



# Characterization and Identification of Mistakes and Errors Made by Clinic Staffs During Cardio Pulmonary Resuscitation

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## Abstract

**Background:** Performing cardio pulmonary resuscitation at hospitals by clinic staffs requires skills, knowledge, precision, and speed for obtaining proper results. The main purpose of the present study was to identify mistakes and errors that occur during cardio pulmonary resuscitation by clinic staffs.

**Methods:** The present study was observational and was performed between years 2014 and 2016, in a way that the researchers, as presenting the resuscitation code, observed patients, who had cardiac arrest, and recorded all actions performed by the clinical staff. The sampling method of the study was convenient sampling and was performed for 48 cases of CPR. Collected data were analyzed without mentioning the patients' and hospitals' name.

**Results:** Most common and important errors or mistakes made during CPR included treating monitors instead of patients, problems in identifying proper equipment, ignoring clinical symptoms of the disease, such as agonal gasp, deciding to terminate the CPR, improper placement of the staffs' palm for circulation, and increasing the speed and number of times for circulating. Over hyperventilation, inability in patients ventilation with bag valve mask, wasting time in difficult vein puncture, delay in circulation, inability in realizing actions priority during CPR, broken and out of service equipment, forgetting to check the pulse, rhythm and shock discharge without shock indication, lack of attention to device sync bottom status, device discharge without informing others, and over use and excessive fluid therapy.

**Conclusions:** The obtained results from the present study indicate that level and quality of presenting clinical care in the emergency section in studied hospitals was not at a desirable and acceptable level and indicates lack of proper education and training for clinical staffs and physicians. Educational needs assessment and optimizing human resource, and proper investment are key factors in developing clinical care and can increase efficiency and reduce casualties.

**Keywords:** Cardio Pulmonary Resuscitation, Clinical Staff, Errors and Mistakes, Education

## 1. Background

Cardio pulmonary arrest is the most serious emergency issue, and performing CPR by clinical staff requires skills, expertise, knowledge, precision, and speed. Many factors can affect death rate, one of which is performing a proper and on time CPR (1). Considering the fact that nurses are the first individuals, which clinically visit the patient and can perform resuscitation until arrival of the expert team and equipment, it seems that educating nurses at the beginning of the resuscitation action is necessary (2). Along with educating nurses as the first persons, who

visit the patient in emergency situations with cardio arrest, until arrival of the resuscitation team, they can play a key role in serious emergency situations (3).

Researchers believe that factors, including expert clinical staff, urgent access to equipment, existence of an efficient connecting line, organizing and effective leadership are necessary for providing the life cycle in hospitals. Deficiency in any of these factors can cause problems in the resuscitation procedure (4). Results obtained from a study at Imam Khomeini Hospital showed that lack of qualified staff related to the resuscitation procedure and any devia-

tion from standard protocol, recommended by the American Cardio Society, and also lack of organization and inconsistency between operating staff during resuscitation procedures, can be a cause of obtaining weak results related to CPR procedures (5).

There is no reliable record related to proper and successful CPR operation in Iran, yet published statistics reported that amongst 96.8% staffs, who performed the resuscitation procedures, only 9.7% had the proper skills in performing CPR (6). Factors, such as lack of trained and expert staffs (6), physicians and other staffs' unaccountability, not being familiar with resuscitation algorithms, and weak performance of leaders were the most possible causes of failure in most of CPR operations (7).

In the recent years many advances have occurred in techniques and drugs used in CPR and the skills of health care workers. However, the mortality rate after cardiac arrest is still high compared to other cases. Past studies have enumerated several factors that can affect the quality of cardiopulmonary operations within the hospital and skills and training is one of them (8, 9).

Team work is a requirement and important factor for patient safety, especially, when team members have acceptable accountability and are well familiar with their duties during the resuscitation procedures, and leads to less mistakes from the operation team (10). Performing the CPR operation need staffs with acceptable accountability, knowledge, skills, and proper acting speed. The main purpose of the present study was to identifying mistakes, which are made by operation team members.

## 2. Methods

The present study was observational and descriptive (cross sectional), and performed between 2014 and 2016, in a way that the researcher observed the resuscitation code and performing of the CPR operation and recorded all observations and actions performed by clinic staff. A checklist was used for gathering data, the reliability of which had been confirmed in advance, with a Cronbach alpha of 0.89, and was based on CPR instructions reported by the American cardio pulmonary society (1, 11). The researchers compared actions performed by clinical staff and what was mentioned in the instructions and then recorded mistakes made by them. The sampling method was convenient and was applied for 48 cases of CPR. In this study, all clinical staffs involved in the CPR operation were chosen as the target group. Data were collected and analyzed without mentioning the hospital's name, and using inferential and descriptive statistics and analyzed using SPSS version 18 and t-test. After performing the above-mentioned tests and analysis, all statistical values less than 0.05 were considered

meaningful. All individual information related to the clinical staffs were not reported and obtained results were published based on secrecy.

## 3. Results

Of 48 cases of resuscitation, 28 were male and 20 were female. Average age of the patients was 48.3 with minimal age of three and the maximum age of 82. There was no meaningful relationship between demographic variables, including age and gender. The same results were obtained for the relationship between personnel background and mistakes during CPR. However, there was a meaningful relationship between education level of studied persons and personnel involved in CPR and the quality of attended CPR and mistake rate during the operations. The mentioned meaningful relationship was in a way that persons with higher education level made less mistakes. There was also a meaningful relationship between resuscitation quality and mistakes in two groups of physicians and nurses. Table 1 demonstrates the most common and important mistakes made during cardio pulmonary resuscitation.

## 4. Discussion

No meaningful relationship was observed in the present study between personnel career background and under study physicians and nurses' groups with mistakes made during CPR operations and procedures. Although, a meaningful relationship was observed in the above-mentioned factors in a study performed by Pourteimoor et al. (12), yet academic education level had not been investigated in that study. A meaningful relationship was observed between academic education level and major of the under study persons and also education and major of the shift personnel in case of quality of the performed CPR and mistake rate, in a way that, anesthesia technician provided a CPR with higher quality and lower mistake rate. A study performed by Kavosi et al. regarding the "obstacles on the way of success of resuscitation team in CPR operation in nurses point of view" indicated no meaningful relationship between academic education level of the studied individuals in answering questionnaires (13). Some cases mentioned influence of anticipation, including having at least one experienced anesthesia staff, such as anesthesia technologist or specialist, in the CPR operation (4).

One of the most important issues identified in the present study was management deficiency. Lack of being informed of duties and responsibilities and lack of consistency or effective cooperation were the subsequent consequences. Lack of communicating skills between team

**Table 1.** Most Common and Important Mistakes Made During Cardio Pulmonary Resuscitation

Factors	Abundance	Percentage
Treating the monitor instead of patient	10	20.83
Lack of assessment of victim's level of consciousness (pulse, calling victim)	12	25
Lack of identifying proper equipment including size, blades ,...	13	27.08
Not paying attention to clinical symptoms including agonal gasp and terminating CPR	23	47.92
Placing the palm in the wrong place during circulation	21	43.75
Hyper ventilation more than usual	28	58.33
Inability in patients ventilation with bag valve mask by non-anesthesia personnel	37	77.08
Wasting time on difficult vein puncture, delay in circulation, inability in realizing actions priority during CPR	11	22.92
Excessive fluid therapy	14	29.16
Lack of knowledge in medicine dosage use through trachea	10	20.83
Inability in realizing actions priority during CPR	24	50
Not checking pulse and shock discharge	9	18.75
Not discharging shock to the patients and not paying attention to sync bottom of the device	6	12.5
Shock discharge without informing others	8	16.66
Placing shock pedals in the wrong place	11	22.92
Contacting the patient with metal parts during discharge	8	16.66
Tubing by non-anesthesia technicians	13	27.08
Not paying attention to flowing oxygen connected to the bag valve	14	29.16
Increasing number and speed of circulation more than usual	18	37.5
Not using the resuscitation board	33	68.75
Out of service devices, including suction and monitoring device	12	25
Deviation from standard situation in emergency Tralee	6	12.5
Out of access devices including pulse oximeter	17	35.42
Out of access stuff including bag valve mask	8	16.66
Not being informed of duties	14	29.16
Dictatorship of the team leader	22	45.83
Preventing from drug delivery and delay in presence	5	10.42
Inconsistency	16	33.33
Lack of presence of security forces in the operation place during CPR	20	41.66
The absence of CPR doctors or delayed presence	14	29.16

members would cause obstacles against success in CPR operation. Mellick and Adams proved that existence of communication skills in team members can affect the CPR quality (14). Hunziker et al. reported that ineffective communication between team members could cause failure in CPR (7). The solution to this problem is inter-professional training. Inter-professional training and education is a method, by which physicians learn from each other for better patient care (15). The American Institute of Medicine, recommended in 2003, that all physicians should participate in patient oriented training and learn as a member of a

team with emphasis on training based on observations, approaches for improving education information and quality (16). Overall, CPR is one of the important medical acts, which needs cooperation of physicians as parts of a team. Therefore, it seems that the best strategy for providing a high quality cardio pulmonary resuscitation, is inter-professional learning and teaching, while, dictatorship of the leader would cause disappointment of team members and prevents them from participating in an effective and scientific cooperation (17). According to the results obtained from Niknafas et al. (17), maintaining resuscitation

skills can be affected by several factors, such as cooperating in resuscitation. Norris and Lockey indicated that among all factors, which affect resuscitation quality, management, communicating and leadership are the most important (18).

In the present study, the most common mistakes were individual, thus, preventing individual mistakes on patient visits during CPR is only possible by having experts with proper and enough skills and experience for applying suitable management and supervision. Having skillful supervisors and physicians in all shifts can prevent individual mistakes during the CPR operation and also clarifying every one's duty and responsibility can be and improve performance. Of course, it seems that selecting personnel from anesthesia technicians, due to their professional nature for CPR, can be very applicable. In the study of Pembeci, which was about factors affecting patients' survival in Turkey educational hospitals, factors such as level of cardio monitoring, existence of anesthesia technician in the resuscitation team, CPR during official working hours, quick start of cardio pulmonary resuscitation, particularly circulation and immediate intubation, were factors which could increase patients' survival until discharge (4).

Out of service equipment and lack of devices calibration and deviation from standard condition in the emergency room and deficiency in guarantee of personnel safety and security were some of the issues recorded in the current study (management issues), therefore, it is very important to apply a monitoring and supervision system for both equipment and human resources to prevent these kinds of issues. Influence of these factors has been confirmed by various studies. Anderson et al. mentioned four factors affecting management of CPR mistakes, including lack of proper organization related to the equipment, issues related to the equipment (not having enough equipment and out of service equipment), not having the ability in using equipment, and lack of a safe place for using them (19). Wall et al. demonstrated, in an assessment of national medical services in six African countries, that only 8% to 22% of breath supporting equipment related to the resuscitation operation were in access (20). Therefore, it seems that training about how to use equipment and monitoring their healthy condition should be emphasized.

#### 4.1. Conclusions

Results of the present study indicate that the quality of emergency medical service at the studied hospital was not acceptable and the personnel did not have enough education for efficient performance. Needs assessment and optimizing human resource performance and type of effective investment are considered as key factors in development

and improvement of medical services, which can increase efficiency and reduce casualties.

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