

Assessment of Emergency Nurses' Knowledge toward Cardiopulmonary Resuscitation at Al Aqsa Martyrs Hospital in the Gaza Strip

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ABSTRACT: Background: The knowledge and skills of emergency nurses regarding cardiopulmonary resuscitation (CPR) are vital to improving patient survival outcomes, especially in high-stress environments such as the Gaza Strip. **Objective:** This study aims to assess the knowledge level of emergency nurses towards CPR at Al Aqsa Martyrs Hospital in the Gaza Strip. **Methods:** A descriptive cross-sectional study design was employed on 70 emergency nurses in a period from January 21 to April 27, 2023. Data were collected using a structured questionnaire distributed among census sample of emergency nurses at Al Aqsa Martyrs Hospital. **Results:** The study showed that the majority of participants (43%) are under 30 years of age, in addition to that (60%) are male and (72.8%) are married. By analyzing the data, it was found that the majority of emergency nurses have a low level of knowledge toward CPR ($M = 36.235 \pm 5.242$), especially in basic techniques and updated guidelines. Factors such as previous participation in CPR training programs, years of emergency experience, and higher education levels were positively associated with higher knowledge scores. **Conclusion:** The findings highlight a need for ongoing, mandatory CPR training and professional development opportunities for emergency nurses at Al Aqsa Martyrs Hospital. Implementing structured training programs and providing access to the latest CPR guidelines could help improve nurses' preparedness and effectiveness in emergency situations.

Keywords: Cardiopulmonary resuscitation, Emergency nurses, Knowledge, Gaza Strip.

INTRODUCTION

Cardiac Arrest (CA) is the most one common causes of death both worldwide and in Palestine. It's account approximately 60% of adult deaths due to ischemic heart disease. The incidence of in-hospital CA is estimated between one to five per 1,000 hospital admissions, and the global survival rate is 17.6%. Ventricular Fibrillation (VF) and Pulseless Ventricular Tachycardia (PVT) are cited as the main causes of CA [4].

Sudden CA and accidents are the most common emergencies with grave consequences. Therefore, these emergencies can be managed efficiently by proper knowledge and practice of cardiopulmonary resuscitation (CPR) skills [13].

CPR is the technique of providing Basic life support (BLS) until Advanced Cardiovascular Life Support (ACLS) can be provided or spontaneous circulation or ventilation is restored. BLS procedure can be delivered by trained medical professions who have received BLS training [6].

Emergency nurses' knowledge and practice toward performing of high-quality CPR is the most important determining factors of the cardiopulmonary success rates. Therefore, it is critical for nurses to know and perform CPR to tackle acute medical emergencies. Thus, improving the knowledge and practice of CPR among nurses is critical in the final outcome of life-threatening conditions [3].

Therefore, this study aims to conduct a thorough assess the knowledge level of emergency nurses towards CPR at Al Aqsa

Martyrs Hospital in the Gaza strip (GS) with the primary objective of enhancing patient safety and healthcare quality.

METHODS

Study Design: The study is a descriptive analytical cross-sectional design to assess the knowledge level of emergency nurses towards CPR at Al Aqsa Martyrs Hospital in the GS.

Study Setting: This study was conducted at Al Aqsa Martyrs hospital in the GS. There are three emergency departments (EDs) (Adult, pediatric, obstetric) are allocated for providing emergency care for life-threatening conditions and cardiac arrested patients.

Period of the Study: Four months the study lasted, in a period from January 21th to April 27th, 2023

Study Population: The target population of this study included emergency nurses who working in EDs (adult, pediatric, obstetric) at Al Aqsa Martyrs hospital in the GS in the actual period from January 21th to April 27th, 2023. The total number of emergency nurses during this period was 76 nurses.

Sample and Sampling: This was census sample of 70 emergency nurses who were recruited after their acceptance to participate in the study and excluded volunteer ED nurses that they do not meet the inclusion criteria. The selected participants were subjected to a test of knowledge toward the CPR skill.

Inclusion Criteria

- Registered nurse (Diploma, Bachelor, Master, PhD).
- Having ≥ 1 year clinical experience.
- Both genders.

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Exclusion criteria

- Absent nurses due to sick leave.
- Having less than one-year clinical experience.

Study Instruments: A researcher used a self-structured questionnaire during data collection after a review of related literature on CPR knowledge and based on American heart association (AHA). The first part covers all aspects of emergency nurses' personal characteristics including gender, age, marital status, level of education, years of emergency experience, and type of EDs. The second part are 15 multiple choice questions covered emergency nurses' knowledge relating to CA and CPR.

Pilot Study: Before the actual data collection began, the researchers conducted a pilot study on 10 (15%) participants selected randomly, which the names of study participants were placed in three boxes according to the ED to which the work. After that we drawn randomly the number of participants in pilot sample according to their proportional representation in the study sample (Adult ED 64.3% (n=6), Pediatric ED 17.1% (n=2), obstetric ED 18.6% (n=2)) in order to test validity and reliability of the questionnaire as presented in the following tables.

Validity: The researcher used Pearson Correlation test to determine the correlation between each item and the total score of the questionnaire as follows:

Table (1): Correlation between each item and total score of the scale.

No.	Correlation	No.	Correlation	No.	Correlation
1	0.737 *	6	0.984 *	11	0.710 *
2	0.804 **	7	0.692 *	12	0.984 **
3	0.805 **	8	0.768 **	13	0.635 *
4	0.736 *	9	0.825 **	14	0.984 **
5	0.825 **	10	0.768 **	15	0.804 **

**significant at 0.01

*significant at 0.05

As shown in table (1), all the items have statistically significant correlation with the total score of the questionnaire.

Reliability

The researcher used Cronbach alpha method to examine the reliability of the questionnaire.

Table (2): Cronbach alpha coefficient for the items of the questionnaire.

Domain	No. of items	Correlation
Knowledge	15	0.959

As presented in table (2), the items of the questionnaire showed high reliability as Cronbach alpha coefficient was 0.959 for knowledge. Therefore, the questionnaire had good validity and reliability, and suitable to be used in this study.

Table (3): Criteria for measurements of variables.

No.	Mean score	Interpretation
1	20 - 36	Very low
2	>36 - 52	Low
3	>52 - 68	Moderate
4	>68 - 84	Above moderate
5	>84 - 100	High

Data Collection: A study was conducted after obtaining ethical and administrative approval. Researcher and data collectors used a self-report structure questionnaire to collect data. The average time for each questionnaire is approximately 20 minutes.

Data Management and Data Analysis: Researcher used the Statistical Package for Social Sciences (SPSS) version 24.0 to analyse data. The mean is used to represent the main feature of the data, namely the standard deviation (SD). In addition. Logistic statistical tests, such as t-tests, are also used to determine the relationship between personal characteristics and emergency nurse's knowledge toward CPR. Test of variance (ANOVA) is also used to determine whether there is a statistically significant difference between the means of independent

variables. P value of 0.05 or less is considered to have a 95% confidence interval (CI), which is statistically significant.

RESULTS

In the period from January 21th to April 27th of 2023, a descriptive-Analytic study was conducted on 70 emergency nurses from three emergency departments at Al-Aqsa Martyrs Hospital, and the results of the study were as follows:

Personal characteristics for participants:

Table (4): Socio-demographic characteristics of study participants.

Variable	n (%)
Age	
Less than 30 years	31 (44.3)
30 - 39 years	29 (41.4)
40 years and more	10 (14.3)
Total	70 (100.0)
Gender	
Male	42 (60)
Female	28 (40)
Total	70 (100.0)
Marital status	
Married	51 (72.8)
Single	13 (18.6)
Divorced / Widow	6 (8.6)
Total	70 (100.0)
Level of education	
Diploma	24 (34.3)
Bachelor	40 (57.1)
Master / PhD	6 (8.6)
Total	70 (100.0)

Table (4) showed that 31 (44.3 %) of participants were from the age group less than 30 years. 42 (60 %) were male EDs nurses. In addition, 51 (72.8 %) were married. 40 (57.1 %) have bachelor degree in nursing.

Table (5): Work-related characteristics of study participants.

Variable	n (%)
Years of experience in ED	
1 - 5 years	35 (50)
6 - 10 years	24 (34.3)
More than 10 years	11 (15.7)
Total	70 (100.0)
Type of ED	
Adult ED	45 (64.3)
Pediatric ED	12 (17.1)
Obstetric ED	13 (18.6)
Total	70 (100.0)
Previous BLS training	
Yes	56 (80)
No	14 (20)
Total	70 (100.0)
When received last BLS training?	
1 - 5 years ago	34 (60.7)
More than 5 years ago	22 (39.3)
Total	56 (100.0)

Table (5) showed that 35 (50 %) of participants have an experience between 1 - 5 years in EDs, 45 (64.3 %) are working in adult ED, 56 (80 %) received previous training about BLS, 34 (60.7 %) received training about BLS 1 - 5 years ago.

Table (6): Level of knowledge about CPR among EDs nurses.

No.	Knowledge items	n	Mean ± SD
1	Source of knowledge about CPR and airway management	70	51.074 ± 16.664
2	Definition of CPR	70	46.428 ± 12.308
3	Correct statements regarding CPR skill	70	37.146 ± 13.343
4	Principles of high-quality cardiopulmonary resuscitation	70	36.785 ± 13.346
5	Equipment worn to minimize the rescuer's risk of infection during CPR	70	41.071 ± 11.664
6	Correct characteristics of compression and ventilation during CPR	70	30.357 ± 9.922
7	Signs of successful CPR	70	33.571 ± 12.015

8	Possible complications of CPR	70	27.499 ± 6.892
9	Steps for using an automated external defibrillator	70	33.213 ± 11.857
10	Basic airway adjuncts	70	29.642 ± 9.852
11	Conditions for termination of CPR	70	40.714 ± 12.046
12	Airway management skill	70	28.571 ± 8.269
13	Reversible causes of cardiac arrest	70	37.499 ± 12.677
14	What the nurse should do when the chest is not rising well	70	26.071 ± 7.100
15	Common mistakes in CPR	70	40.714 ± 12.256
Overall mean score		70	36.235 ± 5.242

As shown in the table (6), the overall mean score of knowledge about BLS for participants was 36.235 ± 5.242, which means a low level in the emergency nurses' knowledge toward CPR, which is inherently an important skill to save life of patients suffering from CA.

Differences in knowledge regarding BLS related to personal variables

Table (7): Differences in knowledge regarding BLS related to sociodemographic variables.

Differences in knowledge of BLS related to age					
Age	N	Mean	SD	F	P value
less than 30 years	31	34.166	6.835	4.165	0.025 *
30-39 years	29	39.803	5.099		
40 years and more	10	34.444	4.554		
Total	70	36.952	6.189		
Multiple comparisons Post Hoc LSD for age					
Domain	Age		Mean difference	P value	
Knowledge regarding BLS	Less than 30 years	30 – 39 years	-5.637	0.013 *	
		40 years and more	-0.277	0.923	
Differences in knowledge of BLS related to gender					
Gender	N	Mean	SD	t	P value
Male	42	38.583	5.626	1.864	0.071
Female	28	34.777	6.420		
Differences in knowledge and practice of BLS related to marital status					
Marital status	N	Mean	SD	F	P value
Married	51	38.600	5.015	7.343	0.002 *
Single	13	29.444	6.206		
Divorced / Widow	6	37.916	5.672		
Total	70	36.952	6.189		
Multiple comparisons Post Hoc LSD for marital status					
Marital status		Mean difference		p value	
Single	Married	-9.155		0.001 *	
	Divorced / widow	-8.472		0.018 *	
Differences in knowledge and practice of BLS related to level of education					
Level of education	N	Mean	SD	F	P value
Diploma	24	32.833	6.715	9.678	0.001 *
Bachelor	40	37.424	4.073		
Ma/PhD	6	47.222	5.357		
Total	70	36.952	6.189		
Multiple comparisons Post Hoc LSD for level of education					
Level of education		Mean difference		p value	
Diploma	Bachelor	-4.590		0.023 *	
	Ma / PhD	-14.388		0.000 *	

* Significant at 0.05

Table (8): Differences in knowledge regarding BLS related to work-related variables.

Differences in knowledge of BLS related to years of experience in EDs					
Years of experience in EDs	n	Mean	SD	F	P value
5 and less	35	35.111	6.499	2.769	0.078

6-10 years	24	36.666	3.600		
more than 10 years	11	41.428	7.783		
Total	70	36.952	6.189		
Differences in knowledge of BLS related to type of EDs					
Type of EDs	n	Mean	SD	F	P value
Adult	45	38.787	5.823	5.839	0.007 *
Pediatric	12	37.500	3.291		
Obstetric	13	30.714	5.599		
Total	70	36.952	6.189		
Multiple comparisons Post Hoc LSD for type of EDs					
Type of EDs		Mean difference		P value	
Obstetric	Adult	-8.073		0.002 *	
	Pediatric	-6.785		0.033 *	
Differences in knowledge of BLS related to previous BLS training					
Previous BLS training	n	Mean	SD	t	P value
Yes	56	38.611	4.953	5.129	0.000 *
No	14	27.000	1.825		
Differences in knowledge of BLS related to time of last BLS course					
When was the last previous BLS training	n	Mean	SD	t	P value
1-5 years ago	34	38.240	2.941	-0.495	0.624
more than 5 years	22	39.166	7.124		

* Significant at 0.05

Table (7) showed that there were statistically significant differences in knowledge about BLS ($p=0.025$) related to age in which there was a statistically significant decrease in the level of knowledge of the skill of CPR among the age group < 30 years compared to other age groups. Moreover, there was a statistically significant decrease in the level of knowledge of the skill of CPR among the single participants compared to married and widowed ($P=0.002$). Also, among EDs nurses hold diploma compared to other educational levels ($P=0.001$).

Table (8) showed that there were statistically significant differences in knowledge about BLS related to type of ED, in which there was a statistically significant decrease in the level of knowledge of the skill of CPR among obstetric ED nurses compared to other EDs nurses ($P=0.007$).

Finally, there was no significant difference between CPR knowledge score and gender, years of experience in EDs, and time of last BLS course.

DISCUSSION

The participants in this study represent a range of experiences and ages of Emergency nurses at Al-Aqsa Martyrs Hospital. The majority have previously completed a BLS course 80% ($n=56$). However, it is interesting to note that even participants who received BLS training had suboptimal mean scores on the knowledge of CPR skill (36.235 ± 5.242). While our results were similar to those reported in the study conducted by Rahmani, et al., 2022 at Seyed Al-Shohada and Ayat Allah Taleghani hospitals in Iran. The study revealed that the average mean score of knowledge toward CPR among emergency nurses were 20.63 ± 2.13 . [8]. The study conducted by Saidkhani, et al., 2023 at Iran University of Medical Sciences is consistent with our result, which the study revealed that there was low level of knowledge toward CPR (21.44 ± 2.48) among EDs nurses [9]. Responders to patients suffering sudden CA include various members of the multidisciplinary team, and therefore all members should be required to stay updated.

Nurses' inadequate theoretical knowledge of CPR has been attributed to ineffective initial or refresher training. Instructor competence, teaching methods, poor recall of knowledge and infrequency of updates are other reasons that influence poor CPR knowledge among nurses. By reviewing the results of knowledge differences regarding the BLS related to personal variables and comparing them to previous studies, the study conducted by Ofori, 2023 examined the effect of simulation-based training BLS program among EDs nurses in the Greater Accra Regional Hospital and Legon hospital is inconsistent with our results, in which the study showed that there is no statistically significant relationship between the performance of nurses toward BLS skill and their age groups [7]. Consistent with Ofori, 2023, the study conducted by Saud, et al., (2020) at Al-Basra teaching hospital to assess the nurses' performance about CPR, the researchers concluded that most of study sample have poor knowledge and practice about CPR, also shown that insignificant association between the nurse's performance and their age group [10]. According to marital status and consistent with our study, the study conducted by Zayed and Saied, 2020 at Tanta University Hospitals included 96 emergency nursing participants; which Showed that most of them were married (58.4%). The study revealed that the level of performance regarding the CPR skill before and after the training program among married nurses is higher than the performance level of unmarried nurses in ($P < 0.001$) [14]. In contrast, Varughese and Silva, 2020 in their work about knowledge and practice on CPR among emergency staff nurses, declared that there are no statistically significant differences between the level of knowledge and practice in the CPR skill and marital status, ($P = 0.475$) [12].

Previous studies have shown that knowledge of the CPR guidelines was significantly associated with academic qualification. In fact, consistent with our study, the study conducted by Andriyani, et al., 2021 to evaluate the educational level and knowledge of emergency nurses in CPR skills and its relationship to the education level, the study showed that the level of performance in the CPR was lower among participants having a diploma's degree in nursing compared to those with other education levels [2]. In contrast, the study conducted by Tamu, et al., 2021 at Mbarara Regional Referral Hospital in Uganda revealed that no significant effect of qualification levels in either the pre-test or post test score of knowledge and practice regarding CPR [11]. Although there was no significant difference in the level of CPR knowledge related to gender, years of experiences in EDs and time of last BLS course among EDs nurses. Consistent with our study, the study of Hassan, et al., 2020, conducted at in Baghdad city to assess the EDs nurses' performance about CPR, and to find out the relationship between knowledge and practice of these nurses and their demographic variables, claimed there was insignificant relationship between the nurse's performance and their gender, years of experiences in EDs [5]. In contrast, A reviewed study conducted by Abu Aser and El Jedi, 2021 to assess the quality of CPR among health care providers in critical care units at governmental hospitals in GS. The results revealed that the average of knowledge among males was higher statistically significant than females (65.88% vs. 57.90%, respectively, $P = 0.001$) [1]

Limitations: While this study provides valuable insights into the knowledge of emergency nurses regarding CPR at Al Aqsa Martyrs Hospital in the GS, there are several limitations that need to be acknowledged, such as the study may have a limited sample size due to the specific focus on emergency nurses at a single hospital, and there are no enough previous studies in GS related to the assessment the knowledge level of emergency nurses towards CPR at Al Aqsa Martyrs Hospital in the GS.

CONCLUSION

The study findings indicate varying levels of CPR knowledge among the EDs nurses, with significant gaps in specific areas such as CPR techniques and the latest updates in CPR guidelines, pediatric CPR, and CPR in special situations like pregnancy. These gaps underscore the need for continuous education and regular training programs tailored to the latest CPR guidelines and protocols. Addressing these knowledge deficiencies is essential not only for improving individual nurse competency but also for enhancing the overall quality of emergency care provided to patients.

Recommendation

Based on the findings from the assessment of emergency nurses' knowledge toward CPR at Al Aqsa Martyrs Hospital in the GS, the following recommendations are proposed to enhance the CPR competencies of the EDs nursing staff which include conduct periodic assessments of CPR knowledge and skill among emergency nurses to identify areas that need improvement and establish and mandate regular, structured CPR training sessions for all emergency nurses.

Disclosure Statements

- **Ethics approval and consent to participate:** Ethical approval was taken from GS Helsinki Committee (Reference Number PHRC/HC/1167/22). An informed consent was taken from all the participants. Participation was voluntary.
- **Consent for publication:** Not applicable
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