



## **Effectiveness of Remote Simulation amongst EMS Professionals in Pune, India**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

**Introduction:** The Sars CoV2 virus has spread havoc claiming millions of lives in its wake and the world health Organization (WHO) had declared it as a pandemic in 2020. Though medical education and clinical training has always laid more emphasis on face – to- face teaching and physical skill based hands-on training, lately various e-learning tools have become popular as teaching pedagogy due to the restriction of social distancing in the current COVID scenario. Simulation based learning plays a very important role in adding to non-technical skills and management of patient as a whole. Simulation through remote mode has gained major precedence in these last few years especially since the onset of COVID. The present study seeks to know the effectiveness of a single remote simulation session amongst Emergency Medical Services (EMS) professionals

**Objective:** To assess the effectiveness of remote simulation in the management of cardiac arrest amongst EMS professionals.

**Study Design:** Cross Sectional Descriptive Study.

**Place of Study:** Symbiosis Centre for Health Skills (SCHS), Pune India in September 2021.

**Materials and Methods:** The present study was conducted in September 2021, amongst 80

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Emergency Medical Professionals (EMPs) from Pune, India. American Heart Association (AHA) – Pre-course Self-Assessment Questionnaire for the year 2020 was utilized for the study to assess ECG interpretation competency among EMS Professionals before and after a remote simulation session.

**Results and Discussion:** Time is of essence in a cardiac arrest scenario as any delay can cause exponential rise in the mortality rate. The COVID 19 era has severely restricted bedside learning and on site simulation. A healthy alternative has emerged in the form of remote simulation, which can ensure continuity of learning along with mitigation of the disease spread.

**Conclusion:** The findings of the study are encouraging and should be followed up with larger sample size and multiple remote simulation sessions to gain further insight into the effectiveness of this unique tool. The COVID 19 era has severely restricted bedside learning and on site simulation. A healthy alternative has emerged in the form of remote simulation, which can ensure continuity of learning along with mitigation of the disease spread.

*Keywords: COVID 19; e learning; remote simulation; EMS professionals.*

## 1. INTRODUCTION

The Sars CoV2 virus has spread havoc claiming millions of lives in its wake and the world health Organization (WHO) had declared it as a pandemic in 2020 [1]. It had brought everything to a standstill and had disrupted the routine life and activities. One of the most significantly affected areas due to this was the mode of delivery of education and provision of practical skill based trainings. Many unique ways of imparting education and skill based training were introduced during these period. The most significant being the use of remote platforms to carry out online skill based training which has proved to be of vital importance [2-3].

Though medical education and clinical training has always laid more emphasis on face – to-face teaching and physical skill based hands-on training, lately various e-learning tools have become popular as teaching pedagogy due to the restriction of social distancing in the current COVID scenario. Computerized simulation education products and virtual simulation-based solutions have helped to provide the necessary tools required for training of healthcare professionals [4-5].

Simulation is a technique, not a technology for practice and learning that helps in amplifying the real life situation by replicating substantial aspects of the real world in a controlled workshop environment [6-7]. Simulation based learning plays a very important role in adding to non-technical skills and management of patient as a whole. Simulation-based training has become an essential aspect in developing the skill and competency of healthcare professionals and plays a significant role in management of

emergency medical crisis situation [8]. Simulation through remote mode has gained major precedence in these last few years especially since the onset of COVID.

Laurent et al [9] in 2018 defined remote simulation as Simulation performed with either the facilitator, learners, or both in an offsite location separate from other members to complete educational or assessment activities. Shao et al [10] in a study in 2018 concluded that video-enabled remote simulation training is a low-cost, feasible, and effective method to disseminate clinical skills to critical care practitioners in diverse international settings. Several studies have shown that using technology to facilitate dissemination of skills using online teaching can achieve results similar to those achieved using traditional instructional methods [11].

A study conducted by Lateef F [12] in 2010 concluded that training in a simulated environment offers additive benefit by enhancing performance and reducing errors. Beneria A et al [13] in a study in 2020 reaffirmed this wherein they concluded that simulation based activity tends to lower the level of stress amongst healthcare professionals during COVID 19.

The present study seeks to know the effectiveness of a remote simulation session amongst Emergency Medical Services (EMS) professionals.

## 2. OBJECTIVE

To assess the effectiveness of remote simulation in the management of cardiac arrest amongst EMS professionals.

### 3. MATERIALS AND METHODS

The present study was conducted in September 2021, amongst 100 Emergency Medical Professionals (EMPs) from Pune, India. Pre-course Self-Assessment Questionnaire of American Heart Association (AHA) for the year 2020 [14] was utilized for the study to assess ECG interpretation competency among Emergency Medical Professionals before and after a remote simulation session.

The original tool consisting of 60 items was modified and 20 items relevant to management of cardiac arrest were retained. The final questionnaire consisted of 6 items to test the competence of EMS professionals with regards to ECG interpretation, 4 items regarding pharmacology and 10 items on general management of ACLS cardiac arrest scenario.

The respondents were provided with pretest questionnaire following which they attended a remote simulation session on Management of cardiac arrest as per AHA protocol. The session lasted for 60 minutes. This was followed by posttest questionnaire of the same items. Each correct answer was awarded a score of 1. Hence, the individual score could range from minimum 0 to maximum 20.

The questionnaire was administered to the respondents through online mode. Informed consent was taken from the respondents prior to the administration of the questionnaire. Any queries pertaining to the questionnaire were clarified during data collection process.

All twenty items were required to be mandatorily filled. Pre and post Test results were compared using paired sample student T test. The data was tabulated and statistically analyzed with the help of SPSS version 23.

### 4. RESULTS and DISCUSSION

As seen above, majority of respondents had work experience of less than 1 year. This was reflected in the low pre test scores obtained. Mean Pretest Score (11.03/20) This score also reinforced the need for regular continued medical education sessions for working professionals.

There was significant improvement in the posttest scores (14.32/30, p value-0.0000000002) after a single session of remote simulation.

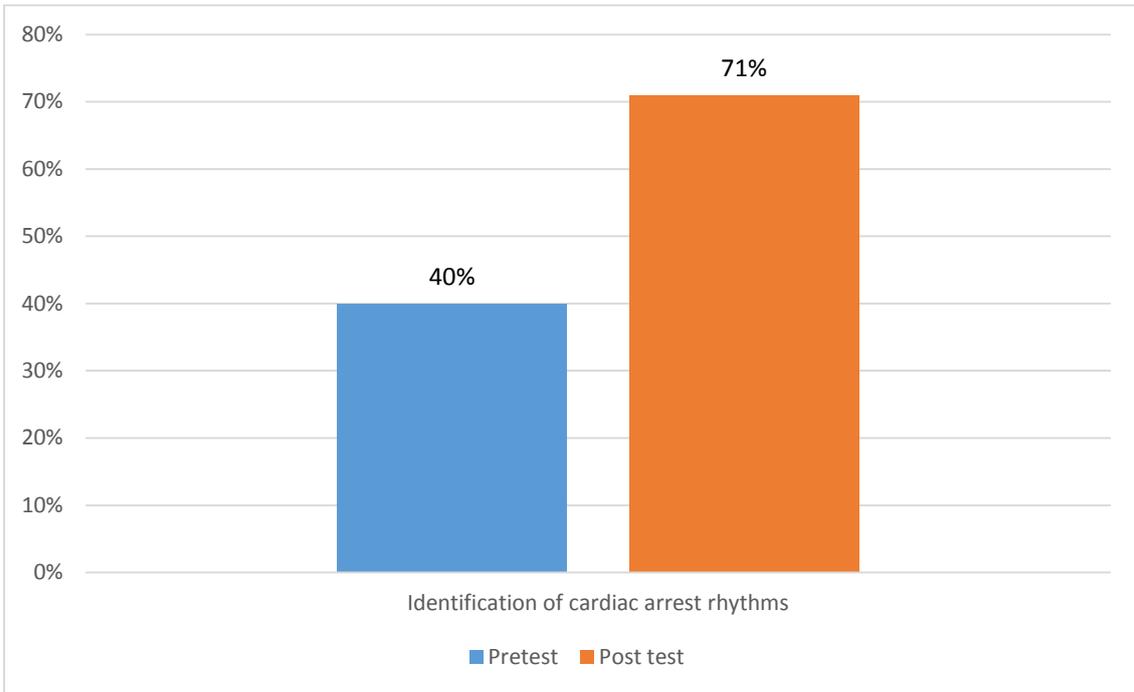
Accurate Recognition of cardiac arrest rhythms is the corner stone of an effective management of cardiac arrest patient. Remote simulation allows for repetitive learning with unique scenarios that improve the exposure of respondents to various cardiac rhythms.

Selection of right emergency drugs play very important role in management of cardiac arrest and it is imperative that the EMS professional must have a thorough knowledge about these drugs for prompt management of patients. Remote simulation offers opportunity to demonstrate actin of drugs on high fidelity manikins in a safe environment [15].

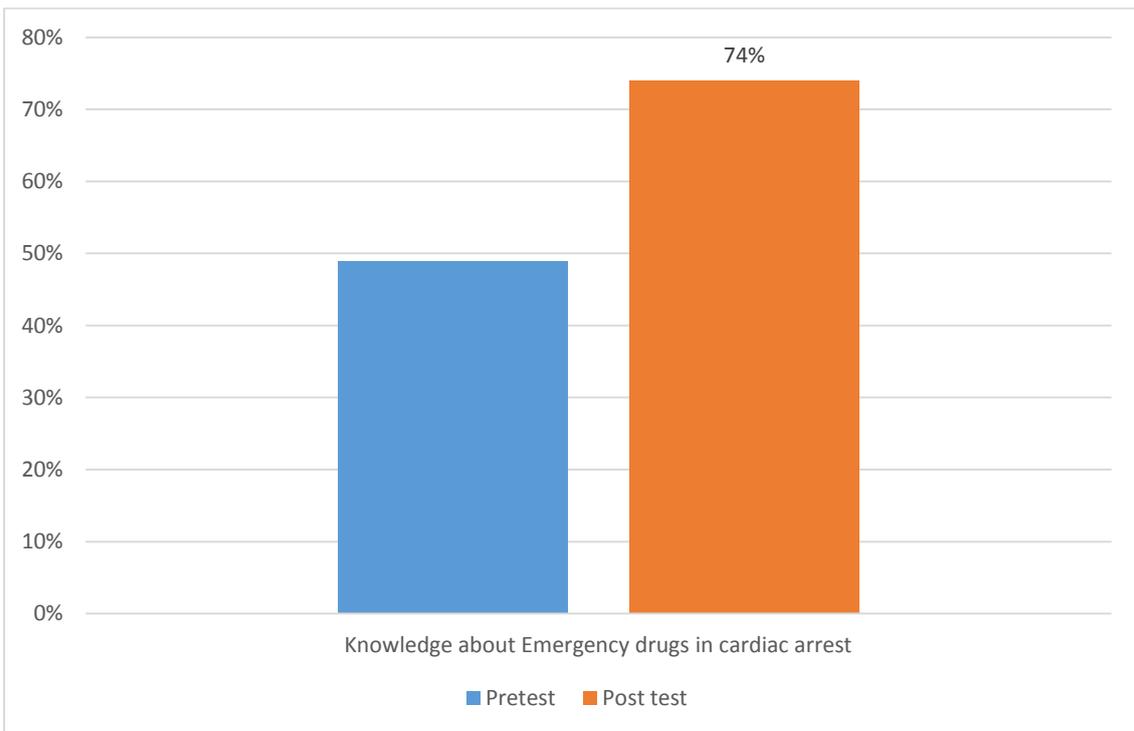
Time is of essence in a cardiac arrest scenario as any delay can cause exponential rise in the mortality rate. Hence, it is expected that EMS professionals should be well versed with the general management principles of cardiac arrest. Live simulations allow the respondent to appreciate the algorithm of management and is much more effective than a didactic lecture [16].

**Table 1. Demographic study profile**

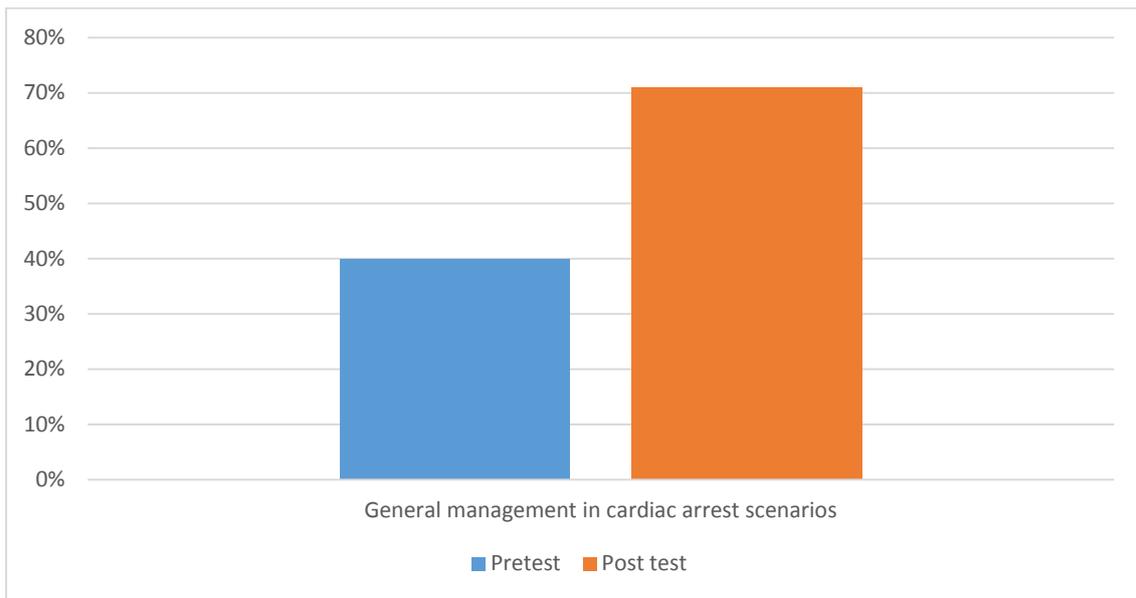
Demographic	Total (n=100)
Age	21-25 years: 60 26-30 years: 37 31-35 years: 3
Sex	Female: 82 (82%) Male: 18 (18%)
Qualification	BHMS Graduate: 51 (51%) BAMS Graduate: 32 (32%) BUMS Graduate: 9 (9%) Others: 8 (8%)
Work Experience	Less than 1year; 59 (59%) 1-3 years: 31 (31%) 3-5 years: 6 (6%) More than 5 years: 5 (5%)



**Fig. 1. Significant improvement in the identification of cardiac arrest rhythms after a session on remote simulation**



**Fig. 2. significant improvement amongst posttest results of respondents with respect to emergency drugs to be used in cardiac arrest**



**Fig. 3. Significant improvement in the posttest scores of the respondents after a session on remote simulation regarding general management in cardiac arrest scenarios**

## 5. CONCLUSION

The findings of the study are encouraging and should be followed up with larger sample size and multiple remote simulation sessions to gain further insight into the effectiveness of this unique tool. The COVID 19 era has severely restricted bedside learning and on site simulation. A healthy alternative has emerged in the form of remote simulation, which can ensure continuity of learning along with mitigation of the disease spread.

## CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

## ETHICAL APPROVAL

Ethical Clearance has been obtained from IEC, SIU.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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