

# **Nurse-Led Intervention On Knowledge of Cardiopulmonary Resuscitation Among Nurses and Midwives in Secondary Health Care Facilities in Oyo State**

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## **Abstract**

Cardiopulmonary resuscitation is a vital intervention to prevent death associated with cardiac arrest. However, previous studies have indicated deficiencies in Nurses' knowledge of CPR, although these vary among countries. The objective of this study was to investigate the influence of Nurse-led intervention on knowledge of CPR among nurses and midwives in secondary health care facilities in Oyo state. One group pre-test post-test quasi experimental design was adopted in the study. The population comprised 92 Nurses and midwives from the three secondary healthcare facilities in Saki Oyo state. Cochran formula was used to determine the sample size while convenience sampling technique was used to draw participants into the sample. The instruments used for data collection were a validated self -designed questionnaire administered to the participants before and after the intervention. Cronbach's Alpha reliability for the instrument was 0.918. The data collected in the study were subjected to descriptive and inferential statistical analyses. The findings revealed that participants had pre-intervention mean knowledge score of 2.76 as majority (78.3%) displayed high knowledge before the intervention. Post-intervention, the mean knowledge score increased to 3.00. It was also revealed that there was significant difference between pre- and post- intervention CPR knowledge. In conclusion, the study revealed that training in CPR is a powerful tool in improving knowledge of Nurses and midwives. Based on the findings, it was recommended among others that regular in-service training and workshop for Nurses and Midwives should be organized by hospital managements for improvement in CPR knowledge.

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## Introduction

Cardiac arrest is a complex lethal condition that poses a substantial public health burden with high nationwide mortality rates and the potential for profound and irreversible neurologic injury and functional disability. In addition to the number of lives lost, cardiac arrest has a considerable economic impact measured in terms of productive years of life lost due to premature deaths or avoidable neurologic disability. Seventy percent of the cases though occur outside the hospital setting (OHCA), the remaining 30% occur in the hospital and most likely to gain the attention of a nurse first. Cardiopulmonary resuscitation is a vital intervention to prevent death associated with cardiac arrest. Returning to life in cardiac arrest victims depends greatly on the success of CPR (Andersen, et al, 2019).

As documented in many studies, in-hospital cardiac arrest is common just as it is outside the hospital setting, this has made it mandatory for all healthcare practitioners especially nurses owing to their key roles and responsibilities to have vast knowledge in cardiopulmonary resuscitation (CPR) as the knowledge is an essential ingredient for overall success of nursing practice. CPR consists of chest compression and assisted ventilation to support circulation and oxygenation, it does not require any sophisticated apparatus. It is globally adjudged to be the number one intervention for a victim of cardiac arrest.

The significance of gaining proficiency about CPR practices among nurses go a long way in reducing mortality rates from cardiac arrest as emphasized by American heart association. Theoretical knowledge alone is however not sufficient for a successful application of CPR. Also existing theoretical knowledge needs to be updated, technical skill should be consolidated and sufficient self-esteem related to application should be established according to training and manual guidelines (Isleyen, 2017).

Ehlers and Rajeswaran (2014) reported that previous studies have shown that training in CPR improves knowledge and performance of the procedure. A nurse with inadequate knowledge or skill in CPR may experience anxiety and lack of self-esteem related to the practice. According to Kaihula et al (2018), a number of literatures indicate deficiencies in Nurses' knowledge and skills, although these vary among countries. Frequency of training is one of the pillars on which knowledge and skill about CPR stand, while in developed countries like USA, compulsory training is required every two years for employment in all licensed health facilities.

However, in Nigeria and other developing countries, there is no nationwide-established CPR training schedule for nurses irrespective of their area of practice. This has been responsible for the gap in knowledge and skill identified among nurses in majority of the previous studies in (Kaihula et al, 2018, Kose, et al, 2019). Effiong, Nsemo and Ekpeyong (2017) in Nigeria reported that 57% of the participants in a study involving public health nurses indicated not to have had about CPR in the past and this was hinged on inadequate supply of CPR equipment, complex nature of procedure, lack of systematic training on device and legal coverage and lack of personal experience on positive outcome to reinforce the capability to initiate CPR.

Despite this, little attention has been given to in-service training of nurses by government and hospital administrators in Nigeria, perhaps due to perceived lack of financial wherewithal. There is thus a need for a way to establish on-going, periodical and repeated theoretical and applied training for nurses as a tool for improving their knowledge with a view to improving the outcome of cardiac arrest and by extension reducing the mortality rate and neurologic disability associated.



It is the awareness of this that prompt the researcher to investigate the effect of Nurse-led intervention on the knowledge of CPR among nurses in secondary health care facilities in Saki Oyo state. Specific objectives were to:

1. determined the pre-intervention knowledge score of Nurses and Midwives about CPR; and
2. determined the post-intervention knowledge score of Nurses and Midwives about CPR

### Research Questions

The following research questions were answered in the study;

1. What is the pre-intervention knowledge score for Nurses and midwives about CPR?
2. What is the post-intervention knowledge score for Nurses and Midwives about CPR?

### Research Hypothesis

**Ho1:** There is no significant difference between pre and post -intervention knowledge of Nurses and Midwives about CPR?

### Methodology

One group pre-test -posttest quasi experimental design was used in this study as it involved administering pre-intervention questionnaire to the participants prior to intervention (lecture and training in CPR) and followed by post-test. The study included nurses and midwives working in the three secondary health facilities in Saki (i.e. State hospital, Baptist Medical Centre and Muslim Hospital). The total number is 118 for the three hospitals. Nurses and midwives irrespective of their qualification were considered. The sample size for this study is 92 participants and this was arrived at from a total of 118 Nurses and midwives in the three hospitals by using Cochran's formular. Purposive sampling technique was used to select the three secondary health facilities in Saki, this technique was considered as the hospitals were selected because of their status as secondary healthcare facilities and being the major referral centers for the other hospitals and primary healthcare centers in the town. Any nurse or midwife who meets the inclusion criteria out of the 118 Nurses and midwives in the three hospitals will then be drafted into the study sample. Quota technique was used to determine how many participants came from each hospital.

The instruments for data collection included a CPR knowledge questionnaire designed following AHA (2010) guideline. The questionnaire consists of 2 sections. Section A is for demographic data and has 5 questions while Section B is about knowledge of cardiopulmonary resuscitation and contains 17 questions. Knowledge of respondents was graded into low, moderate and high based on score of <40 points, 40-70 points and >70 points respectively.

The instruments were subjected to face and content validity. The items in the questionnaire having been drafted following AHA guidelines on CPR were presented to experts in the test and measurement, and nursing field for review, correction and appraisal after which necessary corrections were made. To ensure the reliability of the instrument, 10% of the sample size was used. The questionnaire was administered to 10 nurses at general hospital Igboho and the questionnaire was retrieved back immediately after completion. The reliability index was calculated to be 0.918. The Nurse-led intervention was done in 3 phases as follows pre-intervention phase, intervention phase and post-intervention phase. The quantitative data were analyzed using SPSS version 23. Data on knowledge were analyzed using descriptive and inferential statistics.

## Results

**Research Question 1:** What is the pre-intervention knowledge score for Nurses and Midwives about CPR?

**Table 1: Pre-intervention Participants' Response on CPR knowledge**

Statement	Pretest	
	Yes	No
I have never heard of CPR before	1 (1.1)	91 (98.9)
CPR is applied to patient with cardiac arrest	78 (84.8)	14 (15.2)
CPR should be applied to all patients regardless of absence or presence of pulse	48 (52.2)	44 (47.8)
CPR should be carried out on patient with difficulty in breathing despite full pulse	55 (59.8)	37 (40.2)
Critical life-saving steps in CPR are immediate recognition of danger signs and activation of emergency response system, early CPR and rapid defibrillation	77 (83.7)	15 (16.3)
The first step to take when one finds unconscious victim on the floor is to secure the area	83 (90.2)	9 (9.8)
The current algorithm recommended by AHA (American Heart Association) is C-A-B	80 (87.0)	12 (13.0)
The optimal depth (cm) to which an adult chest should be compressed is 3-5cm	72 (78.3)	20 (21.7)
The minimum number of compressions that need to be given in 1minute of CPR is 120	63 (68.5)	29 (31.5)
Chest compressions must be given at the lower half of the sternum	69 (75.0)	23 (25.0)
If you were responding to cardiopulmonary arrest with another rescuer you change role every 2-3 minutes	73 (79.3)	19 (20.7)
In case the patient reacts (regains consciousness), you must Place him/her in recovery position looking towards the rescuer	80 (87.0)	12 (13.0)
The correct position of the arms of the person giving resuscitation is hands, elbows and shoulders straight and aligned	73 (79.3)	19 (20.7)
To open the airway, the head is tilted while jaw is lifted	70 (76.1)	22 (23.9)
While giving ventilation, the rescuer pinches the nose closed in adult and children	70 (76.1)	22 (23.9)
Ventilation should be provided at the rate of 8-10 breaths per minute	67 (72.8)	25 (27.2)
If the causality does not recover, CPR is continued till help arrives	72 (78.3)	20 (21.7)

**Table 2: Pre intervention mean score for CPR knowledge**

Category of CPR knowledge	Category of scores	Frequency	Percentage %
Low	<40%	2	2.2
Moderate	40-70%	18	19.6
High	70%	72	78.3
<b>Total</b>		92	100
<b>Mean =2.76</b>			
<b>Standard Dev=0.48</b>			

The table 2 above shows pre-intervention CPR knowledge score for the respondents. Majority of the respondents (78.3%) displayed high knowledge level while 2.2% and 19.6% were found to possess low and moderate knowledge of CPR respectively. The mean knowledge score before the intervention was 2.76.

**Research Question 2:** What is the post-intervention mean knowledge score of Nurses and Midwives about CPR?

**Table 3: Post-intervention Participants' Response on CPR knowledge**

Statement	Posttest	
	Yes	No
I have never heard of CPR before	0 (0.0)	92 (100.0)
CPR is applied to patient with cardiac arrest	90 (97.8)	2 (2.2)
CPR should be applied to all patients regardless of absence or presence of pulse	87 (94.6)	5 (5.4)
CPR should be carried out on patient with difficulty in breathing despite full pulse	88 (95.7)	4 (4.3)
Critical life-saving steps in CPR are immediate recognition of danger signs and activation of emergency response system, early CPR and rapid defibrillation	90 (97.8)	2 (2.2)
The first step to take when one finds unconscious victim on the floor is to secure the area	91 (98.9)	1 (1.1)
The current algorithm recommended by AHA (American Heart Association) is C-A-B	90 (97.8)	2 (2.2)
The optimal depth (cm) to which an adult chest should be compressed is 3-5cm	80 (87.0)	12 (13.0)
The minimum number of compressions that need to be given in 1minute of CPR is 120	90 (97.8)	2 (2.2)
Chest compressions must be given at the lower half of the sternum	88 (95.7)	4 (4.3)
If you were responding to cardiopulmonary arrest with another rescuer you change role every 2-3 minutes	87 (94.6)	5 (5.4)
In case the patient reacts (regains consciousness), you must Place him/her in recovery position looking towards the rescuer	91 (98.9)	1 (1.1)
The correct position of the arms of the person giving resuscitation is hands, elbows and shoulders straight and aligned	89 (96.7)	3 (3.3)
To open the airway, the head is tilted while jaw is lifted	90 (97.8)	2 (2.2)
While giving ventilation, the rescuer pinches the nose closed in adult and children	88 (95.7)	4 (4.3)
Ventilation should be provided at the rate of 8-10 breaths per minute	90 (97.8)	2 (2.2)
If the causality does not recover, CPR is continued till help arrives	86 (93.5)	6 (6.5)

**Table 4: Post intervention mean score for CPR knowledge**

Category of CPR knowledge	Category of scores	Frequency	Percentage %
Low	<40%	-	-
Moderate	40-70%	-	-
High	>70%	92	100
Total		92	100
<b>Mean =3.00</b>			
<b>Standard Dev=0.00</b>			

The table 4 above shows pre-intervention CPR knowledge scores for the respondents. Majority of the respondents (78.3%) displayed high knowledge level while 2.2% and 19.6% were found to possess low and moderate knowledge of CPR respectively. The mean knowledge score before the intervention was 2.76.

### Test of Hypothesis

**H<sub>0</sub>1:** There is no significant difference between pre and post -intervention knowledge of Nurses and Midwives about CPR

**Table 5: t-test showing the difference in the pre and post intervention mean score of participants on knowledge of CPR of the respondents**

	N	Mean	Std. Deviation	Std. Error Mean	df	t	P value
Pre-test	92	2.76	0.48	0.05			
Post-test	92	3.00	0.00	0.00	182	23.084	0.000

Results in Table 5 indicates a significant difference in the pre and post intervention mean score of participants on knowledge of CPR among the respondents as p-value of 0.000 was recorded which is lesser than the alpha ( $\alpha$ ) p-value of 0.05, hence, the earlier set hypothesis is rejected and the alternate hypothesis ( $H_1$ ) is accepted. This shows that there is a significant difference between the pre and post intervention mean score of participants on knowledge of CPR of the respondents.

### Discussion of findings

In this study it was observed that majority of the participants were highly knowledgeable about CPR even before intervention as 78.3% of the study participants were found to be in the high knowledge category. Also, it was found that the participants had higher knowledge score (2.76) than skill score pre-intervention. This point to the inclination of nurses and midwives in the area to theoretical aspect of clinical practice. This observation is in line with John, Catherin, Sara and Samuel (2018) who posited that it is a common place to observe that Nurses display more theoretical knowledge of CPR than practical skills they demonstrate. Munezero (2018) went further to call for the need to consolidate technical skills and sufficient self -esteem related to application of cardio-pulmonary resuscitation. High-level pre-intervention knowledge could also be attributed to the fact that close to two-third of the study participants ( 63% ) attended CPR training in the last three years . The relationship between CPR knowledge and training is in keeping with the study carried out by Algeria et al (2017) which investigated factors influencing knowledge of CPR among health

workers in Peru. The study established an association between having taken CPR course and a good knowledge of CPR.

Findings from this study revealed a mean knowledge score of 3.00 post-intervention. Similarly, all the respondents were revealed to be in high knowledge category after the instruction and training sessions. All the participants became highly knowledgeable after the intervention. This finding shows effectiveness of the intervention and is in line with the findings of Ehler and Rajeswaran (2014) which revealed an improved CPR knowledge among Nurses following instruction and training in CPR.

In the hypothesis testing, obtaining a p-value of 0.000 which is lesser than the alpha ( $\alpha$ ) value of 0.05 means that the earlier set hypothesis is rejected and the alternate hypothesis ( $H_1$ ) is accepted. This revealed a significant difference between pre-and post-intervention knowledge of Nurses and midwives. This is as there is increase in knowledge levels of the participant in the post -intervention test .This finding is in accordance with Mersha, et al (2018) who submitted as part of their findings, that in terms of understanding, Nurses who had attended refresher course and CRA training in the previous 6 months recorded the highest score among the participants.

### Conclusion

From the findings of this study, participants had higher mean knowledge scores post -intervention than before the intervention. Hence, it has shown that intervention program improves knowledge of CPR among nurses as this study also achieved a difference in post-intervention CPR knowledge levels among the participants. The intervention program significantly improved knowledge of Nurses and midwives about CPR and is thus deemed effective.

### Recommendations

Based on the findings of this study, the following recommendations were made;

1. Regular training workshop should be organized by hospital managements to update knowledge of health workers generally on cardiopulmonary resuscitation.
2. Nurses and midwives should be sponsored in update program and training to improve their knowledge of CPR.
3. The healthcare facilities should place charts and pictorial items on how to carry out CPR in strategic places for the nurses and midwives to see always.

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