# Assessing outcomes of resuscitation training in hospitals

A sudden cardiac arrest is the leading cause of death, both in hospital and outside hospital. Cardiovascular disease accounts for nearly 3.9 million deaths in Europe every year.[1] Ischaemic heart disease resulted in 8.8 million deaths worldwide and 2 million deaths in Southeast Asia in 2015.[2] In India, the prevalence of ischaemic heart disease is increasing dramatically and so is the incidence of sudden cardiac death. In a hospital, a cardiac and respiratory arrest may occur in critically ill patients from myriad reasons such as myocardial infarction, infections and trauma.

Deficient resuscitation skills of nurses and doctors is a risk factor responsible for poor outcome after cardiac arrest.[3] Death after sudden cardiac arrest should not necessarily have to be the outcome in a hospital environ when good resuscitative facilities and trained workforce are available. After cardiac arrest, every minute counts, and thus, it is pertinent that effective cardiopulmonary resuscitation (CPR) is initiated as early as possible. Trained medical workforce with skills in CPR plays a pivotal role in ensuring patient survival after cardiac arrest in the hospital.

In 1990, in a landmark meeting at Utstein Abbey in Norway, it was first recognised that cardiac arrest survival was a neglected field and no data on resuscitation was available. There were no clear definitions, and there was no consistency in survival after a sudden cardiac arrest. Thus, began an effort to develop an evidence-based universal guideline for CPR. A uniform data reporting system was developed by consensus and the same published in 1991.[4] It is now well recognised that outcomes after cardiac arrest improve significantly when protocols and guidelines are followed.[5] A number of CPR guidelines have been framed across the world thereafter, and global alliances formed to collate data, formulate guidelines and develop effective training modules. Structured algorithms are easy to teach/learn and are more acceptable. However, their acceptance by the general public is better if they are customised to the local conditions. Simple CPR algorithms, tailored for the Indian subcontinent, were recently framed by the Indian Society of Anaesthesiologists, which are focused on training layman and paramedics with uncomplicated, easy to remember, algorithms.[6-8]

Effective early bystander CPR, provided immediately on detection of cardiac arrest, doubles a victim's chance of survival in out-of-hospital settings.[9] The survival rate of patients with in hospital cardiac arrest remained unchanged for many decades. Introduction of mandatory CPR training for hospital staff more than doubled survival rates after cardiac arrest in general wards.[10] When CPR was performed by personnel, with structured training, successful return of spontaneous circulation was reported as 43.9% after in hospital cardiac arrest vis-à-vis 27.1% when performed by untrained personnel.[11] When staff is untrained or when training has lapsed, there is a feeling of helplessness on how to administer CPR in an emergency situation.

In 2003, the International Liaison Committee on Resuscitation Advisory included a hypothetical formula- 'the formula for survival' or the 'Utstein Formula'. The Utstein Formula for Survival from cardiac arrest defines three factors to determine potential survival rates: guideline quality, educational/training efficiency and local implementation.[12] Survival = Guideline quality × education efficiency × local implementation.

Educational efficiency is dependent on CPR quality, simulation, role playing and frequency of training.

The Utstein Formula for Survival is relevant for all medical training as it helps determine strengths and weaknesses in training and education.

To improve survival after an in hospital cardiac arrest, a 'Chain of Survival', must be followed.[13] Most hospitals follow a structured 'code blue' protocol designed to suit their operations. The 'Chain of Survival' is a synergistic effort rather than a single intervention. To run an efficient resuscitation chain protocol, resuscitation education should be based on high-quality structured algorithms and meticulous training. The chain of survival essentially has four links: early access, early CPR, early defibrillation and early advanced care. The audit of the processes in the chain of survival helps find gaps in the training/chain and helps correlate these gaps with survival outcomes. High-quality CPR is a team performance and when performed by a well-trained team looks like a well-choreographed 'ballet', where each member is in synchrony and performs a specific role in the algorithm.[14]

Nurses are the backbone of any hospital facility and are generally the first responders in times of such crisis. They initiate the 'code blue', position patients for effective chest compressions, alert others, gather resources and initiate CPR. In this issue of the journal, Pareek *et al.* present a comparative outcome audit of CPR conducted in a tertiary care centre, before and after formal certified CPR training of nurses. The authors demonstrate significant improvement in survival rates after structured resuscitation training of nursing staff of their hospital.[15] There is an emergent need to ensure high quality structured CPR training of all healthcare workers in our country to improve survival of victims after a sudden cardiac arrest.

Lack of records, audit and analysis of data of 'code blue' resuscitation events have been limiting resuscitation research in our country.[16] Quality improvement programs must provide feedback to the involved personnel following every cardiac arrest, and monthly audit of all 'code blue' events must be done. Records must be meticulously tabulated, and outcomes and deficiencies analysed periodically. There is a need to design a common national CPR data recording chart and to start a National CPR Registry. Analysis of survival outcomes after cardiac arrest and determination of factors hindering successful resuscitation, from the data collected, will help modify and improve our country-specific guidelines.

Training is a process of enhancing skills, capabilities and knowledge of employees. In healthcare, regular training is very important to enhance knowledge and to keep abreast with new research/therapeutic modalities, thereby ensuring improved patient outcomes. Training influences thinking and performance of employees. Training is a continuous and never-ending process. Training can also be a confidence booster. Hospital Accreditation bodies, such as Joint Commission International and National Accreditation Board for Hospitals, have made structured resuscitation training mandatory for all hospital personnel. The level of the training mandated depends on the role of each employee in patient care. With such certified workforce on rolls, hospitals should now collate data, analyse it and thereafter contribute the data to a National CPR registry so that we generate India specific CPR outcome data.

*Mukul Chandra Kapoor*

Department of Anesthesia, Max Smart Super Specialty Hospital,
New Delhi, India
E-mail: mukulanjali@gmail.com

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