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Comparative Study to Assess the Knowledge of Cardiopulmonary Resuscitation among Medical and Nursing Students in Federal University Birnin Kebbi

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Abstract **Original Research Article**

Cardiopulmonary arrest is a life-threatening critical medical emergency requiring immediate intervention through cardiopulmonary resuscitation (CPR) and can result in fatality if not addressed promptly. It requires timely and effective management to prevent mortality. Nurses play a crucial role in early detection and intervention, making their knowledge towards this condition essential in clinical settings. This study aims to assess the knowledge of nursing students at Federal University Birnin Kebbi regarding the knowledge of Cardiopulmonary resuscitation. A descriptive cross-sectional research design was utilized to gather data from 211 nursing students at the Federal University Birnin Kebbi, selected from a total population of 544 (medical students 216, 316 nursing) using stratified sampling technique. Data was collected using a self-structured questionnaire. The collected data were coded and analyzed with Microsoft Excel 2007 and SPSS version 26.0 respectively. The study revealed that MBBS and nursing students 22.3% and 77.7% respectively had average knowledge of cardiopulmonary resuscitation, 73.2% and 75.2% demonstrated good knowledge, respectively, and 7.3% and 5.4% exhibited poor knowledge, respectively. Furthermore, 77.7% of participants had previous knowledge of CPR, while only 22.3% had no previous knowledge of CPR. A statistically significant association was identified between level of study and socio-demographic variables, including age (16-21) and programme of study ($p < 0.001$). In conclusion, while a significant proportion of MBBS and nursing students exhibited average knowledge regarding CPR, the majority displayed a neutral knowledge towards its management. The findings suggest a need for targeted educational strategies that enhance MBBS and nursing students' knowledge and practical skills CPR, particularly through clinical simulations and case-based learning to prepare students more effectively for real-world healthcare challenges.

Keywords: Knowledge, Cardiopulmonary resuscitation, MBBS & Nursing students, Federal University Birnin Kebbi.

INTRODUCTION

Cardiopulmonary arrest is a life-threatening critical medical emergency requiring immediate intervention through cardiopulmonary resuscitation (CPR) and can result in fatality if not addressed promptly (Patel & Hipskind, 2023). Cardiovascular disease (CVD) has been identified as the leading cause of mortality, accounting for over 40% of all deaths in Africa (Kengne, 2020). Each year, approximately 2.5 million people in China die from sudden cardiac arrest, making it the leading cause of death globally (Yu *et al.,*2025). It represents a significant global health burden, particularly in low- and middle-income countries where limited resources and inadequate healthcare infrastructure often hinder timely and effective treatment (Al-Awar *et al.,*2025). Cardiopulmonary resuscitation which combines chest compressions, ventilation, cardioversion or defibrillation and cardiac pacing is vital to preventing irreversible organ damage and improving survival outcomes following cardiac arrest (Patel & Hipskind, 2023). "The knowledge and proficiency of healthcare providers in performing CPR are crucial to delivering high-quality resuscitation and ensuring favorable patient outcomes (Zaki *et al.,*2025). Adult cardiopulmonary arrest can be caused by a number of factors, which differ depending on the age and population. Patients with heart conditions, however, are at a higher risk of experiencing a cardiac arrest. Additionally, it can be divided into many groups, such as traumatic, respiratory, and cardiac reasons. According to some estimates, coronary artery

disorders account for 75% of cardiac arrest events (Nikas *et al.,*2023). The ability of future healthcare providers to effectively perform Cardiopulmonary Resuscitation (CPR) is a critical determinant of patient survival following cardiac arrest (Nolan *et al.,*2021). Early, high-quality CPR is the cornerstone of the management of cardiopulmonary arrest, emphasizing the need for robust educational programs in all health professions (Perkins *et al.,*2022)

In the United States, nearly 500,000 people die from sudden cardiac arrest annually and more than 70% of sudden cardiac arrests occur outside of hospitals each year (Girotra *et al.,*2015). However, data indicates that healthcare professionals around the world continue to lack basic CPR knowledge and abilities, highlighting the critical need for standardized training and continuous skill development to preserve clinical competency and emergency preparedness (Khan *et al.,*2025). Out-of-hospital cardiac arrest (OHCA) is a significant cause of out-of-hospital deaths and has emerged as a major public health issue across the globe. The incidence of OHCA ranges from 40.8 to 100.2 per 100,000 person-years worldwide (Nishiyama *et al.,*2023). The latest report indicates that the overall incidence of OHCA in China is 97.1 per 100,000 person-years, showing an upward trend compared to 10 years ago (Chen *et al.,*2022). More than 230 million people in China have cardiovascular disease, and each year, 550,000 individuals experience cardiac arrest, with a survival rate estimated to be 1.2% (Xu *et al.,*2017). Initiating bystander cardiopulmonary resuscitation (CPR) early is a critical contributing factor in improving survival rates for OHCA (Panchal *et al.,*2020). Studies have demonstrated that patients who received CPR from bystanders had a 2.6 times higher 30-day survival rate than those who did not receive CPR (Panchal *et al.,*2020). However, the average rate of bystander CPR performed in China is only 17% (Chen *et al.,*2022), whereas in the USA, England, France, and Europe, it is approximately 40.2, 55.2, 51, and 58%, respectively (Reuter *et al.,*2021).

Statement of Problem

Nurses are often the healthcare providers closest to the bed side and the first to respond to patient's needs, therefore their knowledge of CPR and skills need to be optimal (Oermann, et al, 2024). Nurses' competency in cardiopulmonary resuscitation is a critical factor in determining successful patient outcomes from a cardiac arrest (Zuercher *et al.,*2024). It is however unfortunate that in spite of all the advantages and benefits of cardiopulmonary resuscitation, findings from studies have compelling evidence that suggests that nurses across continents lack adequate knowledge and competence in the performance of cardiopulmonary resuscitation (Mekhlafi *et al.,*2023). Despite the universally acknowledged importance of CPR, various studies conducted within Nigeria consistently report suboptimal levels of knowledge and practical skills among healthcare students, often falling below the internationally recommended standards of the American Heart Association (AA) and the European Resuscitation Council (ERC) (Adewale *et al.,*2021). This observed gap between expected competency and actual proficiency compromises patient safety and contributes to poor clinical outcomes. Absence of efficient Emergency Medical Services (EMS) and ambulance systems means that a victim often depends solely on the first person to recognize the emergency (Okonkwo *et al.,*2024). A lack of specialized cardiac centers and equipment for definitive treatment leads to high case-fatality rates once a cardiac event occurs (World Heart Federation, 2023). Since professional EMS is often absent or delayed, early initiation of Cardiopulmonary Resuscitation (CPR) by bystanders or first responders (including students) is a proven key to improving cardiac arrest survival (Perkins *et al.,*2022).

Research repeatedly shows a concerning gap in the CPR knowledge and skills of even future healthcare professionals, such as medical and nursing students in Nigeria. Studies report that a significant percentage of students and even qualified healthcare workers have poor or insufficient CPR knowledge and a low level of practical experience (Ativie *et al.,*2018; Nwobi *et al.,*2024). Furthermore, there is often a lack of standardized, high-quality, and compulsory CPR training across different healthcare professional programs, creating an unknown disparity in competency between cadres like medical and nursing students who will work side-by-side in emergency settings.

General Objective

The broad objective of this study is to conduct a comparative study to assess and compare the theoretical knowledge of Cardiopulmonary Resuscitation among medical and nursing students at the Federal University, Birnin Kebbi.

Specific Objectives

- Determine the level of theoretical knowledge of Cardiopulmonary Resuscitation among medical students at Federal University, Birnin Kebbi
- Ascertain the level of theoretical knowledge of Cardiopulmonary Resuscitation among nursing students at Federal University, Birnin Kebbi
- Compare the overall mean knowledge scores of Cardiopulmonary Resuscitation between medical and nursing students at Federal University, Birnin Kebbi.
- Determine the association between students' demographics (e.g., year of study, gender) and their CPR knowledge levels in both programs.

METHODOLOGY

Descriptive cross-sectional survey design was utilized to assess the knowledge of cardiopulmonary resuscitation among medical and nursing students in Federal University, Birnin Kebbi. The target population

for the study were undergraduate medical and nursing students (100 to 500 level) of Federal University Birnin Kebbi with sample size of 231. Stratified random sampling technique was used for the study. The instrument for data collection was a self-structured closed-ended questionnaire to suit the research objectives. Test-retest reliability was utilized in this study; The reliability was calculated using Spearman's Brown formula (split half reliability method). The reliability value is 0.75 and found to be highly reliable for the main study. Data was analyzed using descriptive and inferential statistics with the aid of IBM SPSS Statistics for version 20.0.

Findings

SOCIO-DEMOGRAPHIC VARIABLES

Table 4.1 Respondents' socio-demographic variables N=211

Variable	Category	Frequency	Percentage (%)
Age (years)	16–21	63	29.9
	22–26	129	61.1
	27–31	9	4.3
	≥32	10	4.7
Sex	Male	89	42.2
	Female	122	57.8
Marital Status	Single	180	85.3
	Married	31	14.7
Level of Study	100 Level	34	16.1
	200 Level	33	15.6
	300 Level	45	21.3
	400 Level	64	30.3
	500 Level	35	16.6
Ethnicity	Hausa	112	53.1
	Yoruba	76	36.0
	Igbo	13	6.2
	Others	10	4.7
Religion	Islam	183	86.7
	Christianity	28	13.3
Programme	MBBS	82	38.9
	Nursing	129	61.1
Previous Knowledge of CPR	Yes	164	77.7
	No	47	22.3

The table 4.1 revealed that the majority of respondents were in the 22–26 years age group 129 (61.1%), followed by the 16–21 years group 63 (29.9%). Those aged 27–31 years and ≥32 years constituted the smallest groups, with 9 (4.3%) and 10 (4.7%), respectively. In terms of Sex, the sample was predominantly female 122 (57.8%), while males accounted for 89 (42.2%). Regarding Marital Status, the vast majority was single 180 (85.3%), with married respondents making up 31 (14.7%). For Level of Study, the largest group was the 400 Level students 64 (30.3%), followed by 300 Level 45 (21.3%). The remaining levels were 500 Level 35 (16.6%), 100 Level 34 (16.1%), and 200 Level 33 (15.6%). Concerning Ethnicity, the Hausa ethnic group was the largest 112 (53.1%), followed by Yoruba 76 (36.0%), Igbo 13 (6.2%), and Others 10 (4.7%). The predominant Religion was Islam 183 (86.7%), while Christianity accounted for 28 (13.3%). Finally, based on Programme, the sample was composed mainly of Nursing students 129 (61.1%) versus MBBS students 82 (38.9%). A large majority of all students reported having Previous Knowledge of CPR 164 (77.7%), compared to 47 (22.3%) who did not

4.2 Knowledge of Theoretical Knowledge Cardiopulmonary Resuscitation

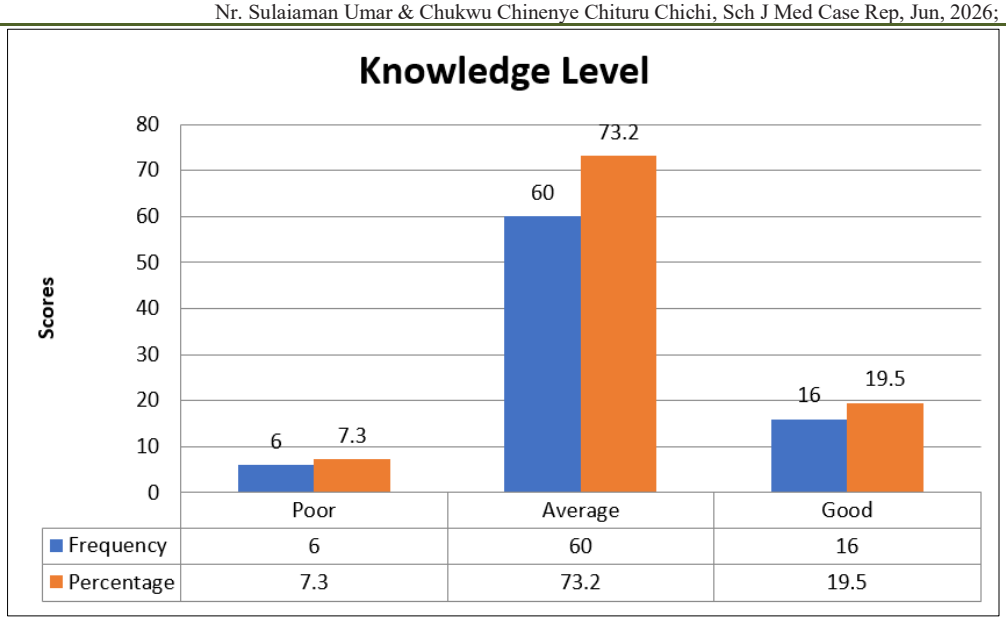

Figure 4.1 MBBS student theoritical Knowledge level of CPR N=211

As shown in the figure 4.1, the majority of MBBS students demonstrated an average level of knowledge (60 respondents, 73.2%). This was followed by 16 respondents (19.5%) who exhibited a good level of knowledge, while the smallest group was the 6 respondents (7.3%) who had a poor level of knowledge.

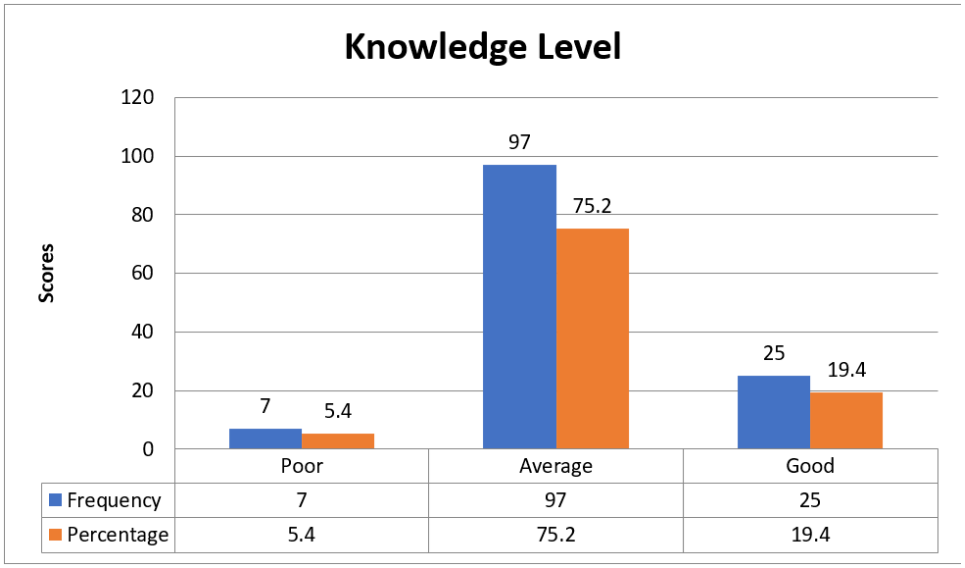

Figure 4.2 Nursing student theoretical Knowledge level of CPR N=211

As shown in figure 4.2, the vast majority of nursing students demonstrated an average level of knowledge (97 respondents, 75.2%). This was followed by 25 respondents (19.4%) who exhibited a good level of knowledge, while the smallest group was the 7 respondents (5.4%) who had a poor level of knowledge.

Table 4.2: Comparison of Mean Scores between MBBS and Nursing Students knowledge of CPR N=211

Programme	N	Mean	Std. Deviation	t(df)	p-value	Mean Difference
MBBS	82	10.67	2.57	-0.23 (209)	0.822	-0.08
Nursing	129	10.75	2.46			

In table 4.2, there was no statistically significant difference between MBBS and Nursing students' knowledge of CPR (t(209) = -0.23, p = 0.822). This indicates that both groups demonstrated similar mean scores.

Table 4.4: Association between selected socio-demographic variables and knowledge level of CPR among respondents N=211

Variables	Knowledge Level					
	Poor	Average	Good	χ^2	df	p-value
Age (years)	**F(%)**	**F(%)**	**F(%)**			
16–21	9 (14.3%)	39 (61.9%)	15 (23.8%)	17.415[a]	6	0.586
22–26	4 (3.2%)	99 (79.2%)	22 (17.6%)			
27–31	0 (0.0%)	9 (100.0%)	0 (0.0%)			
≥32	0 (0.0%)	10 (100.0%)	0 (0.0%)			
Sex						
Male	9 (10.1%)	71 (79.8%)	9 (10.1%)	9.231[a]	2	0.010
Female	4 (3.4%)	86 (72.9%)	28 (23.7%)			
Level of Study				23.028[a]	8	0.003
100 Level	5 (15.6%)	26 (81.3%)	1 (3.1%)			
200 Level	1 (3.0%)	23 (69.7%)	9 (27.3%)			
300 Level	0 (0.0%)	33 (75.0%)	11 (25.0%)			
400 Level	2 (3.2%)	47 (74.6%)	14 (22.2%)			
500 Level	5 (14.3%)	28 (80.0%)	2 (5.7%)			
Programme						
MBBS	6 (7.4%)	60 (74.1%)	15 (18.5%)	0.355[a]	2	0.837
Nursing	7 (5.6%)	97 (77.0%)	22 (17.5%)			
Previous Knowledge of CPR						
Yes	4 (2.4%)	123 (75.0%)	37 (22.6%)	28.324[a]	2	0.000
No	9 (20.9%)	34 (79.1%)	0 (0.0%)			

Table 4.4 shows the association between selected socio-demographic variables and respondents' knowledge level of CPR. There was no significant association between age and knowledge level, $\chi^2(6, N = 211) = 17.415$, $p = .586$. However, sex was significantly associated with CPR knowledge, $\chi^2(2, N = 211) = 9.231$, $p = .010$. Level of study also showed a significant relationship with knowledge, $\chi^2(8, N = 211) = 23.028$, $p = .003$. There was no significant association between programme of study and knowledge level, $\chi^2(2, N = 211) = 0.355$, $p = .837$. Previous knowledge of CPR was highly significantly associated with respondents' knowledge level, $\chi^2(2, N = 211) = 28.324$, $p < .001$.

DISCUSSION

Findings according to socio-demographic variables, the result shows that respondents between the ages of 22-26 have the highest frequency and percentage of 129 (61.1%) followed by the respondents between the ages of 16-21 with 63 (29.9%) then 32 and above with 10 (4.7%) and lastly respondents with the lowest frequency and percentage are those between the ages of 27 and 31 with 9 (4.3%). Majority of the respondents were female accounting for 122 (57.8%), while the male were 89 with 42.2%. Also, the table displays the marital status of the study participants in which 180 of the respondents were single with the highest percentage of 85.3%, the married summed up to 31 which is 14.7%. Respondents from 400level were the highest with the frequency of 64 (30.3%) followed by 300 level with the second highest frequency of 45 (21.3%), then respondents from the 500 level, 100 level and 200 level are within the same range of 35 (16.6%), 34 (16.1%) and 33 (15.6%). In terms of the ethnicity of the respondents, the Hausas accounted for 112 (53.1%), the yorubas accounted for 76 (36.0%), Yorub (17.8%), Igbos accounted for 13 (6.2%) and the least of responses came from other unspecified ethnicity which accounted for 10 (4.7%). Moreover, the table gives information on the religion of the respondents in which 183 with a percentage of 86.7% practices Islam and the minority, 28 with 13.3% practices Christianity. Moving to the area of programme, 129 students were from nursing and 82 students were from MBBS which accounted for 61.1% and 38.9% respectively.

Data on respondents' previous knowledge majority had previous knowledge of cardiopulmonary resuscitation accounting for 164 (77.7%) while only 47 (22.3%) of the respondents did not have previous knowledge of cardiopulmonary resuscitation.

The result shows that, the respondents' scores of knowledges of management of cardiopulmonary resuscitation were categorized into poor, average and good level of knowledge. Respondents from MBBS with average knowledge score were the majority making up to 73.2% of the study sample with the highest frequency of 60. This is followed by respondents with good knowledge level which are 19.5% summing up to 16 of the sample. Respondents with poor knowledge level had the lowest frequency and percentage accounting for 6 and 7.3% respectively. Respondents from nursing with average knowledge score were the majority making up to 75.2% of the study sample with the highest frequency of 97. This is followed by respondents with good knowledge level which are 19.4% summing up to 25 of

the sample. Respondents with poor knowledge level had the lowest frequency and percentage accounting for 7 and 5.4% respectively.

The findings showed that there was no statistically significant association between MBBS and nursing student respondents and their level of knowledge**, (T(209) =0.230)** *P*-value <**.822**, df **= -0.08**. There was no significant relationship between age and knowledge level, X^2=17.415, *P*-value = .586. However, sex was significantly associated with CPR knowledge, x^2=9.231, P-value .**010**. Also, there was significant relationship between the respondents' level of study and their knowledge status, X^2 = 23.028, *P*-value = .003. There was significant association between the previous knowledge of CPR of the respondents and their level of knowledge, X^2 = 28.324, *P*-value <**.001**.

Relationship with Other Studies

The results revealed that, 75.2% nursing students have average knowledge CPR,19.4 % have good knowledge, and only 5.4% have poor knowledge. Therefore, the $H_{0:1}$ was rejected, while the $H_{1:1}$ was accepted, Our study found that the mean score for resuscitation knowledge was moderate, a finding that parallels that of Sachdeva (2020) in a tertiary care hospital in India that aimed to assess knowledge and practice of CPR-D among nurses. In another study, nurses enrolled at Umm Al-Qura University were found to have moderate levels of CPR-D knowledge and practical skills (Shammah *et al.,*2020). The study also showed that 73.2% of MBBS students have an average knowledge on CPR, 19.5% have good knowledge while only 7.3% have poor knowledge. Therefore $H_{0:2}$ was rejected while $H_{2:2}$ was accepted.

The finding shows that there was no association between the age of the respondents and their level of knowledge, X2=17.415[a], *P*-value = 0.586, df = 6. But, there was a significant relationship between level of study and knowledge level X2= 23.028[a], *P*-value = 0.003, df = 8. However, there was no significant association between the sex of the respondents with their knowledge level, X2 =9.231, *P*-value 0.010, df = 2. There was no significant association between programme of study and knowledge level, $\chi^2(2, N = 211) = 0.355$, p = .837. Previous knowledge of CPR was highly significantly associated with respondents' knowledge level, X2 = 28.324, P-value =.001. Therefore, our study also revealed that the mean score was moderate, a study that was not in line with majority of the studies that revealed the knowledge of CPR among MBBS students of other medical schools were not satisfactory. This study also revealed that, there was no statistically significant difference between MBBS and Nursing student knowledge of CPR. This indicates that both groups demonstrated similar mean scores which is also in line with other research studies the research carried out by Ativie *et al.,*(2021) which revealed that both nursing and MBBS students exhibit moderate knowledge levels of CPR"

CONCLUSION

Majority of MBBS and nursing student respondent had average knowledge on cardiopulmonary resuscitation, both groups showed a statistically significant association between their respondents and their level of knowledge with their selected socio-demographic variables (age and previous knowledge of CPR).

Summary

The result shows that respondents between the ages of 22- 129 (61.1%), followed by the respondents between the ages of 16-21 with 63 (29.9%) then 32 and above with 10 (4.7%) and lastly respondents between the ages of 27 and 31 with 9 (4.3%). Majority of the respondents were female accounting for 122 (57.8%), while the males were 89 with 42.2%. Also, the marital status of the study participants in which 180 of the respondents were single with the highest percentage of 85.3%, the married summed up to 31 which is 14.7%. Respondents from 400 level 64 (30.3%), followed by 300 level of 45 (21.3%), then respondents from the 500 level, 100 level and 200 level within the same range of 35 (16.6%), 34 (16.1%) and 33 (15.6%).

RECOMMENDATION

In view of the study findings, the researcher recommends the following:

1. Since students demonstrated only average knowledge, expanding the curriculum to cover CPR knowledge in detail, including real-life case studies and practical scenarios will help equip students with the necessary knowledge.
2. Take advantage of the previous knowledge of most students by introducing engaging teaching methods such as simulation-based training, visual aids, etc that inspire further interest and commitment to learning about CPR.
3. If average knowledge is prevalent among nursing and MBBS students, the profession as a whole may need to raise the standard of competency for entry into practice, particularly in emergency care settings. This could mean advocating for stronger critical care components in nursing and MBBS curricula or certification.
4. Increase clinical rotation opportunities in emergency departments or trauma units where students can observe and participate in the cardiac arrest under the supervision of experienced professionals.
5. Foster a collaborative environment where students can learn from each other. Those with more knowledge or experience can help their peers, creating a supportive learning culture.

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