percentage, according to the percentage knowledge of healthcare professional student is assessed which includes Good Knowledge (above 80%), Adequate Knowledge (50-79%), Inadequate Knowledge (below 49%).
6. Completed data were collected, entered in excel sheet and the results were analyzed with the proper statistical method.

Table 1:- Survey Questionnaire.

Sl. No	Questions	Options given for scoring
1.	What is meant by Cardiac Arrest?	a) Myocardial Infarction (MI) b) Sudden unexpected loss of heart function c) Angina Pectoris d) Don't know
2.	Which is the most common etiology (cause) of Cardiac Arrest?	a) Myocardial Infarction (MI) b) Valvular heart disease c) Arrhythmia d) Infective endocarditis e) Don't know
3.	Can Cardiac Arrest cause Brain Damage?	a) Yes b) No c) Don't know
4.	Which is the most common risk factor of Cardiac Arrest?	a) Coronary artery disease b) Rheumatic heart disease c) Valvular heart disease d) Congenital heart disease e) Don't know
5.	How do you diagnose a patient under Cardiac Arrest?	a) Sudden loss of responsiveness, No breathing and No pulse in carotid artery b) Sudden loss of responsiveness, High pulse rate and No breathing c) Sudden loss of responsiveness, Increased body core temperature and High blood pressure d) Don't know
6.	Where should you feel for a pulse in an unresponsive adult victim under Cardiac arrest?	a) Radial artery b) Brachial artery c) Carotid artery d) Femoral artery e) Don't know

7.	Where should you feel for a pulse in an unresponsive infant victim under Cardiac arrest?	a) Radial artery b) Brachial artery c) Carotid artery d) Femoral artery e) Don't know
8.	What is the first line emergency treatment for cardiac arrest?	a) Advanced Airway b) Use of Defibrillator c) Cardio Pulmonary Resuscitation d) Don't know
9.	Is cardiac arrest and heart Attack the same?	a) Yes b) No c) Don't know
10.	Before beginning CPR, check for the pulse,	a) No longer than 10 seconds b) At least 20 seconds c) At least 30-40 seconds d) At least 1 minute e) Don't know
11.	What is the chest compression depth for adults and adolescents in High quality CPR?	a) 1to 1.5 inches b) 2 to 2.4 inches c) 2.5 to 3.2 inches d) 3 to 3.5 inches e) Don't know
12.	What is the chest compression depth for infants in High quality CPR?	a) 1.5 inches b) 2.5 inches c) 3.5 inches d) 4 inches e) Don't know
13.	What is the CPR ratio of chest compression and rescue breathing in Cardiac Arrest?	a) 2: 30 b) 4: 15 c) 15: 4 d) 30: 2 e) Don't know
14.	The rate of chest compression for an adult in High quality CPR is	a) 60-80 compressions per minute b) 40-70 compressions per minute c) Between 100-120 compressions per minute d) Between 130-170 compressions per minute e) Don't know
15.	According to 2021 CPR Guidelines, line of survival sequence will be	a) Airway -> Breathing -> Compression b) Compression -> Airway -> Breathing c) Compression -> Breathing -> Airway d) Breathing -> Airway -> Compression e) Don't know
16.	According to American Heart Association (AHA), How many joules of shock should be delivered by a	a) 70 Joules b) 120 Joules

	monophasic defibrillator to an adult victim?	c) 270 Joules d) 360 Joules e) Don't know
17.	The most common abnormal shockable rhythms observed in Cardiac Arrest are	a) Ventricular Flutter and Atrial fibrillation b) Ventricular Fibrillation and Ventricular Tachycardia c) Asystole and Pulseless electrical activity d) Don't know
18.	Which drug is considered as first line of treatment for Asystole and PEA (Pulseless electrical activity)?	a) Amiodarone b) Lidocaine c) Epinephrine d) Atropine e) Don't know
19.	When you are doing an CPR on a patient with pulseless ventricular tachycardia. You should check for a pulse,	a) After each cycle of CPR b) After 2 minutes of CPR c) After 5 minutes of CPR d) After 10 minutes of CPR e) Don't know
20.	Are you trained in Basic Life Support (BLS)?	a) Yes, I am trained and able to perform BLS skills under medical emergency b) Yes, I am trained but not practically trained to perform BLS skills under medical emergency c) Not trained in BLS
21.	Are you trained in Advanced Cardiovascular Life Support (ACLS)?	a) Yes, I am trained and able to perform ACLS skills under medical emergency b) Yes, I am trained but not practically trained to perform ACLS skills under medical emergency c) Not trained in ACLS
22.	Are you trained in Pediatric Advanced Life Support (PALS)?	a) Yes, I am trained and able to perform PALS skills under medical emergency b) Yes, I am trained but not practically trained to perform PALS skills under medical emergency c) Not trained in PALS
23.	Your Institution motivates and provides you training on BLS, ACLS and PALS ?	a) Yes, my institution provides me training on all 3 of the courses mentioned above b) Yes, my institution provides me training only on 2 of the courses mentioned above c) Yes, my institution provides me training only on 1 of the courses mentioned above d) No, my institution doesn't provide me training on any of the courses mentioned above

Results:-

A survey on knowledge of cardiac arrest and its management was conducted on health care professional students of I-year, II-year, III-year, Final year, and Interns which includes MBBS,AHS, Nursing, BPT, BOT, other health care professional students in Chennai and Kanchipuram. Around 525 students from various colleges in Chennai and Kanchipuram responded to this survey.

Among the 525 responses 26.9% of responders were from Nursing,17.7%of responders were from MBBS,15.6%of responders were from BPT, 10.1%of responders were from B.Sc. Cardio Pulmonary Technology, 8.8% of responders were from B.Sc. Anesthesia Technology, 8% of responders were from B.Sc. Perfusion Technology,4.8%of responders were from B.Sc. Renal Dialysis Technology, 3.4% of responders were from B.Sc. Physician Assistant ,2.3%of responders were from B.Sc. Radio Imaging Technology,1.1% of responders were from B.Sc. Medical Laboratory Technology, 0.8% of responders were from other AHS, 0.6% of responders were from Respiratory Therapyand 0.1% of responders were from BOT(Figure 4).

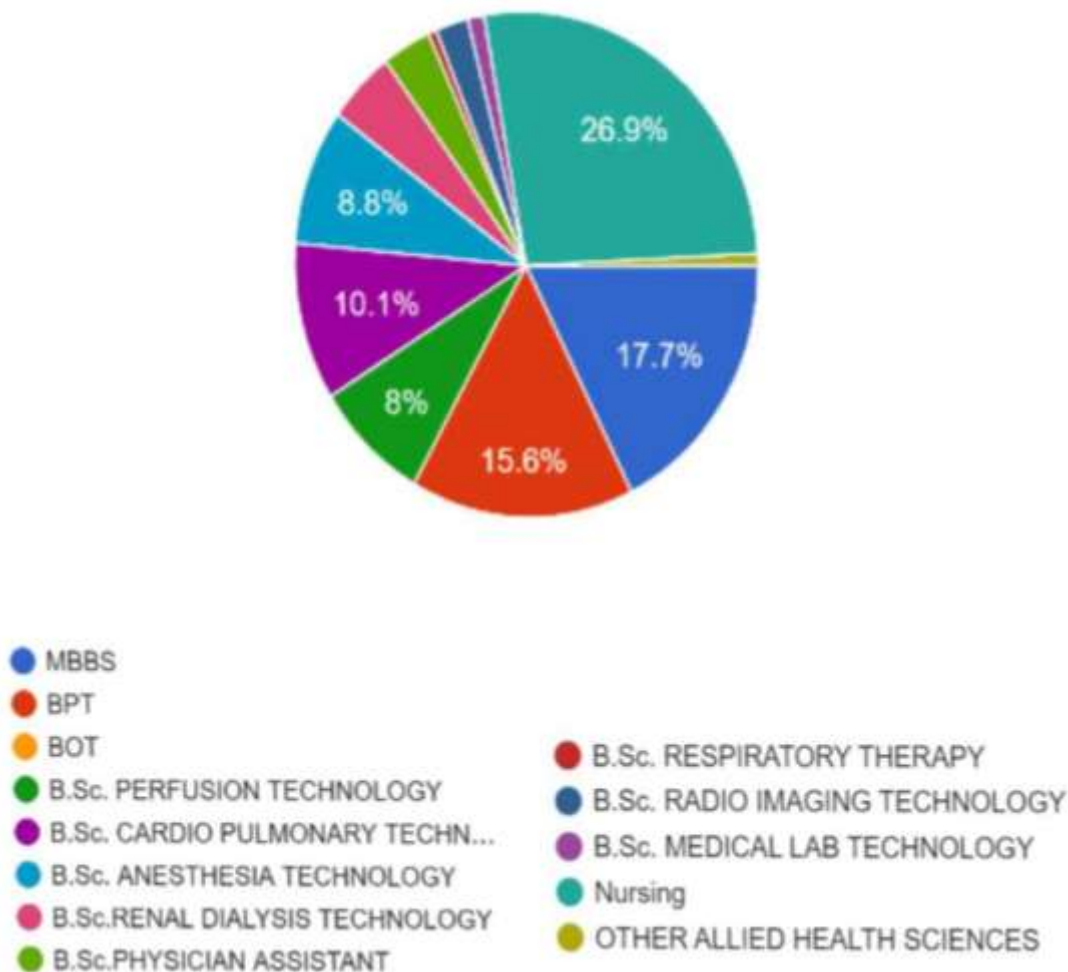


Figure 4:- Responses showing the course of study of health care professional students participated in the study(Figure 4).

According to the statistical analysis of data received, 18.9% of the responders were a first-year, 21.7% of the responders were second year, 39.8% of the responders were third year, 12% of the responders were fourth year and 7.6% of responders were Interns(Figure 5).

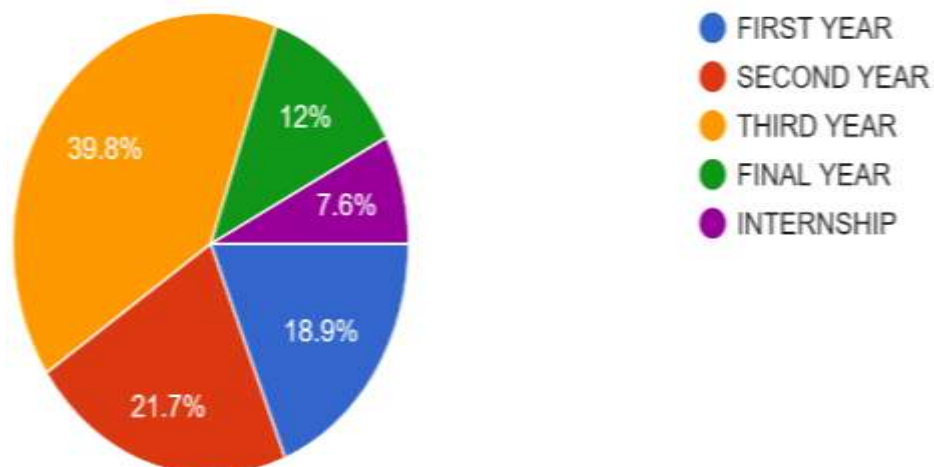


Figure 5:- Responses showing the year of study of health care professional students participated in the study(Figure 5).

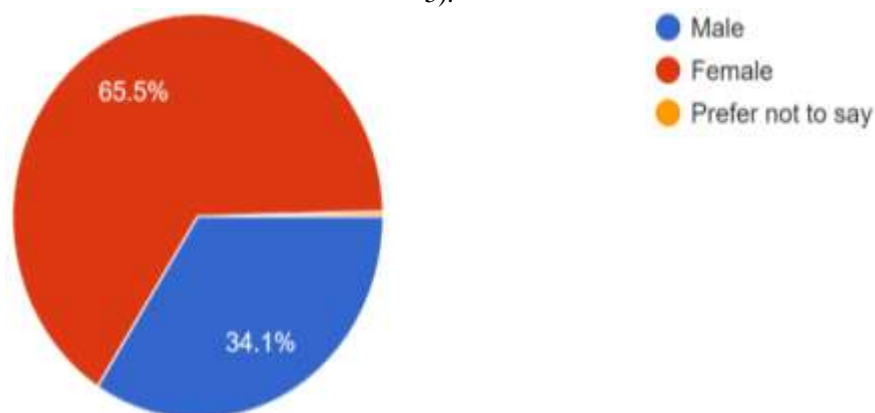


Figure 6:- Responses showing the gender of health care professional students participated in the study(Figure 6).

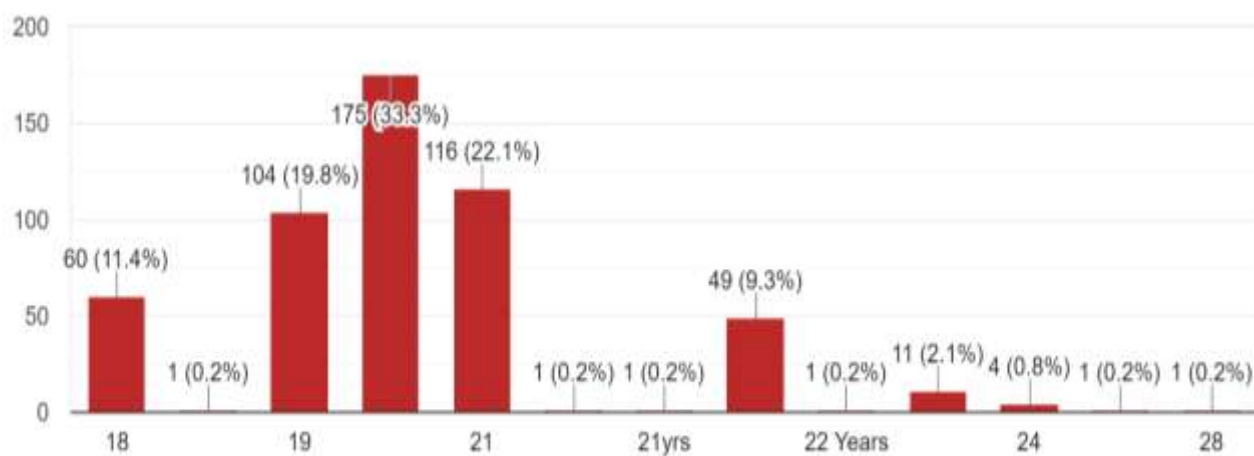


Figure 7:- Responses showing the age of health care professional students participated in the study(Figure 7).

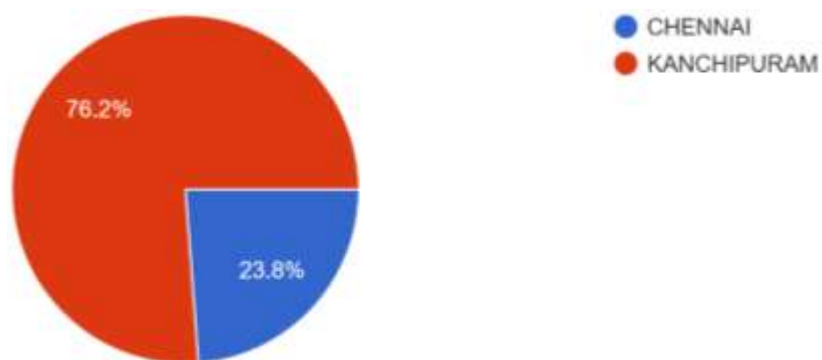
**Figure 8**

Fig. 8:- Responses showing the institutional place of health care professional students participated in the study(Figure 8).

According to the statistical analysis of data received, it results, only 4% of health care professional students have good knowledge about cardiac arrest and its management, only 36% of health care professional students have adequate knowledge about cardiac arrest and its management and 60% of health care professional students have inadequate knowledge about cardiac arrest and its management.



Figure 9:- Represents the knowledge of cardiac arrest and its management among health care professional students participated in the study(Figure 9).

Discussion:-

The Study was conducted online in Chennai and Kanchipuram from July 9th, 2022, to September 9th, 2022. This study was aimed at assessing the knowledge of cardiac arrest and its management among health care professional students.

According to the statistical analysis of data received, it results, only 4% (21 participants) of health care professional students have good knowledge about cardiac arrest and its management, only 36% (188 participants) of health care professional students have adequate knowledge about cardiac arrest and its management and 60% (316 participants) of health care professional students have inadequate knowledge about cardiac arrest and its management.

Cardiac arrest is the most common cause of death worldwide, and early intervention with high quality BLS improves a victim's chances of survival. A patient in cardiac arrest is treated by early CPR, early defibrillation, and the administration of emergency drugs. Quick and instant intervention using early, high-quality CPR can be a good

strategy to save numerous precious lives, especially as health care professional students are future clinicians, teachers, and researchers who will be at the forefront in educating and treating the general public.

An alarming find in our study was that 38.1% of institutions doesn't motivate and provide the proper training on management of cardiac arrest to their health care professional students,

According to the statistical analysis of data received, it results, only 21% of students are properly trained in BLS, and 17.3% of students are properly trained in ACLS, and just 13.9% of students are properly trained in PALS.

A victim under cardiac arrest can be saved by early CPR, early defibrillation, and the administration of emergency drugs. Quick and instant intervention using early, high-quality CPR can be a good strategy to save numerous precious lives, Therefore, Every Health Care Professional student should be knowledgeable about cardiac arrest and its management to save the precious life of patient.

This study highlighted the gaps in knowledge of cardiac arrest and its management among health care professional students. Institutions should provide technical education and proper training to their students which is highly needed to make them knowledgeable to manage cardiac arrest and save the life of the victim.

Conclusion:-

Our study suggests that training programs, simulation-based training, seminars, and lectures, etc., need to be organized for health care professional students to enable them to gain knowledge about cardiac arrest and its management. Our study concludes that every healthcare professional student should be knowledgeable about cardiac arrest and able to manage it in an emergency condition to save the precious life of the victim.

Declarations:

Ethics Approval:

Permission was obtained from the **Human Institutional Ethical Committee (IEC), MMCHRI, Kanchipuram**, Approval Number (MMCH & RI IEC/UG/01/JUNE/22).

It certifies that the study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Consent To Participate:

Informed Consent - I hereby consent to participate in this online survey on "STUDY ON KNOWLEDGE OF CARDIAC ARREST AND ITS MANAGEMENT" of time from participating in this activity.
525 responses

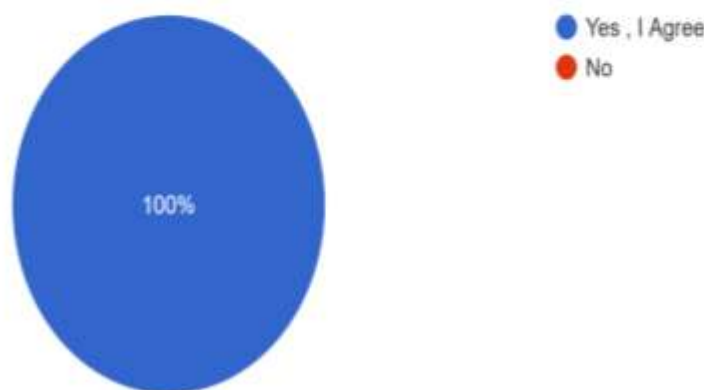


Figure 10:- Represents the consent of health care professional students participated in the study (Figure 10).

Written informed consent was obtained from all participants and from a parent and/or legal guardian.

Availability Of Data And Materials:

The datasets generated during and/or analyzed during the current study are available at the <https://docs.google.com/spreadsheets/d/1HUEzjcAPDSfTjiRTi-Fwqrf43-013IQCaxafoIXLFdM/edit?usp=sharing>

Competing Of Interest

The authors declare that they have no competing of interest.

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None.

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