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**Research article**

# Assessment of Nurses' Knowledge and Training Needs in Cardiopulmonary Resuscitation (CPR) at Al-Shoumali General Hospital, Babylon, Iraq

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**ABSTRACT:**
**Background:** Cardiopulmonary resuscitation (CPR) is a fundamental life-saving intervention, and nurses play a crucial role in its timely and effective application. However, variability in CPR knowledge, skill retention, and confidence remains a challenge. This study aimed to evaluate nurses' knowledge of first aid related to CPR, identify existing knowledge gaps, and explore factors influencing their competency to guide future educational strategies.
**Methodology:** A cross-sectional survey was conducted using a structured electronic questionnaire distributed to 89 nurses. The questionnaire assessed demographic characteristics and key aspects of CPR knowledge, including basic procedures, patient assessment, hand placement, compression and ventilation ratios, Automated external defibrillator **(**AED) use, airway management, age-specific CPR techniques, and self-reported confidence. Data were collected between April 29 and July 15, 2025, and analyzed using descriptive statistics.
**Results:** Results showed that nurses demonstrated an acceptable baseline knowledge of CPR. While 69.3% correctly identified basic CPR steps and 79.5% recognized proper hand placement, only 39.8% demonstrated adequate knowledge of AED use. Confidence was high for adult CPR (82.8%) but considerably lower for infants (40.2%) and pregnant women (34.5%). A strong demand for additional, practical, and specialized training was reported.
**Conclusion:** Although nurses possess foundational CPR knowledge, notable deficiencies remain, particularly in AED use, age-specific CPR, and confidence in managing vulnerable populations. Targeted and continuous practical training programs are essential to enhance nursing preparedness and improve outcomes in cardiac arrest situations.

**Keywords:**
*Nurses, CPR, First Aid, Knowledge, Confidence, Training, AED.*

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## INTRODUCTION

Cardiopulmonary resuscitation (CPR) is a critical emergency intervention aimed at maintaining cerebral and myocardial perfusion during cardiac arrest until spontaneous circulation is restored or advanced life support is initiated. High-quality CPR has been shown to significantly improve survival rates and neurological outcomes in both in-hospital and out-of-hospital cardiac arrest cases [1]. As frontline healthcare providers, nurses are often the first professionals to recognize cardiac arrest and initiate resuscitative measures, making their knowledge and competence in CPR a decisive factor in patient survival [2].

Globally, cardiac arrest remains a leading cause of sudden death, and timely initiation of CPR can double or even triple survival chances when performed correctly [1]. International resuscitation guidelines emphasize the importance of proper chest compression depth and rate, correct hand placement, minimal interruptions, and early defibrillation using an automated external

defibrillator (AED) [3]. Nurses are expected to be proficient in these skills, as delays or errors in CPR execution can result in poor patient outcomes.

Despite standardized guidelines and widespread CPR training programs, numerous studies have reported inadequate knowledge and suboptimal skill retention among nurses. Research conducted in various healthcare settings has demonstrated that nurses often possess basic theoretical knowledge of CPR but lack competence in advanced components such as AED usage, airway management, and age-specific resuscitation techniques [4].

The use of AEDs is a cornerstone of modern CPR, particularly in cases of ventricular fibrillation and pulseless ventricular tachycardia. Early defibrillation significantly increases survival rates; however, studies consistently report low confidence and limited practical experience among nurses regarding AED operation [3-5]. This gap highlights the need for structured, repetitive training programs that emphasize practical exposure rather than reliance on theoretical instruction alone.

Another critical challenge relates to CPR in special populations, including infants, children, and pregnant women. These groups require modified techniques due to anatomical and physiological differences, yet evidence suggests that nurses demonstrate lower confidence and knowledge in performing CPR for these vulnerable populations [4]. Anxiety, fear of causing harm, and lack of exposure to real-life scenarios further contribute to reduced performance during emergencies.

Continuous professional development, regular refresher courses, and simulation-based training have been identified as effective strategies to improve CPR knowledge retention and skill performance among nurses [5]. Integrating competency-based CPR training into institutional policies is essential to ensure sustained readiness and adherence to international resuscitation standards.

Therefore, assessing nurses' knowledge, confidence, and training needs related to CPR is crucial for identifying gaps and informing targeted educational interventions. Strengthening nurses' CPR competencies has the potential to enhance emergency response effectiveness and significantly improve patient survival outcomes in cardiac arrest situations.

## MATERIALS AND METHODS

***Study Design and Setting:*** A descriptive analytical cross-sectional study was conducted to assess nurses' knowledge, confidence, and training needs regarding first aid for cardiopulmonary resuscitation (CPR). The study was carried out at Al-Shoumali General Hospital, Babylon, Iraq and targeted registered nurses working in different hospital departments during the data collection period.

***Study Population and Sample Size:*** The study population consisted of male and female nurses employed at Al-Shoumali General Hospital. A total of 89 nurses participated in the study and were included in the final analysis. Eligibility criteria included active clinical practice and willingness to participate, while incomplete questionnaires were excluded.

***Data Collection Tool:*** Data were collected using a structured electronic questionnaire specifically designed for the purpose of this study after reviewing relevant literature and international CPR guidelines. The questionnaire comprised close-ended questions, including multiple-choice and yes/no/sometimes responses, and was divided into four main sections:

The questionnaire included a section addressing demographic characteristics, which collected information on participants' age, gender, educational qualification, years of nursing experience, and whether they had previously attended any cardiopulmonary resuscitation (CPR) training courses.

Another section focused on basic CPR knowledge, assessing nurses' understanding of fundamental CPR components. This included initial patient assessment, the correct sequence of CPR steps, appropriate hand placement for chest compressions, recommended compression and ventilation rates, airway opening techniques, and the proper use of an

automated external defibrillator (AED).

The questionnaire also evaluated advanced CPR knowledge and self-reported confidence. This section examined nurses' ability to recognize cardiac arrest, perform artificial respiration, identify indications and criteria for discontinuing CPR, assess pulse in infants, ensure adequate compression quality, and apply age-specific CPR techniques for adults, children, and infants. In addition, it assessed nurses' confidence in performing CPR in special situations, including resuscitation of pregnant women.

Finally, a section on training needs and professional development explored nurses' perceptions regarding the need for additional CPR training and regular refresher courses. It also assessed difficulties in recalling CPR steps, participation in workshops, the need for specialized training for pediatric and infant CPR, utilization of educational resources such as videos and brochures, perceptions of CPR as an essential nursing skill, perceived benefits of interactive training methods, and willingness to participate in mandatory CPR training programs.

***Data Collection Procedure:*** The electronic questionnaire was distributed to eligible nurses during the study period. Participation was voluntary, and respondents completed the questionnaire anonymously to ensure confidentiality and minimize response bias.

***Data Analysis:*** Collected data were exported and analyzed using descriptive statistical methods were applied, including calculation of frequencies and percentages, to summarize nurses' responses and identify patterns related to knowledge levels, confidence, and training needs.

***Ethical Considerations:*** The study was conducted in accordance with ethical principles governing research involving human participants. Participation was voluntary, informed consent was implied through questionnaire completion, and anonymity was strictly maintained. The study involved no invasive procedures and focused solely on professional knowledge and self-reported practices.

## RESULTS

This This section presents the findings of the survey assessing nurses' knowledge, confidence, and training needs related to first aid for cardiopulmonary resuscitation (CPR). A total of 89 nurses participated in the study. Demographic analysis demonstrated a diverse sample in terms of age, gender, educational level, and years of nursing experience. More than half of the participants (52 out of 88; 59.1%) reported having previously attended at least one CPR training course.

Overall assessment of CPR knowledge revealed variable levels of understanding across different CPR components. Approximately two-thirds of the nurses (69.3%) reported knowing the basic steps of CPR, while 21.0% indicated partial knowledge and 6.8% reported no knowledge. More than half of the participants (55.7%) were able to rapidly assess a patient's condition to determine the need for CPR. Correct hand placement for chest compressions was identified by a high proportion of nurses (79.5%), and 75.0% reported knowing the appropriate compression and ventilation rates during CPR.

Knowledge related to specific and advanced aspects of CPR showed notable gaps. Only 39.8% of nurses reported knowing how to use an automated external defibrillator (AED). Airway management was correctly identified by 60.2% of participants, and the same proportion was able to distinguish cardiac arrest from simple fainting. Effective artificial respiration was reported by 64.8% of nurses, while just over half (54.5%) were aware of the correct criteria for discontinuing CPR. With regard to age-specific CPR techniques, 53.4% correctly identified the appropriate method for performing CPR on infants, and 73.9% understood that the quality of chest compressions is more important than the number alone. Knowledge related to infant pulse assessment was reported by 52.3% of participants, and less than half (48.9%) recognized the importance of left lateral positioning during CPR in pregnant women.

Nurses' confidence in performing CPR varied substantially depending on the patient population. Confidence was highest for adult CPR, with 82.8% of nurses reporting feeling confident. In contrast,

only 40.2% felt confident performing CPR on infants, while 46.5% reported confidence in pediatric CPR. Confidence was lowest for CPR in pregnant women, with only 34.5% reporting confidence, and an equal proportion reporting lack of confidence.

The findings also highlighted substantial training needs among participants. A majority of nurses (68.2%) expressed a need for additional CPR training, and more than half (56.3%) emphasized the need for increased practical, hands-on training. Specialized training for pediatric and infant CPR was considered necessary by 60.9% of respondents. Difficulties in recalling CPR steps during emergencies were reported by 22.1% of nurses, while 44.3% indicated occasional difficulty [Figure 1].

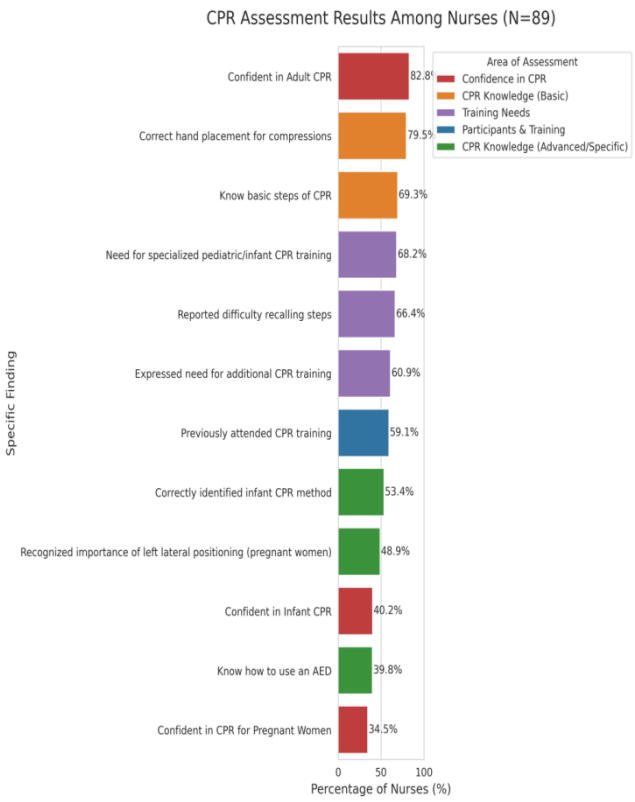


Figure 1: Assessment results among nursing regarding CPR.

## DISCUSSIONS

This study aimed to assess nurses' knowledge, confidence, and training needs regarding first aid for cardiopulmonary resuscitation (CPR). The findings demonstrate that although nurses possess a basic understanding of CPR principles, considerable gaps persist in advanced knowledge, age-specific techniques, and confidence levels, particularly in relation to automated external defibrillator (AED) use and CPR for vulnerable populations. These findings align with previous international research highlighting ongoing deficiencies in CPR competence among nursing professionals [6-7].

The results revealed that most nurses were familiar with basic CPR steps and proper hand placement for chest compressions. This observation is consistent with previous studies indicating that foundational CPR knowledge is usually acquired during formal education or initial professional training [8-9]. However, knowledge retention diminishes over time without regular refresher courses. Meaney et al. emphasized that both theoretical knowledge and psychomotor skills in CPR decline rapidly without ongoing practice, reinforcing the need for continuous training programs [10].

AED-related knowledge was a major area of deficiency, with less than half of the nurses reporting competence in AED use. Early defibrillation is critical for survival in cardiac arrest cases, and inadequate AED skills among nurses can significantly compromise outcomes [6]. Similar gaps have been documented globally, where limited hands-on exposure and lack of confidence in using AEDs are common barriers [7]. These findings highlight the importance of incorporating AED-focused practical sessions and simulation training into routine nursing education.

Knowledge and confidence in age-specific CPR were also limited. Nurses reported lower competence when performing CPR on infants, children, and pregnant women compared with adults. Pediatric and maternal CPR require modified techniques due to anatomical and physiological differences, yet they are often underemphasized in standard training. Anxiety and uncertainty during real-life emergencies in these populations can negatively impact performance, which aligns with prior evidence emphasizing the need for targeted training [10-11].

Confidence levels reflected these knowledge gaps. While most nurses felt confident performing CPR on adults, confidence was markedly lower for infants, children, and pregnant women. Confidence

is a critical determinant of effective CPR performance, as hesitation may delay life-saving interventions [12]. Simulation-based and scenario-driven training has been shown to improve both skill proficiency and self-confidence, especially for low-frequency, high-risk scenarios such as pediatric and maternal cardiac arrest [13].

The study also highlighted the nurses' expressed need for additional and practical CPR training, including specialized pediatric and infant CPR programs. This aligns with recommendations from international resuscitation councils advocating for frequent refresher courses, competency-based assessment, and hands-on practice rather than reliance solely on certification [14]. The reported difficulty in recalling CPR steps during emergencies further supports the necessity for continuous professional development and structured reinforcement.

In conclusion, while nurses demonstrate foundational CPR knowledge, critical deficiencies remain in AED usage, age-specific CPR techniques, and confidence when managing vulnerable populations. Targeted, practical, and regularly updated training programs are essential to enhance nurses' preparedness and improve patient outcomes during cardiac arrest situations [15].

## CONCLUSION

The study demonstrates that nurses possess a foundational understanding of CPR, yet critical gaps remain in advanced skills, AED usage, age-specific techniques, and confidence when performing resuscitation on vulnerable populations such as infants, children, and pregnant women. These deficiencies highlight the urgent need for targeted, practical, and regularly updated training programs to enhance nurses' preparedness, improve skill retention, and ultimately strengthen patient outcomes during cardiac arrest emergencies.

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