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Knowledge and Attitudes Toward Cardiopulmonary Resuscitation Among Medical Students at Enugu State University of Science and Technology, Nigeria

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Abstract: **Background:** Cardiopulmonary resuscitation (CPR) is a fundamental life-saving intervention used in the management of cardiac arrest and other life-threatening emergencies. Medical students, as future healthcare professionals, require adequate knowledge and appropriate attitudes to recognise emergencies and respond effectively. Assessing students' understanding of CPR and their perceptions of resuscitation training can help identify educational needs within medical training programmes. **Objective:** This study assessed knowledge and attitudes towards cardiopulmonary resuscitation among medical students at Enugu State University of Science and Technology College of Medicine (ESUCOM), Nigeria. **Methods:** A cross-sectional analytical study was conducted among 213 medical students selected through a multistage sampling technique. Data were collected over 4–6 weeks using a structured, self-administered questionnaire covering sociodemographic characteristics, knowledge of CPR, and attitudes towards CPR. Data were analysed using the Statistical Package for the Social Sciences (SPSS), version 27, and Microsoft Excel. Results were summarised using frequencies and percentages. **Results:** Of the 213 respondents, 96.24% were classified as having good knowledge of CPR, while 3.76% had poor knowledge. Individual responses showed that 97.7% correctly identified the function of a defibrillator, 92.5% identified the pulse site and chest compression location, and 77.9% identified the adult compression-to-ventilation ratio as 30:2. Furthermore, 98.12% of respondents demonstrated a positive attitude towards CPR, while 1.88% demonstrated a negative attitude. Most respondents supported the inclusion of basic life support in the medical curriculum (99.1%) and considered CPR training mandatory for clinical students (98.1%). However, only 37.1% considered themselves sufficiently well trained to perform CPR, while 62.9% did not. **Conclusion:** Medical students at ESUCOM demonstrated good reported knowledge and predominantly positive attitudes towards CPR. Nevertheless, the proportion who considered themselves sufficiently trained was considerably lower than the proportion with positive attitudes. Structured CPR education, practical learning opportunities, and regular assessment may help address this perceived preparedness gap.

Keywords: Cardiopulmonary resuscitation; knowledge; attitude; medical students; basic life support; Nigeria.

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INTRODUCTION

Cardiopulmonary resuscitation (CPR) is an emergency life-saving procedure involving chest compressions, often combined with artificial ventilation, to maintain blood circulation and oxygen delivery when a person experiences cardiac arrest. It is an essential component of basic life support and is intended to preserve vital organ function until spontaneous circulation and breathing can be restored or advanced medical interventions become available [1,2]. Timely recognition of cardiac arrest and initiation of appropriate resuscitation measures are important components of emergency care.

Cardiovascular diseases remain a major public health concern worldwide. According to the World Health Organization [3], cardiovascular diseases account for a substantial proportion of global mortality, with more than three-quarters of cardiovascular-related deaths occurring in low- and middle-income countries. Behavioural and metabolic risk factors, including unhealthy dietary practices, physical inactivity, obesity, and diabetes mellitus, contribute to the burden of

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cardiovascular disease [4,5]. The potential occurrence of acute cardiovascular emergencies highlights the importance of preparing healthcare professionals to recognise and respond to life-threatening situations.

Medical students are an important group in resuscitation education because they represent the future healthcare workforce and may encounter patients requiring immediate intervention during clinical training and subsequent professional practice. Their preparedness depends partly on their understanding of CPR principles and their attitudes towards resuscitation. Appropriate education can help students recognise the importance of early intervention and understand the sequence of basic life support procedures [2].

The effectiveness of CPR depends not only on the availability of emergency equipment and trained personnel but also on the ability of individuals to recognise cardiac arrest and initiate appropriate measures without unnecessary delay. The American Heart Association emphasises the importance of early resuscitation and an appropriate emergency response in improving outcomes following sudden cardiac arrest [6]. Medical education should therefore provide students with the theoretical foundation required to understand resuscitation and prepare them for further practical training.

International resuscitation recommendations support CPR education and regular training for healthcare professionals. The American Heart Association and the International Liaison Committee on Resuscitation have published guidance on resuscitation education and basic life support [6,7]. Incorporating CPR education into medical training can help ensure that students become familiar with the principles of resuscitation before assuming greater clinical responsibilities.

Knowledge of CPR encompasses an understanding of cardiac arrest, the purpose of resuscitation, chest compression techniques, airway management, ventilation, and the use of defibrillation when indicated. Theoretical knowledge provides a foundation for recognising emergencies and understanding the sequence of resuscitative interventions. However, knowledge alone may not ensure effective performance during an actual emergency. Students must also have opportunities to develop practical competence and confidence in applying what they have learned [8,9].

Attitude towards CPR is another important dimension of resuscitation preparedness. It includes students' beliefs, perceptions, willingness, and confidence regarding the performance of CPR in emergency situations. Students may recognise the importance of resuscitation but feel inadequately prepared to undertake it because of limited training, insufficient practical exposure, or concerns about causing harm. These perceptions may influence their participation in training and their readiness to respond when a patient experiences cardiac arrest. Previous studies have examined knowledge, attitudes, and perceived barriers among healthcare students and professionals [8,10].

Previous research indicates that CPR knowledge and attitudes vary across institutions and geographical settings. A study involving medical students at Obafemi Awolowo University, Ile-Ife, Nigeria, reported that 74.9% of respondents had a positive attitude towards CPR, while 25.1% demonstrated good knowledge [2]. Research conducted at the University of Port Harcourt reported deficiencies in theoretical CPR knowledge among clinical medical students [11]. Inadequate knowledge has also been reported among clinical students in Kano, Nigeria, and among medical students in Upper Egypt [9,12].

Evidence from other countries similarly demonstrates variation in CPR preparedness among medical students. Studies conducted in Ethiopia and Saudi Arabia have examined knowledge and attitudes towards CPR in medical training settings [13,14]. Research involving medical students and junior doctors in Lebanon has also identified deficiencies in basic life support knowledge and practical competence despite generally favourable attitudes towards resuscitation [15]. These findings indicate the importance of assessing CPR knowledge and attitudes within individual institutions rather than assuming that results from one setting apply uniformly to another.

Within Enugu State and the wider South-Eastern region of Nigeria, institution-specific evidence on CPR preparedness among medical students is important for understanding local educational needs. Differences in academic exposure, curriculum, and access to practical instruction may influence students' understanding of CPR and their perceptions of their own preparedness.

Against this background, the present study assessed knowledge and attitudes towards cardiopulmonary resuscitation among medical students at Enugu State University of Science and Technology College of Medicine (ESUCOM), Nigeria. The findings provide institution-specific evidence that may inform CPR education and the development of training initiatives for medical students.

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MATERIALS AND METHODS

Study Design

A cross-sectional analytical study was conducted to assess knowledge and attitudes towards cardiopulmonary resuscitation among medical students at Enugu State University of Science and Technology (ESUT), Nigeria.

Study Area

The study was conducted at the Enugu State University of Science and Technology College of Medicine (ESUCOM), located at Park Avenue, GRA, Enugu North Local Government Area, Enugu State, Nigeria. The study involved students enrolled in the 200, 400A, 400B, 500, and 600 levels of the medical programme.

Study Population

The study population comprised medical students in the selected levels of study at ESUCOM. Students from the 200, 400A, 400B, 500, and 600 levels were included in the sampling process.

Sample Size and Sampling Technique

A total of 213 medical students participated in the study. A multistage sampling technique was used, with proportional allocation of participants across the selected levels of study.

The distribution of participants was as follows: 72 students (33.8%) from the 200 level, 37 (17.4%) from the 400B level, 31 (14.6%) from the 400A level, 40 (18.8%) from the 500 level, and 33 (15.5%) from the 600 level.

Data Collection Instrument

Data were collected using a structured, self-administered questionnaire. The questionnaire included sections on sociodemographic characteristics, knowledge of CPR, attitudes towards CPR, and other CPR-related questions from the original study.

The knowledge section assessed participants' understanding of CPR-related concepts and procedures. The attitude section examined their perceptions of CPR, support for resuscitation training, and perceived preparedness to perform the procedure.

Measurement of Knowledge and Attitude

CPR knowledge was assessed using 12 variables. Scores ranging from 0 to 5 were classified as poor knowledge, while scores from 6 to 12 were classified as good knowledge.

Attitude was assessed using eight variables. Scores from 0 to 3 were classified as poor attitude, while scores from 4 to 8 were classified as good attitude.

These categories were retained from the original study.

Data Analysis

The collected data were analysed using the Statistical Package for the Social Sciences (SPSS), version 27, and Microsoft Excel. Descriptive statistics, including frequencies and percentages, were used to summarise participants' sociodemographic characteristics and responses concerning CPR knowledge and attitudes.

Ethical Considerations

Ethical approval was obtained from the Health Research and Ethics Committee of ESUT Teaching Hospital, Parklane. Participation was based on informed consent. Confidentiality and anonymity of participants were maintained during data collection and handling.

RESULTS

Sociodemographic Characteristics of Participants

A total of 213 medical students participated in the study. The mean age of the participants was 21.47 ± 2.84 years. Nearly half were aged 20–25 years (48.4%), while 43.7% were younger than 20 years. Males accounted for 51.6% of participants and females for 48.4%.

Most participants were single (99.1%), of Igbo ethnicity (97.2%), and Christian (98.1%). Students in the 200 level constituted the largest group (33.8%), followed by students in the 500 level (18.8%).

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Table 1. Sociodemographic characteristics of medical students (n = 213)

Characteristic	Frequency (n)	Percentage (%)
Age (years)		
Below 20	93	43.7
20–25	103	48.4
26–30	16	7.5
Above 30	1	0.5
Mean age	21.47 ± 2.84	—
Gender		
Male	110	51.6
Female	103	48.4
Marital status		
Single	211	99.1
Married	1	0.5
Widowed	1	0.5
Ethnicity		
Igbo	207	97.2
Yoruba	1	0.5
Others	5	2.3
Religion		
Christianity	209	98.1
African Traditional Religion	2	0.9
Others	2	0.9
Level of study		
200 level	72	33.8
400B level	37	17.4
400A level	31	14.6
500 level	40	18.8
600 level	33	15.5
Total	**213**	**100.0***

Note: Percentages are reproduced from the original study and may vary slightly from 100% because of rounding.

Knowledge of Cardiopulmonary Resuscitation

The findings indicated that 96.24% of respondents were classified as having good knowledge of CPR, while 3.76% were classified as having poor knowledge.

Individual responses showed high awareness of several CPR-related concepts. Most respondents correctly identified the function of a defibrillator and the pulse site and chest compression location. However, responses to individual knowledge items varied.

Table 2. Selected knowledge items on cardiopulmonary resuscitation (n = 213)

Knowledge item	Reported response	Frequency (n)	Percentage (%)
Correct identification of the pulse site and chest compression location	Correct	197	92.5
Correct compression-to-ventilation ratio for adults (30:2)	Yes	166	77.9
Two rescuers performing CPR should switch roles after each cycle	Yes	168	78.9
A defibrillator is an electrical device used to deliver a shock to restore a viable heart rhythm	Yes	208	97.7
CPR must always be attempted in a hospital and not outside	No	202	94.8
CPR is generally continued until return of spontaneous circulation or death is confirmed	Yes	194	91.1

Note: These are the knowledge-item figures available in the supplied manuscript. They do not represent the complete original knowledge table.

The source reported that 92% of respondents had heard of CPR. It also reported that 62.4% correctly identified the CAB sequence and that 69.5% agreed that CPR should be performed in every cardiac emergency. Nearly all respondents

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recognised the function of a defibrillator (97.7%), while 91.1% understood that CPR is generally continued until return of spontaneous circulation or death is confirmed.

Overall, 96.24% of respondents scored between 6 and 12 and were classified as having good knowledge. The remaining 3.76% scored below 6 and were classified as having poor knowledge.

Attitudes Towards Cardiopulmonary Resuscitation

Attitudes towards CPR were predominantly positive. Most respondents supported incorporating basic life support into the medical curriculum and making CPR training mandatory for clinical students. However, a considerable proportion did not consider themselves sufficiently trained to perform CPR.

Table 3. Attitudes towards cardiopulmonary resuscitation among participants (n = 213)

Attitude statement	Response	Frequency (n)	Percentage (%)
Consider yourself sufficiently well trained to perform CPR	Yes	79	37.1
	No	134	62.9
CPR training should be mandatory for all clinical students	Yes	209	98.1
	No	4	1.9
Basic life support is necessary and should be part of the curriculum in all colleges of medicine	Yes	211	99.1
	No	2	0.9
The team member with the greatest understanding and experience should lead CPR, irrespective of professional designation	Yes	200	93.9
	No	13	6.1
CPR is complex, time-consuming, and energy-expending	Yes	56	26.3
	No	157	73.7
CPR should not be practised if the necessary equipment is unavailable	Yes	37	17.4
	No	176	82.6
It is futile to perform CPR on elderly patients	Yes	16	7.5
	No	197	92.5
Doctors should be responsible for initiating CPR	Yes	13	6.1
	No	200	93.9

The findings demonstrate strong support for CPR education among the participants. Specifically, 99.1% supported including basic life support in the medical curriculum, and 98.1% supported mandatory CPR training for clinical students. In addition, 93.9% agreed that the most experienced and knowledgeable team member should lead CPR, irrespective of professional designation.

Despite these positive attitudes, only 37.1% considered themselves sufficiently well trained to perform CPR, while 62.9% did not. This indicates that support for CPR education did not necessarily correspond to perceived personal preparedness.

The original study reported that 98.12% of respondents had a positive attitude and 1.88% had a negative attitude. Attitude scores of 4–8 were classified as good attitude, while scores of 0–3 were classified as poor attitude.

DISCUSSION

This study assessed knowledge and attitudes towards CPR among 213 medical students at Enugu State University of Science and Technology College of Medicine. The principal findings were that most participants were classified as having good CPR knowledge and positive attitudes towards resuscitation. However, a substantial proportion did not consider themselves sufficiently trained to perform CPR.

Knowledge of CPR

The study found that 96.24% of participants were classified as having good CPR knowledge, while 3.76% were classified as having poor knowledge. Responses to individual knowledge items also indicated substantial awareness of several CPR-related concepts. For example, 97.7% identified the function of a defibrillator, 92.5% correctly identified the pulse site and chest compression location, and 77.9% identified the adult compression-to-ventilation ratio as 30:2.

These findings are consistent with the Southern Nigerian study cited in the original manuscript by Fawole *et al.* [2], which reported good theoretical knowledge among a large proportion of clinical undergraduate students. However,

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studies conducted in Port Harcourt, Kano, and Upper Egypt have reported deficiencies in CPR knowledge among medical students and other clinical trainees [9,11,12].

Differences between studies may reflect variations in participant populations, training exposure, assessment instruments, and educational settings. The findings from the present study should therefore be interpreted in the context of the institution and assessment method used.

Although the overall knowledge classification was favourable, the responses to individual questions were not uniformly high. For instance, 77.9% correctly identified the adult compression-to-ventilation ratio, and 78.9% recognised the recommendation concerning switching roles between two rescuers after each cycle. These results suggest that the overall knowledge category does not eliminate the possibility of gaps in understanding specific CPR procedures.

Attitudes Towards CPR

The study reported that 98.12% of participants had a positive attitude towards CPR. Support for formal training was particularly strong: 99.1% agreed that basic life support should form part of the medical curriculum, and 98.1% supported mandatory CPR training for clinical students.

These findings indicate that most respondents recognised the educational importance of CPR. The original manuscript compares this result with research in Southern Nigeria and Ethiopia, where participants also expressed support for CPR education and its inclusion in medical training [2,13].

However, positive attitudes should not be equated with perceived readiness to perform CPR. In the present study, only 37.1% considered themselves sufficiently well trained, while 62.9% did not. This difference suggests that students could value CPR and support formal training while still feeling inadequately prepared to perform the procedure.

The findings underline the importance of distinguishing between support for resuscitation education and confidence in personal preparedness. Students may recognise the importance of CPR training without believing that they have received enough training to apply it effectively.

Implications for Medical Education

The high proportions of respondents classified as having good knowledge and positive attitudes provide a useful foundation for CPR education at ESUCOM. Nevertheless, the proportion who considered themselves sufficiently trained was much lower than the proportion who supported mandatory training. This finding supports the consideration of educational approaches that address both theoretical knowledge and students' perceived preparedness.

Structured teaching, practical demonstrations, simulation-based learning, and opportunities for repeated practice may be considered within the medical curriculum. Regular assessment could also help educators identify specific knowledge gaps and areas where students require additional support. These approaches are educational implications of the findings; the present cross-sectional study did not directly test the effectiveness of any training intervention.

Study Limitations

Several limitations should be considered when interpreting the findings. First, the study was conducted at a single medical college, limiting the extent to which the results can be generalised to medical students in other institutions or regions.

Second, the study relied on a self-administered questionnaire. Responses may therefore have been affected by recall or reporting bias. Third, the study's classification of knowledge and attitude was based on the score thresholds specified in the original methodology. The findings should be interpreted according to these classifications.

Finally, the study assessed reported knowledge and attitudes and did not establish practical competence through an independently observed skills examination. Consequently, a good knowledge score or positive attitude should not be interpreted as proof of competent performance during an actual cardiac emergency.

CONCLUSION

Medical students at Enugu State University of Science and Technology College of Medicine generally demonstrated good reported knowledge of CPR and predominantly positive attitudes towards resuscitation. Most participants supported the inclusion of basic life support in the medical curriculum and considered CPR training mandatory for clinical students.

Despite these favourable findings, only 37.1% considered themselves sufficiently well trained to perform CPR, while 62.9% did not. This indicates a difference between positive attitudes towards CPR and perceived personal preparedness.

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The findings support continued attention to CPR education within medical training. Structured teaching, practical learning opportunities, and regular assessment may help address perceived training needs. Further research incorporating objective assessment of CPR skills would help determine how well reported knowledge and attitudes correspond to practical competence.

Recommendations

Based on the findings of the study, the following recommendations are proposed:

1. **For the College of Medicine:** Maintain CPR and basic life support education as an important component of medical training.
2. **For medical educators:** Provide structured CPR instruction and opportunities for students to practise resuscitation procedures under appropriate supervision.
3. **For curriculum planners:** Consider regular assessment of CPR knowledge and practical skills to identify areas where additional teaching may be needed.
4. **For medical students:** Participate actively in available CPR education and seek opportunities to strengthen their understanding of resuscitation procedures.
5. **For future researchers:** Conduct studies using objective CPR skills assessments and examine the relationship between knowledge, attitudes, confidence, and practical competence.

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