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A Study on Paramedic Students' Proficiency in Cardiac Resuscitation Techniques

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ABSTRACT

Purpose: Cardiac arrest accounts for 15-20% of all fatalities, making it a major public health concern. Prompt cardiopulmonary resuscitation (CPR) can dramatically minimize the risk of sudden death. Significant members of the healthcare delivery team are thought to have mastered the core skills and knowledge necessary to do CPR. The study aimed to assess CPR knowledge and competence among paramedical students.

Methods: This study employed a cross-sectional survey design, Data were collected using a structured questionnaire administered through Google Forms, allowing for efficient and wide-reaching distribution among participants. The questionnaire included sections designed to evaluate both theoretical understanding and perceptions regarding CPR practices.

Results: Out of 413 participants, 388 paramedical students from five departments—Radiological Imaging Techniques (RIT), Medical Laboratory Techniques (MLT), Optometry (OPT), Forensic Sciences (FS), and Anesthesia and Intensive Care Technology (AICT)—completed the questionnaire. The distribution of participants was as follows: RIT (33%), MLT (27%), OPT (22%), FS (13%), and AICT (5%). Students from the RIT department achieved the highest percentage of correct responses (50.3%), followed by MLT (48.7%), OPT (48.2%), AICT (47.6%), and FS (46.3%). These findings suggest that students in Radiological Imaging Techniques possess greater knowledge of CPR compared to those in the other four programs.

Conclusion: The findings of this study indicate that among paramedical students, those enrolled in the Radiological Imaging Techniques (RIT) program demonstrated the highest level of knowledge regarding cardiopulmonary resuscitation (CPR), outperforming their peers from Medical Laboratory Techniques, Optometry, Anesthesia and Intensive Care Technology, and Forensic Sciences. While overall knowledge levels varied across departments, the results highlight a need for enhanced CPR training and education across all paramedical disciplines to ensure consistent competency in life-saving procedures. Strengthening CPR instruction in curricula could significantly improve preparedness and response in emergency situations among future healthcare professionals.

Keywords: *CPR: Cardio Pulmonary Resuscitation, Cardiac Arrest, ABC: Airways, Breathing Circulation, CAB Chest Compression Airways Breathing*

1. INTRODUCTION

Cardiopulmonary resuscitation (CPR) is a life-saving therapy that keeps patients alive until more treatment can be delivered. Basic CPR skills are crucial for paramedical care workers. If not treated quickly, it can lead to sudden cardiac death.

The American Heart Association (AHA) refers to cardio-pulmonary resuscitation (CPR) as a link in the "chain of survival". It is understood that prompt and effective cardio-pulmonary resuscitation increases a patient's chance of survival after a cardiac arrest by a factor of two to three [7, 13-16]. Guidelines for resuscitation during cardiac arrest are frequently released by the American Heart Association (AHA). For people to understand how to conduct CPR properly, it also provides certification courses (Basic Life Support and Advanced Cardiac Life Support). The American Heart Association (AHA) and the Sudden Cardiac Arrest Association (SCAA) define cardiac arrest as" the suspension of mechanical activity of the heart, leading to absence of pulse, unconsciousness, and temporarily suspension of breathing" One of the main causes of death worldwide is cardiac arrest [2, 11]. Cardiopulmonary arrest is divided into two types: in-hospital and out-of-hospital. CPR is a modern medicine lifesaving procedure that consists of a set of lifesaving actions that improve survival rates following CPR [3–5, 8]. Later, it was discovered that many of these instances occurred outside of the hospital setting and that bystanders who witnessed the event were required to provide early CPR.

As a result, CPR is considered a skill for everyone. Victims, who receive bystander CPR immediately, even in the absence of expert assistance, have a higher quality of life. According to studies, performing CPR immediately after collapsing due to ventricular fibrillation doubles or even triples the chances of survival. Several papers [1, 4–6, 9, 10]. In recent years have revealed shortcomings in CPR quality, both out-of-hospital and in-hospital, which have been addressed in part by the most recent CPR guidelines. It is essential that all medical personnel understand CPR in order to save lives and improve the general level of community health. However, lack of confidence among medical students in doing CPR has been recorded across Europe. Inadequate CPR knowledge has also been documented among medical students from Switzerland and Pakistan. Previously, the ABC (Airway, breathing, and circulation) approach was used. However, according to 2010 AHA guidelines, it was renamed to CAB (Chest compression, airway, and breathing). As a result, training strategies should be used, as poor training among undergraduate medical students has also been found in the United Kingdom and Poland. CPR education for emergency medical personnel and the general public has boosted patient survival rates.The importance of health workers knowing how to perform basic and advanced life support cannot be overstated, as they frequently meet such a circumstance in their practice.

2. METHODS

This study was carried out to explore paramedical students' knowledge of CPR, which will aid in recognizing gaps and further developing medical education protocols in this regard. It also analyzed their opinions toward CPR.

Inclusion Criteria: The study included paramedical college students who were actively enrolled in specific academic programs related to healthcare. Eligible participants were those pursuing studies in Radiological Imaging Techniques, Optometry, Forensic Sciences, Medical Laboratory Science, and Anesthesia and Intensive Care Technology. Only students currently attending courses within these disciplines at the time of data collection were considered for inclusion in the survey.

Exclusion Criteria: Diploma students and non-medical students were excluded. That student had not acknowledged having an interest in the project.

Study Duration: The researchers conducted this questionnaire-based study from February 2024 to September 2024. This prospective, comparative, and questionnaire-based study was designed and conducted among paramedical students to determine the amount of information available regarding CPR.

The University's institutional ethical committee, Moradabad-226026, U.P., India, accepted the study. Written informed consent was obtained from all participants before to completing the questionnaire. A total of 413 students took part in the study. Before the study began, each participant provided informed consent. There were three sections of questions. In the first section of the questionnaire, demographic information such as name, gender, program, and year was requested. The second questionnaire asked about participation in any CPR course and thoughts towards including CPR in the undergraduate paramedical curriculum. The third segment of the questionnaire used straightforward questions to assess the participant's adequate theoretical and practical understanding of CPR.

3. RESULT

Out of 413 students, 388 filled the questionnaire, of which 240 (62%) were males and 148 (38%) were females as shows in Figure 1. In 388 respondent, 129 (33%) students of Radiology and Imaging Technology, 103(26%) were students of Medical Laboratory Techniques, 87(22%) were students of

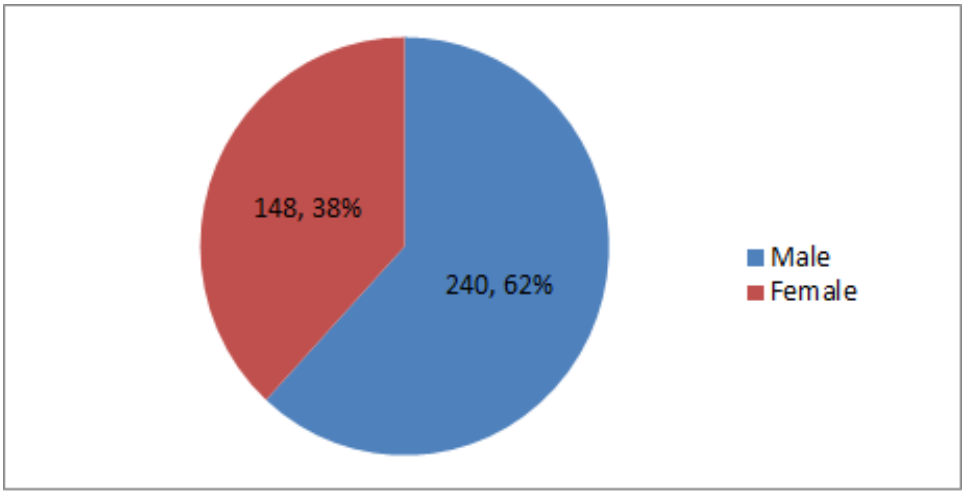

Figure 1: Show the ratio of male and female students.

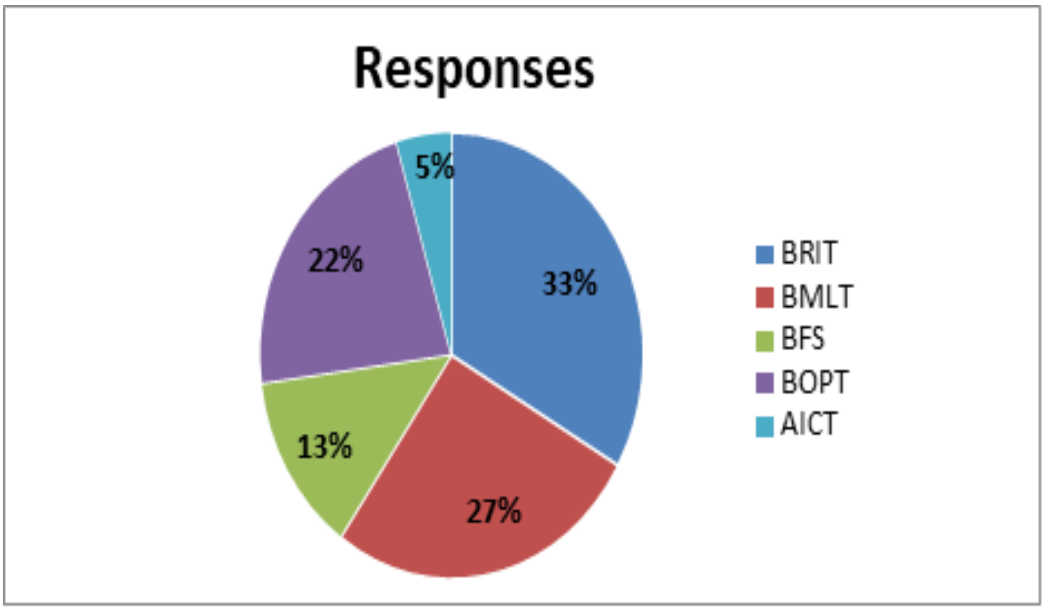

Figure 2: Represents the percentage of total number of respondents according to course

Optometry, 51(13%) were students of Forensic Sciences, and 18(4%) were students of Anesthesia and Intensive Care Technology see Figure 2.

The correct replies demonstrated that a significant number of participants understood the general concept of CPR. A substantial proportion of participants were aware of the maneuver's acronym, purpose, and significance. On the contrary, a large majority of participants answered wrong to questions about CPR skills.

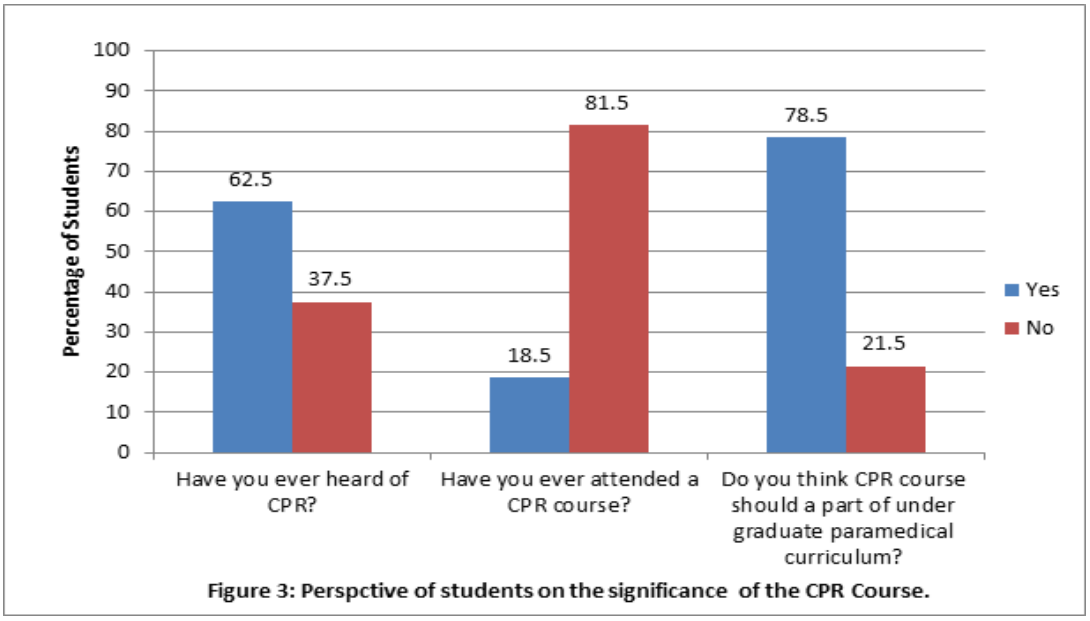

Figure 3: Perspctive of students on the significance of the CPR Course.

The questionnaire considered of 15 questions, together with total percentage of right answers from different respondent categories as shown in Table 1. At the end of the study, after analysis following results was observed for the first question (What does CPR mean?) 73% of respondents knew CPR. For the second question (What are the CPR requirements?) it is observed that 62.7% of students gave the correct answer. For the third question (What happens when a victim stops breathing?) 64% of participants knew about it. What happens when a victim stops breathing? To answer the fourth question, only 24.2% of participants gave the right response. Approximately 72.3% of students knew the fifth question: why should you learn CPR? In response to the sixth question, Hand's location for CPR in adults: 47% of students gave the right answer, and a large number of students were unaware of it.

In response to the seventh question, Chest compression rate in adults: 49.9% of students gave the correct answer. Only 29.6% correctly answered the eighth question, the Adult's chest compression depth. Adult chest compression to ventilation ratio: 48.5% are aware of it, according to the ninth question. Only 26.9% correctly answered the tenth question, Infants' Rescue Breathing. The eleventh question, Chest compression to ventilation ratio in children, was correctly answered by only 32.6% of those questioned. The twelfth question, Infants' chest compression depth: received only 48.7% correct answers. The thirteenth question, in a witnessed out-of-hospital cardiac arrest, the correct order of events during resuscitation was correctly answered by only 30.6% of the questioned. In response to the fourteenth question, refusing to conduct mouth-to-mouth CPR. What comes next? It has been found that 52.5% of the people answered correctly. In response to the fifteenth question,

"No signs of life" indicates: 64.2% of the students correctly replied.

Table 1: Show total percentage of right answers observed from different respondent categories (Percentage of correct answer out of 388)

Questions	BRIT 129	BMLT 103	BOPT 87	BFS 51	AICT 18
Q1	75.5%	73.2%	72%	70%	73.1%
Q2	65.1%	64%	63.4%	60.2%	61%
Q3	66.5%	64.5%	62%	61%	66%
Q4	27.5%	24.6%	23.7%	22.9%	23%
Q5	73.2%	72%	72.5%	71%	73.2%
Q6	49.5%	48.3%	48.1%	44%	46%
Q7	50.4%	45%	48.4%	45%	46%
Q8	32.2%	31.2%	29.1%	27%	28%

Q9	49.5%	49.2%	48.3%	48.1%	47.8%
Q10	28.5%	28.1%	26.7%	25.6%	26%
Q11	34.5%	33.2%	32.1%	31%	31.5%
Q12	50.3%	49.7%	49.3%	47%	47.5%
Q13	33.2%	30.4%	30.5%	29%	30.3%
Q14	54.2%	52.4%	53%	51%	52%
Q15	65.5%	65.1%	64%	63.1%	63.5%

4. DISCUSSION

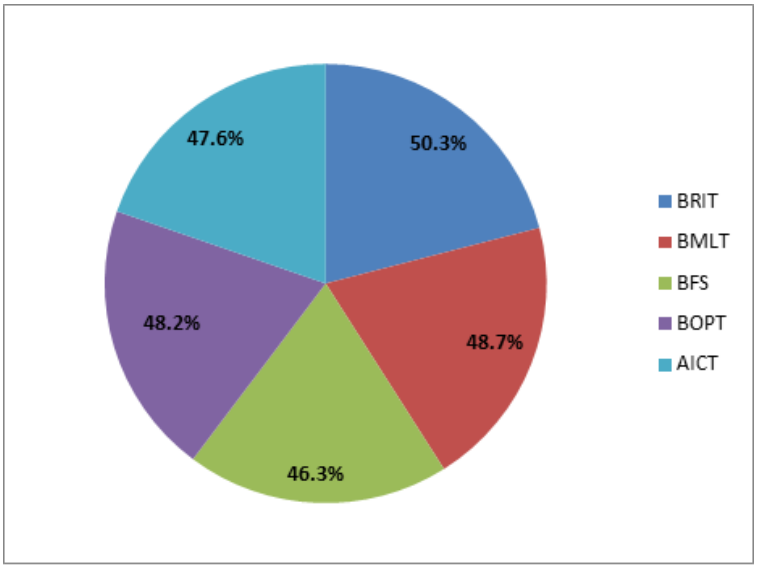

Figure 4: Shows the mean value of respondents

Health practitioners should have excellent CPR/BLS knowledge and abilities, how-ever there is a significant problem with skill retention and obsolete information. The purpose of this study was to investigate the current CPR knowledge of our college's paramedical students in order to develop a CPR training strategy. In this study analysis of knowledge and skills of cardiopulmonary resuscitation and calculated the mean value of respondents who answered correctly and observed that 50.3% of BRIT students, 48.7% of BMLT students, 48.2% of BOPT students, 46.3% of BFS students, and 47.6% of AICT students knew about CPR as shown in figure 4.

CPR knowledge was present in more than 60% of students. On the contrary, a large majority of participants answered wrong to questions about CPR skills. More than 60% correctly answered the questions first, second, third, fifth and last, which were about CPR awareness. < 50% of students correctly answered the remaining question. A substantial proportion of research participants (78.5%) said that CPR should be included in the undergraduate curriculum. It is also true that training in resuscitation skills after graduation is challenging. The majority of cardiac arrests happen at home or anywhere other than hospitals. Therefore, bystander CPR is extremely important. In our study, we found that 93% of

paramedical students did not believe that bystanders should do CPR without any prior training. The understanding of the paramedical students in the current study is insufficient to provide the recommended CPR. Therefore, appropriate measures should be done to raise the level of training for paramedical students. The paramedical students' overall view of the CPR training is favorable, nonetheless.

5. CONCLUSION

The study found that paramedical students have a positive attitude towards CPR, but their knowledge and practice scores are low. To solve this issue, CPR teaching should be incorporated into the curriculum. Paramedical students need repeated education and demonstrations to build practical knowledge. This study suggests that paramedical students should participate

in CPR training programs, including webinars and guest lectures.

Limitations: The current report has a number of flaws. First, a small sample of students was questioned. Second, these individuals shared an academic atmosphere because they attended the same college. Without a question, there has been a significant movement in understanding. However, it is not used in the paramedical curriculum for students. As a result, extra research is required to back up our statements.

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Conflict of interest: The authors declare that there is no conflict of interest.

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