

Training, knowledge, and attitude of non-anaesthetist doctors to cardiopulmonary resuscitation in a South-South teaching hospital in Nigeria: a cross-sectional study

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Abstract

Background: Cardiopulmonary resuscitation, when done properly, improves the survival rates of patients with in-hospital cardiac arrest. The American Heart Association recommends retraining every two years and simulations every three months. Lack of frequent training results in poor performance and outcomes.

Aim: To evaluate the training, knowledge, and attitude to cardiopulmonary resuscitation amongst non-anaesthetist doctors in a teaching hospital in South-South Nigeria.

Methods: A custom-designed online-based questionnaire, reviewed by CPR providers, was distributed among non-anaesthetist doctors to obtain information on training, knowledge, and attitudes toward CPR. The knowledge component of the questionnaire covered basic life support. Availability and knowledge of the use of AEDs were also assessed.

Results: One hundred and thirteen (55%) doctors out of 204 non-anaesthetist doctors participated. Ninety-one (80.5%) respondents had received formal training on Basic Life Support CPR, with 44 (38.9%) having received their training over 5 years prior. The overall knowledge score of the respondents ranged from 24.0 – 84.0, with a mean score of 56.96 ± 12.72 . Most respondents had a positive attitude towards performing mouth-to-mouth ventilation during CPR. One hundred and ten (97.3%) indicated interest in learning CPR techniques.

Conclusion: The overall training of a considerable number of doctors was inadequate, with the majority being out of certification. Additionally, the knowledge competence among respondents was found to be insufficient. However, the general attitude towards CPR was favourable. To improve knowledge, confidence, and, most importantly, patient outcomes, it is imperative that CPR training be required for all medical, nursing staff, and healthcare workers.

Keywords: Cardio-pulmonary resuscitation, non-anaesthetist doctors, training, knowledge, attitude

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INTRODUCTION

Cardiopulmonary resuscitation (CPR) is an emergency lifesaving procedure performed when the heart stops. Cardiac arrest is a catastrophic event that can occur both in a hospital and an out-of-hospital setting. Early initiation of cardiopulmonary resuscitation (CPR) and defibrillation is critical for improving survival, as every minute of delayed treatment decreases survival by 10%.¹ Immediate initiation of efficient CPR can double or triple the chances of survival after cardiac arrest.²

In the United Kingdom, the annual incidence of in-hospital cardiac arrest (IHCA) is 1 to 1.5 per 1,000 hospital admissions, with most cardiac arrests (85%) occurring on wards and in patients admitted to hospital for medical reasons.³

Oyan et al.⁴ evaluated admission trends at Rivers State University Teaching Hospital (RUSTH), and observed that 48.8% of patients admitted to the medical wards were diagnosed with cardiovascular disease. Over two years, 311 patients passed away in the medical wards. These findings highlight the critical importance of ensuring that doctors across all levels and specialties are proficient in performing CPR, as a significant proportion of deaths among hospitalized patients occur within the wards.

The American Heart Association (AHA) has stated that training and recertification of staff be done every two years to ensure optimum knowledge and practice of CPR amongst health care workers, while simulations should be done monthly to ensure that the team is always prepared to deliver quality CPR if needed.⁵

Desalu et al.⁶ in one study found that during their pretest, only 7.7% of the trainees passed the test, scoring 75%. However, they found no significant difference in the knowledge competence following training amongst the different cadres. They concluded that there was a paucity of knowledge among doctors generally, with a need for standardized periodic training.

Anaesthetists perform CPR and are involved in activities that cover most of Advanced Cardiac Life Support (ACLS) during their daily practice; hence, it is assumed that their level of

training, knowledge, competency, perception, and practice of CPR meet international standards. This study evaluated non-anesthetist physicians' training, knowledge, perception, and practice in performing CPR on patients in Rivers State University Teaching Hospital.

METHODOLOGY

This descriptive cross-sectional study utilized a structured questionnaire, including a CPR knowledge assessment, administered to 113 non-anaesthetist doctors (including interns) out of a total of 234 clinical staff at Rivers State University Teaching Hospital. The total number of anaesthetists in the hospital at the time of the study was 30, and they were excluded from this study. The study population size was 204. Data were collected using Google Forms following ethical approval by the Health and Research Ethics Committee of the hospital. The questionnaire gathered demographic data and assessed CPR training, experience, attitude towards retraining, and CPR knowledge. The knowledge section comprised 25 questions: 10 on basic CPR, 15 on advanced cardiac CPR, including 3 paediatric, and 2 neonatal resuscitation items. Questions were based on AHA guidelines. A score of $\geq 80\%$ for the CPR knowledge was deemed indicative of adequate knowledge, in line with AHA standards for BLS, ACLS and PALS certification.

Knowledge of AED availability and proficiency in their use was also assessed. The survey link was shared on WhatsApp groups for interns, Residents, and Consultants, with periodic reminders. Participation was voluntary and anonymous.

Data analysis

Data were captured into a custom-designed Microsoft Excel spreadsheet and analysed using IBM SPSS Statistics for Windows. Version 27.0 (IBM Corp., Armonk, NY: USA). Using Google Forms, most questions were made compulsory, and as such, all respondents had to fill in the questions to go from section to section, and data collected at the end was equivalent to the number of respondents who attempted and completed the questionnaire. Data was analysed to represent the different segments of the questionnaire. The chi-square

test was used to compare the results observed with the expected outcome variables.

RESULTS

Demographics of respondents

One hundred and thirteen doctors responded out of a total of 204 non-anaesthetist doctors in the hospital, with a response rate of 84% using a sample size of 134. About 32.7% of the respondents were within the age range of 41 to 50 years. Sixty-one (54.0%) of the respondents were females. Obstetrics/Gynaecology was the most represented specialty, making up 15.9% of the respondents. Thirty-eight (33.6%) of the respondents were senior registrars. However, the majority, 70 (61.9%), of the respondents had over 10 years of clinical experience. This is presented in Table 1.

Clinical experience among the respondents

Table 2 shows the clinical experience among the respondents. One hundred and seven (94.7%) of the respondents had experience in resuscitating a patient with cardiac arrest, with 39 (34.5%) having done this only once. Only 11 (9.7%) reported not knowing how to resuscitate a dying person, 10 of whom believed that it is important to know as part of the job. Seventy-five (65.5%) had experience resuscitating a dying child. Ninety-one (80.5%) of the respondents had received formal training on Basic Life Support CPR, with 44 (38.9%) having received their training over 5 years prior. Ninety-six (85.0%) of the respondents reported they could identify a defibrillator, 62 (54.9%) reported receiving training on its use, and less than half (47.8%) of the respondents had a defibrillator in their department. Table 3 shows that the overall knowledge score of the respondents ranged from 24.0 – 84.0, with a mean score of 56.96 ± 12.72 .

Attitude towards cardiopulmonary resuscitation among the respondents

Table 4 shows the respondents attitude towards CPR. Only 30 (26.5%) of the respondents had positive attitude towards performing mouth-to-mouth ventilation during CPR. A high proportion of the respondents, 98 (86.7%) felt that their knowledge of CPR was insufficient. One hundred and ten (97.3%) respondents indicated interest towards learning CPR techniques. Only 6 (5.3%) reported that they would abstain from performing CPR. Ninety-seven (85.8%) of the respondents believed that CPR training courses should be a mandatory graduation requirement for all medical students. The most favoured means for increasing awareness among Nigerian doctors was “Encourage CPR training in Continuous Professional Development,” with 61 (54.0%) of the respondents choosing this option. Only 33 (29.2%) of the respondents believed they would feel unsure of how to react when present in a scene where CPR is needed. Majority, 106 (93.8%) of the respondents reported they would consider it their duty to intervene in a situation requiring CPR. Sixty-nine (61.1%) of the respondents reported they would not feel anxious to perform CPR. Eighty-seven (77.0%) reported they would know what to do if a cardiac arrest occurs. One hundred and twelve (99.1%) see CPR as a chance to help. Seventy-three (64.6%) of the respondents reported that they would need self-protection items to perform CPR.

Association between sociodemographic and clinical experience variables and level of CPR Knowledge

This is presented in Table 5. There was no significant association between any of the selected variables and the level of CPR knowledge among the respondents.

Table 1: Descriptive characteristics of the respondents

Variable	Frequency	Percentage
Age		
20-30	28	24.8
31-40	26	23.0
41-50	37	32.7
51-60	20	17.7
61-70	2	1.8
Gender		
Male	52	46.0
Female	61	54.0
Specialty		
Medical	54	47.8
Surgical	59	52.2
Training Level		
House Officer	32	28.3
Medical Officer	3	2.7
Registrar	5	4.4
Senior Registrar	38	33.6
Consultant	35	31.0
Years of Clinical Practice		
< 5 Years	36	31.9
5-10 Years	7	6.2
> 10 Years	70	61.9

Table 2: Clinical experience among the respondents

	Frequency	Percentage
Have you ever tried to resuscitate a dying person/adult with no pulse?		
Yes	107	94.7
If yes, how many times in the past month?		
0	26	23.0
1	39	34.5
2	23	20.4
3	9	8.0
4	2	1.8
5 or more	8	7.1
Do you know how to resuscitate a dying person?		
Yes	102	90.3

If the answer to the question above is no, do you think it is important to know it as a part of your job?

Yes 10 8.8

Have you ever tried to resuscitate a dying child with no pulse?

Yes 74 65.5

Have you formally received training in Basic Life Support CPR?

Yes 91 80.5

How long ago were you trained?

<1 year 18 15.9

1 – 5 years 29 25.7

>5 years 44 38.9

Can you identify a defibrillator?

Yes 96 85.0

Have you been trained in the use of a defibrillator?

Yes 62 54.9

Do you have a defibrillator in your department?

Yes 54 47.8

Table 3: Knowledge of cardiopulmonary resuscitation among the respondents

Overall score	Range	Mean \pm SD
Knowledge	24.0 – 84.0	56.96 \pm 12.72
Knowledge Category	Frequency	Percentage
Adequate	4	3.54
Inadequate	109	96.46

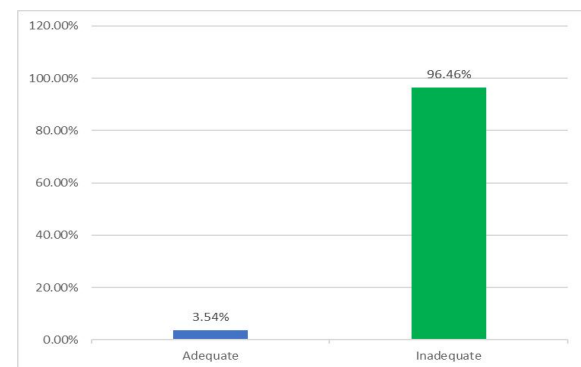
**Figure 1: Level of CPR knowledge among the respondents**

Table 4: Attitude towards cardiopulmonary resuscitation among the respondents

	Frequency	Percentage
Mouth to mouth during CPR		
Yes	30	26.5
No	83	76.5
Sufficient knowledge of CPR		
Yes	15	13.3
No	98	86.7
Learning CPR Techniques		
Yes	110	97.3
No	3	2.7
Abstain from CPR		
Yes	6	5.3
No	107	94.7
Value of CPR training course		
Mandatory for all medical students (graduation requirement)	97	85.8
Mandatory for physicians and nurses only	15	13.3
Optional	1	0.9
Improving awareness of CPR among Doctors		
Encourage increase publicity	37	32.7
Encourage CPR training in Continuous Professional Development	61	54.0
Encourage CPR training in medical school	15	13.3
I would feel unsure of how to react when present at the scene		
Yes	33	29.2
No	80	70.8
I would consider it my duty to intervene in a situation requiring CPR		
Yes	106	93.8
No	7	6.2
I would feel anxious to perform CPR		
Yes	44	38.9
No	69	61.1
I know what to do if cardiac		

arrests occur

Yes	87	77.0
No	26	23.0

I would see CPR as a chance to help

Yes	112	99.1
No	1	0.9

I would need gloves, face mask and other items relevant for self-protection to act

Yes	73	64.6
No	40	35.4

Table 5: Chi-square association between sociodemographic and clinical experience variables and level of CPR Knowledge

	Level of CPR Knowledge (% within variable)			
Variable	Adequate	Inadequate	χ^2	P
Gender				
Male	2 (3.8)	50 (96.2)	0.026	0.871
Female	2 (3.3)	59 (96.7)		
Age				
20 – 30	1 (3.6)	27 (96.4)	2.196	0.70
31 – 40	2 (7.7)	24 (92.3)		
41 – 50	1 (2.7)	36 (97.3)		
51 – 60	0 (0)	20 (100)		
61 – 70	0 (0)	2 (100)		
Years of clinical practice				
<5 years	1 (2.8)	35 (97.2)	2.524	0.283
5 – 10 years	1 (14.3)	6 (85.7)		
>10 years	2 (2.9)	68 (97.1)		
Experience resuscitating an adult				
Yes	4 (3.7)	103 (96.3)	0.233	0.630
No	0 (0)	6 (100)		
Experience resuscitating a child				
Yes	2 (2.7)	72 (97.3)	0.440	0.507
No	2 (5.1)	37 (94.9)		

DISCUSSION

The results of the study showed that most doctors needed retraining on the performance of CPR, with most having low knowledge of current AHA guidelines for performing CPR. The AHA recommends retraining every 2 years; however, studies have shown that knowledge depreciates after 3-12 months of retraining,⁷ hence the need for repeated monthly simulations. The demographics showed that most participants (63%) had practice experience of greater than 10 years, with 31% being consultants in their subspecialties. This could also explain why most participants felt inadequate to perform CPR, as this correlates with the time of the last CPR training received.

Most doctors undergo training for CPR as part of their requirements to qualify for the post-graduate professional examinations, and are often not required to do this post-qualification, except for personal self-development. This is in keeping with the findings by Olajumoke et al⁸ that consultants had a lower attendance rate for retraining courses on CPR than resident doctors. However, in the index study, there was no statistically significant difference between the number of years of practice and the knowledge competence of the responders. Thirty-eight percent (38%) of respondents in our study had undergone their last CPR training over five years ago, while 19% had never received training on BLS.

A similar finding was made by Du Plessis et al,⁹ who reported that 23 (9.4%) doctors had never received training in CPR during their undergraduate studies. Most had not attended retraining within two years, with most doctors saying they were too busy to do so. Almost all doctors (n = 237; 96.7%) felt that keeping up-to-date with current CPR guidelines would improve patient outcomes. Most consultants in their study had less confidence in their ability to perform CPR. They related this to the fact that they didn't perform CPR enough (35%), this may also be applicable to our study as consultants are often times not involved in the performance of CPR. However, over 70% of doctors, regardless of seniority, attributed their lack of confidence to a lack of recent training. The index study showed that most participants felt their CPR knowledge was inadequate

(86.7%), with most respondents (93.7%) indicating interest in learning CPR techniques and being open to refresher courses on CPR.

The knowledge competency evaluated showed that over 96% of participants did not have adequate knowledge (competence of greater than 80%). The mean average score was 55%, which is below the recommended pass score using the knowledge competence assessment of the questionnaire generated from the current AHA guideline. Similar knowledge deficiencies were reported amongst doctors and medical students in other LMICS, including South India,¹⁰ Sri Lanka,¹¹ Jamaica,¹² Ethiopia,¹³ and other parts of Nigeria.⁸ The most common recommendation on ways to improve the CPR knowledge competence by the responders was to encourage CPR training in continuous professional development; this is in line with the AHA recommendation of training and recertification every two years.

Olajumoke et al⁸ found that most medical practitioners were not competent in the performance of CPR. The inadequate knowledge was principally due to limited retraining and poor attendance at refresher courses for CPR. In Nigeria, unlike other countries, certification for ACLS and BLS is not a mandatory pre-employment requirement amongst doctors of all cadres. Development and adoption of policies that ensure this as a criterion will also help more doctors ensure proper training and recent recertifications. Bankole et al¹⁴ evaluated the knowledge of CPR pre and post training amongst doctors and found that the cadre of doctors did not affect the knowledge competence following evaluation after the training, similar to our finding about the level of experience and CPR knowledge. Consultants scored the lowest post-training. Du Plessis et al⁹ found that only 55 (22.4%) of the participants achieved an overall score of $\geq 80\%$ in knowledge competence, although the overall performance of respondents was higher than that in our study, with the mean score of about 64%. This was similar to our finding of low knowledge competency, although our average mean score was 55% for most of the respondents.

The chain of survival for both out-of-hospital and in-hospital cardiac arrest involves early

use of AEDs after initiation of high-quality CPR. In our study, evaluation of the availability and knowledge on how to use the AED revealed that only 85% of the study population could identify an AED, while only 54.9% had been trained on the use of the AED, and 47.8% had the AED readily available for use in their department. Olajumoke et al⁸ had found that only 30% in their study had knowledge on how to use an AED. This finding is significant as the likelihood of a successful CPR in a patient with cardiac arrest without the use of an AED is significantly reduced. According to the AHA, immediate CPR and the use of an AED can double or even triple the survival rates.¹⁵ Therefore, performing CPR without an AED equipped with a teleprompter that guides the physician may result in lower chances of patient survival. It is therefore imperative that the hospital needs to set up training programmes by certified trainers in-house to perform regular refresher courses for the clinical departments to boost the knowledge, confidence and practice amongst doctors. Provision of AEDs on the wards and in key areas of the hospital is also very important as knowledge of its use without availability will still result in poor outcomes. Allocation of resources for key trainings like these and adoption of action policies to implement them is often a challenge as most hospitals in Nigeria are struggling with deficiencies in basic infrastructure and healthcare equipment and have their primary focus on solving these issues.

The overall attitude to perform CPR by physicians was good however; the attitude to perform mouth-to-mouth ventilation when other aids were absent was poor, as only 30% indicated the willingness to do it. Also, most would wait for donning of Personal Protective Equipment (PPE) before commencing CPR on the patients. This could lead to a delay in the commencement of chest compression and high-quality CPR. This observation is in tandem with the findings by the AHA amongst healthcare workers attending to patients with COVID or suspected cases of COVID which is in agreement with the update on the guideline issued by the AHA, ILCOR and AHA.¹⁶ However, the recommendation is for the commencement of chest compression without delay while donning PPE when dealing with

COVID cases. The respondents in the index study were not asked about CPR for COVID-19 cases. However, their responses showed they would not initiate CPR without donning PPE leading to a delay in initiating the process and lower patient survival rates.

This index study has shown clearly that there is an overwhelming need to set up in-house training programs on cardiopulmonary resuscitation amongst doctors with regular monthly simulations as recommended by the WHO. Furthermore, there is a dire need to have dedicated CPR teams after training and overall improved knowledge amongst staff to improve outcome.

CONCLUSION

Our study revealed that the overall CPR training of most non-anaesthetist doctors was poor, with most receiving their last training more than 5 years ago. Furthermore, the knowledge competence amongst the doctors evaluated was low. However, the overall attitude to perform CPR was good. Training in CPR should be made mandatory for all medical and nursing personnel to improve their knowledge and confidence, and most importantly, patient outcomes.

Limitation of this study

The study had limitations, firstly, the assumption that anaesthetists in our centre had good training and knowledge of CPR and were therefore excluded from this study. Secondly, we did not evaluate difficulties faced by doctors in performing CPR when required to, as this information will enable us to make better recommendations to eliminate such difficulties. There is a need to assess the knowledge of nurses as they are the first responders following a cardiac arrest in-hospital.

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Conflicts of interest

There are no conflicts of interest.

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