

REVIEW

Nurse's Role in the Modern Resuscitation Era

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ABSTRACT

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KEY WORDS: *cardiac arrest;
cardiopulmonary resuscitation;
nursing role; nursing care; witnessed
resuscitation; external defibrillators*

LIST OF ABBREVIATIONS

AED = automated external defibrillator
ACLS = advanced cardiac life support
ALS = advanced life support
BLS = basic life support
CCOT = critical care outreach teams
CCU = cardiac care unit
CPR = cardiopulmonary resuscitation
DNAR = do not attempt resuscitation
(order)
DNR = do not resuscitate (order)
ED = emergency department
ERC = European Resuscitation Council
ICU = intensive care unit
IV = intravenous
MET = medical emergency teams
RRT = rapid response team

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*Manuscript received February 2, 2011;
Revised manuscript received October 4,
2011; Accepted October 21, 2011*

AIM: The aim of the present study was to explore the current literature referring to the new roles of nurses in the modern resuscitation era.

METHODS AND MATERIAL: For the present study, a systematic search of international bibliography from both the review and the research literature was performed to sort out articles mainly over the last several years from the Medline, Medscape and Science Direct databases. Used keywords included cardiac arrest, resuscitation, cardiopulmonary resuscitation (CPR), nursing role, and rapid response nurse.

RESULTS: The review of the literature indicated that improvement in nursing education, increased needs for expert nurses due to the requirements of specialized fields of medicine, and an increase in the autonomy of the nursing role have led to a change in nurses' responsibilities during CPR. Furthermore, the review showed that roles and duties of nurses during CPR are limited mainly in preparing the drugs administered and monitoring the patients' vital signs. Regarding nurses' perspectives, a commonly held view is that their role during CPR is slowly but steadily improving. Finally, nurses are perceived by the community as the most capable individuals to perform effective CPR.

CONCLUSION: Nurses should become more active members of the multidisciplinary team during CPR by increasing their knowledge and improving their skills. Nurses working in departments such as Cardiology, Cardiac and Intensive Care Units and Accident and Emergency Departments should be more willing to attend CPR seminars.

INTRODUCTION

Cardiopulmonary resuscitation (CPR) consists of interventions performed in an effort to restore a person's heartbeat.¹ Nowadays CPR efforts do not stop with restoration of spontaneous circulation but also incorporate efforts to preserve function of vital organs (fourth chain in the chain of survival). The event of resuscitation is known as being an extremely stressful experience for health professionals.² Resuscitation is a complex area which requires a multidisciplinary approach and effective teamwork and communication in order to accomplish its goals.³ During CPR, the main roles of the multidisciplinary team are held by the medical and nursing staff, as the rest offer

assistance only when called upon. Therefore, it is essential for teams to show effective communication and professional competence.⁴ Nurses are generally the first responders to a cardiac arrest and initiate basic life support while waiting for the advanced cardiac life support team to arrive.⁵

This study's purpose is to outline the new roles that have been given to nurses in the modern resuscitation era. For this article a literature review was conducted in the databases Medline and CINAHL using the keywords cardiac arrest, resuscitation, CPR, rapid response nurse, and nursing role.

CHANGES IN ROLE

Cardiopulmonary resuscitation is undertaken for all cardiac arrests except where a "do not resuscitate" (DNR) or "do not attempt resuscitation" (DNAR) order has been given for a particular patient.⁶ Although a cardiac arrest may occur in all units and wards in a hospital setting, they are most common in areas such as the Intensive Care Unit (ICU), the Accident and Emergency Department (ED), and the Coronary Care Unit (CCU). Nurses who practice in the cardiac department are more frequently involved with CPR compared to other departments due to the relevance of the unit's interest. Nurses are considered to be the key-person for the success of the entire system of coronary care.⁷

When sudden death occurs, CPR is the final hope for survival, and involves chest compressions and ventilation of the victim, which maintains circulation until normal circulation and ventilation has been restored through definitive therapy.^{7,8} The necessary skills for conducting CPR are taught during the period of nursing education, both theoretically and practically. It has been shown that training in nursing and medical schools is often ineffective to produce professionals capable of performing high quality CPR. As a consequence of this, the requirements for the CCU staff in the U.K. include biannual certification in Advanced Cardiac Life Support (ACLS) and annual certification in CPR.⁷ The European Resuscitation Council (ERC) (1992) has produced guidelines concerning training in Basic Life Support (BLS) and Advanced Life Support (ALS). Besides training guidelines, the council has offered recommendations, which include the following: a) training in BLS should be compulsory in all European medical and dental schools and nurse training institutions, b) hospitals within Europe should provide programs to ensure that all staff involved in direct patient care receives compulsory training and re-training in CPR skills.⁷

Throughout the years, as CPR guidelines are updated, the roles of the multidisciplinary team members are also subject to change. Factors, such as improvement in nursing education, increased needs for experienced nurses due to the requirements of specialized fields of medicine, and an increase noted in the autonomy of the nursing role have led to a change

TABLE 1. Reasons for changes in nurses' responsibilities during cardiopulmonary resuscitation (CPR)

Traditional role of nurses during CPR has evolved due to:

- improvement in nursing education
 - increased needs for expert nurses
 - new requirements in specialized fields of practice
 - increase noted in the autonomy of the nursing role
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in nurses' responsibilities during CPR (Table 1). Therefore, the traditional roles of nurses during CPR which held them responsible for limited duties, such as preparing the drugs administered and monitoring the patients' vital signs, have evolved; hence the nurse has become a more active member of the multidisciplinary team.

CONTEMPORARY NURSING ROLES

Clinical teams are not new to healthcare and hospitals. Various medical response teams were developed and implemented by the army and have been in place for a period of time. To name a few, there are burn teams, stroke teams, cardiac arrest teams, intravenous (IV) start teams, bioterrorism teams, trauma teams and rapid deployment teams that set up triage and field hospitals in national emergencies and warfare. Various models and protocols dictate the structure and roles of each of these teams. Each team requires specialized skills and knowledge. The goal of these teams is to save lives primarily in emergent situations. Adapting these teams, such as "code blue" teams to the hospital setting has resulted in a more comprehensive approach to the care of hospitalized patients.⁹

Although changes have not been made in all health care settings, many hospitals have been experimenting by attempting to implement new strategies. As the role of the nurse continues to expand, the boundaries between what is considered to be medical care and what is deemed nursing care become less obvious.¹⁰ Nurses have been given increased responsibilities that require both high standard knowledge, as well as skills. Among these new roles, the five most widely used are herein mentioned (Table 2).

RAPID RESPONSE NURSE

The response to patients who are critically ill or who are at risk of becoming critically ill is usually provided by medical emergency teams (MET), rapid response teams (RRT), or critical care outreach teams (CCOT).^{11,12} These teams replace or coexist with traditional cardiac arrest teams, which typically respond to patients already in cardiac arrest. Medical emergency teams and RRT usually comprise medical and nursing

TABLE 2. Modern nursing roles during CPR

The new roles are:
• rapid response nurse
• using external defibrillators
• nurse's involvement in CPR decision making (DNAR)
• understanding the drugs used during cardiac arrest response
• nurses and witnessed resuscitation (family support nurse)

CPR = cardiopulmonary resuscitation; DNAR = do not attempt resuscitation (status)

staff from intensive care and general medicine and respond to specific calling criteria. Critical care outreach teams are based predominantly on individual or teams of nurses.¹³

The rapid response teams (RRT) are composed of clinicians who bring critical care expertise to the patient bedside. The purpose of the team is to assess and stabilize the patient, assist with communication among the interdisciplinary care providers, educate and support the staff caring for the patient, and assist with transfer of the patient if necessary. Hundreds of lives are now being saved in hospitals across the world with the use of rapid response teams.¹¹

Rapid response teams first appeared experimentally in 1995 in a hospital in Australia. The concept rapidly expanded to hospitals of many countries once it was believed to increase patient safety.¹⁴ Studies from the introducing hospital indicated that an RRT increased the calls to the emergency team but did not substantially affect the incidence of cardiac arrest or unplanned intensive care unit admissions of unexpected deaths. Later studies showed that there was a 50% reduction in non-ICU arrests, a 58% reduction in unexpected postoperative emergency ICU transfers, and a 37% reduction in unexpected ICU deaths.^{3,9} Implementation of a RRT (which was summoned by a "Code Purple") in a community hospital in Pennsylvania showed that after one year during which 86 "Code Purples" were called, there was a 53% reduction in the number of cardiac arrests of the ED and the ICU.¹⁵

Non-critical care nurses are instructed to call for the RRT when patients display changes in vital signs or mental or respiratory status, or if they feel that advanced assessment skills are necessary.¹⁵ Criteria for calling the RRT are the following:

- Change in vital signs- a low or elevated heart rate, blood pressure, or respiratory rate
- New onset of difficulty breathing
- Change in level of consciousness
- Repeated or prolonged seizures
- Low urinary output
- Acute decrease in oxygen saturation despite delivery of oxygen

The rapid response nurse was first introduced at the

Ohio State University Medical Center, where the manager of the emergency department was asked to develop a team of nurses who could respond to crisis situations.³ Involving a rapid response nurse to the resuscitation team can help with trauma interventions and ensure the continuing of care of ED patients. Possessing critical care skills and critical thinking, the rapid response nurse is beneficial to the trauma resuscitation, as well as to the hospital as a whole.³

The basic job description is the same for any registered nurse, plus at least 2 years of critical care experience in a large ICU setting. The role requires identification of nurses who possess the following qualities:

- Competency for working on several different units
- A capacity to work independently
- Goal oriented
- Self-directed
- Able to identify and set priorities
- Assertive with a positive attitude
- Able to work well with the professional staff

Among the roles of the rapid response nurse besides responding to cardiac arrests and trauma activations, he/she obtains intravenous access, troubleshoots peripherally inserted central catheter lines and other vascular access devices, assists with conscious sedation, and serves as a clinical recourse to staff and administration.³ When trauma activation is called, the nurse can serve in multiple roles. These roles are dependent upon patient condition, staff availability, and intervention requirement during the resuscitation. Having this extra hand for everything, from running blood draws to the laboratory, setting up the rapid fluid equipment, ensuring the patient's family is accompanied to a quiet room, to even documenting patient care, can be essential in a cardiac arrest.

The use of rapid response nurses is a hot topic among healthcare agencies. The goal for the registered nurse in the RRT is not to take over the role of the ward nurses, but to keep them involved and to use this opportunity to teach and mentor more advanced assessment and intervention skills.^{4,9,14} The Ohio State University Medical Center is one that has set the lead for the positive use of these knowledgeable registered nurses. With almost 10 years of trial and tribulations, the rapid response nurse continues to see own role become more defined and productive. Among other tasks, there provides a positive impact on patient care and staff morale, and this is a financially smart approach.³ Furthermore, implementation of such a team at any organization can help build trusting relationships between nurses and ancillary staff along with empowering these staff members.¹⁶

USE OF AUTOMATIC EXTERNAL DEFIBRILLATORS

The outcome from in-hospital cardiac arrest has improved little since the implementation of cardiopulmonary resuscitation 40 years ago. Early defibrillation improves survival follow-

ing ventricular fibrillation and pulseless ventricular tachycardia. The implementation of automatic external defibrillators (AED) and advisory defibrillators has been considered as the answer to defibrillation delays in-hospital.¹⁷

At the time of the 2010 Consensus on CPR Science Conference, there were no published randomized trials comparing in-hospital use of AEDs with manual defibrillators. Two lower-level studies of adults with in-hospital cardiac arrest from shockable rhythms showed higher survival-to-hospital discharge rates when defibrillation was provided through an AED program than with manual defibrillation alone.¹⁸ Despite limited evidence, AEDs should be considered for the hospital setting as a way to facilitate early defibrillation (a goal of <3 min from collapse), especially in areas where healthcare providers have no rhythm recognition skills or where they use defibrillators infrequently.¹²

The Resuscitation Council (UK) recommends that doctors, nurses, medical students and student nurses should be trained to use AEDs to facilitate early defibrillation, and that AEDs should be available to all non-critical ward areas.^{10,17} The nursing position is reinforced by the chief nurse (UK) who, as part of the "National Health Service plan" to raise standards, recommends nurse defibrillation as a basic rather than an extended role.^{19,20} Nurses are key health care professionals for using AEDs in hospitals and for teaching other first responders--inside and outside hospitals--how to use AEDs.²¹ Although the use of AEDs by nursing staff has been suggested and implemented in many hospitals, studies assessing the results of this practice are limited with small sample size.

In order for nurses to initiate defibrillation there is clearly a need for a widespread change in philosophy as well as equipment.²⁰ Simply introducing AEDs may not be sufficient to improve survival. First of all, nurses must accept defibrillation as a primary rather than extended role. The concept of nurse-initiated defibrillation is supported by many nurses.²² Combining AED training with annual BLS training may facilitate the acceptance of defibrillation as a nursing role and assist in its wider dissemination.²⁰

Secondly, it is essential that nurses are trained for the correct use of AEDs. A study showed that although the 15 untrained nurses could deliver a shock with an AED in 68.8 ± 29.2 sec (time \pm SD; range, 40-169 sec), most failed to position the pads correctly (53%) or to follow correct safety procedures (67%). After a standardized training session, the time to deliver a shock improved significantly to 48.5 ± 5.5 sec (range, 41-61 sec, $P < 0.01$) and all subjects placed the pads correctly and followed a safe defibrillation procedure.²³

Concerning the education of nurses, an interesting study was found regarding the trainers' efficiency. Xanthos et al showed that nurses trained by nurses and not by doctors were more focused during training, used AED more accurately and continued cardiopulmonary resuscitation with no delays.²⁴

NURSES' INVOLVEMENT IN CPR DECISION MAKING

Both physicians and nurses play important roles in discussing do-not-attempt resuscitation (DNAR) orders with patients and surrogates. There are several factors that support the involvement of nurses in CPR decision making. As a result of lengthy stays, nurses spend a lot of time with many long-term care patients, and could be expected to have a good understanding of their values and beliefs.²⁵ Nurses are usually the first responders during an in-hospital cardiac arrest, and must either initiate CPR or withhold it. In order to fulfill their role as patient advocates, nurses need to be informed about decisions that affect their patients. Although nurses are infrequently consulted before the CPR decision making process, several studies have reported that they desire greater involvement and they believe they can offer a unique and worthwhile perspective.²⁵

According to a study conducted by Thibault-Prevost et al which assessed the knowledge, the attitudes, and the practices concerning DNAR status distributed to all critical care nurses who were registered with the provincial licensing body in Alberta, Canada, and held positions of staff nurse, educator, or manager, the term "DNAR" was found to be ambiguous.²⁶ The rationale for DNAR orders were also not well articulated in practice. Although nurses believed that patients, families, and nurses should participate in DNAR decisions, physicians were most often cited as being responsible for the decision. A study by Sulmasy et al compared attending internists, medical house officers, and staff nurses' beliefs, attitudes and confidence regarding DNAR discussions.²⁷ According to their surveys, staff nurses were more likely than their physician colleagues to believe they should be allowed to initiate DNAR discussions, were more confident in their ability to discuss DNAR than house officers, and had more positive attitudes. According to Godkin et al, nurses could take a leading role in ensuring that relevant information about CPR is presented and that all patients have the opportunity to discuss their wishes.²⁵ They state that incorporating discussions about CPR into the normal routine might diminish some of the discomfort health professionals may experience when discussing death with patients.

UNDERSTANDING THE DRUGS USED DURING CARDIAC ARREST

Pharmacology education in nursing has become increasingly important as nurses' roles in administering, prescribing and educating patients about medications have grown. Some authors expressed concern regarding the lack of science teaching in nurse education, and others have suggested that there is a theory-practice gap in this area of the curriculum.^{28,29}

During cardiac arrest patient survival depends on a rapid response that provides high-quality treatment based on the latest guidelines. Administration of the correct drugs is an important aspect of this process and one in which nurses are

taking an increasingly important role, both as a member of the RRT, as well as during routine shift. In the modern resuscitation era nurses understand the use of drugs, can explain the rationale for their use, the dosage and any significant problems likely to be encountered.³⁰ Finally, improved pharmacology teaching might increase nurses' confidence in performing drug administration, patient education, and nurse prescribing, and decrease anxieties related to these roles.²⁸

NURSES AND WITNESSED RESUSCITATION

Boyd³¹ describes witnessed resuscitation as "the process of active medical resuscitation in the presence of family members". The idea of witnessed resuscitation originated in 1982 in Foote Hospital, Michigan, USA. Staff members were forced to question their policy of excluding family members during CPR by two separate incidents in which family members demanded to be present.³² The Emergency Nurses Association argues that it is the families who have the most vested interests in the outcome of the procedure and should therefore have the authority to make the decision regarding presence.³³ In 1996, the Resuscitation Council of the UK supported the individual's right to remain with their relative following a sudden life-threatening event which requires active resuscitation.^{34,35}

Despite an estimated 25,000-30,000 resuscitation attempts in Accident and Emergency Departments in the UK each year, a survey by the British Association for Accident and Emergency Medicine and the Royal College of Nursing revealed that less than one in four hospitals allows relatives the option of unrestricted access to the resuscitation room.^{36,37}

The medical staff's views vary. Staff members less experienced are reluctant to accept the concept.³⁸ Chalk states that nurses, compared to doctors, are more open to witnessed resuscitation.³⁹ The issue of witnessed resuscitation is increasingly being discussed among health professionals. Every person involved in the resuscitation team has a personal opinion based on principles and experiences.⁴⁰ Doctors, compared to other professions, are not as ready to allow relatives in the resuscitation room.^{35,41,42} A study conducted by Grice et al showed that 56% of doctors and 66% of nurses surveyed were initially receptive and this improved to 70% and 82% respectively if the relative was accompanied by a trained member of the staff.³⁵ Some fear their skills may be inadequate and will be thought to be incompetent.⁴³ Higgs suggests that they are accused of being more concerned with the outcome of their work, than with the process involved.⁴⁴ He defends their view by stating that successful resuscitation continues life, whereas failure compounds the tragedy. The majority of doctors would consider having witnessed resuscitation, but under controlled circumstances.^{41,45}

Another issue discussed by staff members is anxiety. Day⁴⁶ mentions that staff members cope with anxiety in many ways, using a mixture of humor and detachment from the patient, which are difficult to use in the presence of relatives. Loose

talk and black humor used to defuse a tragic situation may have to be carefully monitored.⁴⁷ Bloomfield is concerned that the resuscitation attempt may be hampered or hindered by the presence of the relatives, and that when resuscitation seems futile it will be hard to stop.⁴³ Rosenczweig and McClenathan et al agree, stating that relatives could impede staff performance by influencing the decision to prolong a futile effort, or pressuring the team to stop an effort prematurely.^{48,49} Although the atmosphere in the resuscitation room must be relaxed, for it helps concentration, relatives cause anxiety which distracts. Relatives may faint or become hysterical, or interfere verbally, emotionally, or physically.^{38,50,51} Opinions like the above should perhaps be taken more into consideration, since they mean that the professional performance of the staff could be negatively influenced. Rattrie mentions that witnessed resuscitation is less likely to bring lawsuits and complaints, as a result of the bond between staff and the relatives, since they see firsthand that all that could be done was done.⁴² This bond also makes communication about death easier for the staff.⁵¹ It can be concluded from this that staff are sensitive when resuscitation is unsuccessful, therefore being witnessed may ease their conscience.

Based on these opinions and experiences, there have been several proposals for initiating witnessed resuscitations. Rattrie and Woning recommend the introduction of the role of a "family support nurse".^{42,50} It would be the responsibility of this staff member to assess and prepare the family during and after resuscitation. Eichorn et al suggest that, first, the staff should decide if the family can cope with the experience and only then offer the option of entering the resuscitation room.⁵²

The general impression families have been given about resuscitation by external factors, such as television series and the media, might influence their decision whether to witness the effort or not. For example, it has been recognized that patients and their families have an unrealistically optimistic impression of the effectiveness of resuscitation.^{35,53} The success rate is overestimated; hence an unsuccessful effort may result in emotional scarring. Preparation for the experience would include giving information on the patient's condition, discussion on what will be seen and heard, the patient's appearance, the equipment used, and the procedures that will be undertaken. The family support nurse would remain with the family throughout the resuscitation, providing information and emotional support and not become involved in the resuscitation.^{45,54,55}

CONCLUSION

All these new roles mentioned herein are on a good experimental track in several hospitals. Although they have not yet been implemented in the Hellenic health care setting, nurses are optimistic that their role during CPR is slowly but

steadily improving. More nurses are interested in continuing education and training, in increasing their knowledge and improving their skills. As a result, nurses that are working in departments such as Cardiology, CCUs, ICUs and Accident and Emergency Departments where events of cardiac arrest are more common are more involved in attending CPR seminars. Finally, in the event of a cardiac arrest, nurses are perceived by the community to be competent and ready to perform effective CPR. Irrespective of their level, nurses have a professional responsibility to maintain competence in CPR through regular updates.

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