


Knowledge and Skills of the Workers About Field of Basic Life Support

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Abstract

Article history:

Received: 28 Sep 2025
Accepted: 11 Nov 2025
Available online: 18 Nov 2025

Keywords:

Cardiopulmonary Resuscitation (CPR)
Nursing
Knowledge
Skill
AED
Clinical Training

Background: Cardiopulmonary resuscitation (CPR) is a critical life-saving intervention in cases of cardiac and respiratory arrest. Nurses, as front-line healthcare providers in hospital settings, play a vital role in initiating and performing effective CPR. This study aimed to assess the knowledge and practical skills of nurses at Imam Khomeini Teaching Hospital in Sari regarding the basic principles of CPR.

Methods: This descriptive-analytical and cross-sectional study was conducted in 1403. The research population included 149 nurses working in different departments of Imam Khomeini Center in Sari who were included in the study by census method. The data collection tool was a standard checklist prepared based on the guidelines of the Heart Association. To examine the normality of the scores obtained from the total nurses' knowledge and skills questionnaire, two statistical tests, Kolmogorov-Smirnov, were used.

Results: Most participants were female (65.1%) and held a bachelor's degree in nursing (96.6%). Although all nurses reported prior theoretical familiarity with CPR, deficiencies were noted in critical areas of practical skills, including proper AED usage, correct depth and frequency of chest compressions, and effective artificial ventilation. No statistically significant differences were found in knowledge and skill scores based on age, gender, education level, work experience, or ward of employment ($P>0.05$).

Conclusion: Despite theoretical awareness, the nurses' practical CPR skills, especially in high-stakes interventions, were suboptimal. This highlights the necessity of regular hands-on training, simulation-based learning, and continuous professional development programs to enhance CPR competencies in clinical settings.

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Introduction

Cardiac arrest is one of the life-threatening emergencies in clinical settings which, if not managed promptly and effectively, can lead to death or severe neurological and functional impairments. Cardiopulmonary resuscitation (CPR), as a life-saving intervention, plays a crucial role in reducing mortality associated with cardiac arrest, and adherence to its guidelines by healthcare professionals, particularly nurses, can significantly increase patients' chances of survival (1).

Due to their continuous presence at the patient's bedside, nurses are often the first to encounter cardiac arrest, and the rapid, accurate, and coordinated initiation of CPR by them can be the key to saving the patient's life. However, in many healthcare facilities, a considerable gap has been reported between the theoretical knowledge and practical performance of nurses regarding CPR (2).

Studies conducted in Iran and other countries have shown that theoretical education alone, without hands-on training, limits the ability of nursing staff to perform CPR successfully (3,4). Furthermore, factors such as age, work experience, level of education, and workplace can influence nurses' knowledge and skills; nevertheless, the results of studies in this regard have been inconsistent, and more accurate investigations in real hospital settings are required (5).

Given the vital importance of CPR and the key role of nurses in its implementation, assessing their level of knowledge and practical skills—especially in educational and clinical centers—can be an effective step toward educational planning and improving the quality of emergency care. Accordingly, the present study was conducted to assess the knowledge and skills of nurses at Imam Khomeini Hospital in Sari regarding the basic principles of cardiopulmonary resuscitation.

Materials and Methods

This descriptive–analytical and cross-sectional study was conducted in 2022 at Imam Khomeini Educational and Medical Center in Sari. The study population consisted of all nurses working in this hospital. Using a convenience sampling method and the sample size formula for a finite population, a total of 130 nurses were included as the final sample.

Inclusion and exclusion criteria

The inclusion criteria were: having at least one year of work experience in clinical wards, willingness to participate in the study, and complete completion of the

study tools. Exclusion criteria were unwillingness to continue participation or failure to complete the questionnaire and performance checklist.

Data collection tools

Data were collected using two instruments.

Demographic information questionnaire, including variables such as age, gender, educational level, work experience, and workplace.

Basic Life Support (BLS) knowledge and skills checklist, which was developed based on the 2020 American Heart Association (AHA) guidelines. This checklist included items related to various steps of cardiopulmonary resuscitation such as scene assessment, checking responsiveness, calling for help, checking breathing and pulse, performing high-quality chest compressions, ventilation, using an AED, delivering a shock, and checking for recovery position. Scoring was done according to the correct performance of each step.

The content validity of the tools was confirmed by a panel of 14 emergency medicine faculty members. The reliability of the instrument was assessed using Cronbach's alpha, which was reported to be 0.84 for the entire tool.

Data collection procedure

Data were collected through direct observation of nurses' performance in a simulated CPR scenario, while the researcher simultaneously completed the checklist.

Data analysis

Data analysis was performed using SPSS software, version 16. Descriptive statistics (mean, standard deviation, frequency, and percentage) were used to describe the characteristics of the sample. The normality of data distribution was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Independent t-tests were used to compare two groups (e.g., gender or education level), and one-way ANOVA was used to compare mean knowledge and skills scores across different age groups, work experience categories, and workplaces. A p-value of less than 0.05 was considered statistically significant.

Results

This study was conducted on 141 nurses working at Imam Khomeini Hospital in Sari. Among the participants, 81.5% were female and 18.5% were male. Regarding educational level, 86.3% held a bachelor's degree, while only 13.7% had a master's degree. The majority of nurses (81.0%) had less than five years of

work experience, and the largest proportion of participants were working in the emergency department (15.8%).

Level of knowledge and skills

Evaluation of nurses' performance in the initial steps of cardiopulmonary resuscitation revealed that only 8.0% of nurses checked the scene for safety before initiating resuscitation. A total of 67.8% correctly assessed the patient's level of consciousness, while only 26.8% called for help. The assessment of breathing and pulse was correctly performed by 69.6% of participants. Chest compressions were initiated on time by 94% of nurses, and 90.6% were aware of the correct hand placement for compressions. However, only 58.0% adhered to the correct number and rate of compressions. In addition, 75.2% of participants performed rescue breaths correctly. Only 18.0% attempted to connect the automated external defibrillator (AED), and just 16.8% did so correctly. Moreover, 24.1% delivered defibrillation at the appropriate time, and only 21.5% resumed chest compressions immediately after shock delivery.

Comparative statistical analysis

Based on the statistical tests, no significant differences were found in knowledge and skills scores according to gender ($p = 0.896$), educational level ($p = 0.070$), age group ($p = 0.873$), years of work experience ($p = 0.202$), or hospital ward ($p = 0.834$). Although nurses with a master's degree tended to have slightly higher scores, this difference was not statistically significant.

Discussion

The findings of the present study revealed that, despite a 91% theoretical familiarity of nurses with the principles of cardiopulmonary resuscitation, many critical steps of the practical process—particularly the correct use of the automated external defibrillator (AED), adherence to the correct sequence and rate of chest compressions, and continuation of resuscitation after defibrillation—were not performed correctly. This indicates a considerable gap between theoretical knowledge and practical competence among nurses.

Our results demonstrate that although nurses' theoretical knowledge of CPR was generally acceptable, significant weaknesses were observed in the execution of practical skills, especially in areas that require high-level technical proficiency and rapid decision-making. Deficiencies in AED use, adherence to the correct timing

and sequence of resuscitation, and failure to resume chest compressions after shock delivery are critical issues that may significantly reduce the likelihood of successful CPR.

These findings highlight the urgent need for regular refresher CPR workshops with a focus on hands-on practice.

Active educational strategies such as simulation-based learning, instructional videos, and real-life scenarios.

Continuous assessment of nurses' clinical performance in real settings by trained observers, followed by targeted corrective interventions.

Several previous studies support these observations. Ghanem et al. reported that more than 55% of Iranian nurses lacked sufficient CPR knowledge, which negatively affected the quality of emergency care (6). This finding is consistent with our results, confirming weaknesses in essential skills such as ensuring scene safety (performed correctly in only 5.8% of cases), calling for help (26.5%), and the connection and correct use of an AED (less than 20%).

Asadi et al. demonstrated that modern educational methods, such as combining instructional videos with practical exercises, were more effective than traditional approaches in improving CPR skills (10). Our findings also support the need for a skills-based, practical training approach.

Similarly, Khaledi et al. emphasized that factors such as years of work experience and age had no significant effect on CPR performance; only structured and continuous training could significantly improve performance. This is in line with our results, which found no significant differences in CPR knowledge and skills based on educational level, gender, age, work experience, or workplace.

At the international level, Johnson et al. also reported that even in advanced healthcare systems, poor proficiency in AED use and incorrect CPR performance remain major issues affecting clinical outcomes (3). Our study echoed these findings, as more than 85% of nurses failed to resume chest compressions after shock delivery, and over 15% did not follow the AED's voice prompts.

Furthermore, the results of Aftabi, Akhlaghdoust, and colleagues emphasized that poor performance in CPR skills among nursing students and nurses impairs clinical outcomes and reduces the effectiveness of life-saving interventions. These findings collectively highlight the need for skill-focused workshops, regular training, and structured practical.

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