**Original**

# Knowledge, Attitude, and Practice of Basic Life Support Skills Among Undergraduate Students at the University of Port Harcourt Rivers State Nigeria

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## Abstract

**Background:** Cardiorespiratory arrest incidents are rising globally, increasing the need for adequate knowledge, positive attitudes, and effective practice of Basic Life Support (BLS) to reduce mortalities. BLS consists of lifesaving procedures to keep a person alive after a cardiac arrest. This study aimed to assess the knowledge, attitude, and practice of BLS among undergraduate students at the University of Port Harcourt.

**Methods:** A descriptive cross-sectional study with multi-stage sampling was employed. An online self-administered questionnaire was completed by 494 undergraduate students at the institution. Data were analyzed using IBM Statistical Product and Service Solutions (SPSS) version 27. Data were summarized using means, frequency, proportions, Chi-square and regression analysis; p-value of $\leq 0.05$ was considered significant

**Results:** Of the 494 respondents, 53.6% had heard of BLS, mostly learning about it in school, but only 12.8% had good knowledge, and 60.1% had poor knowledge. Medical students showed better knowledge than non-medical students. 77.8% believed BLS was necessary, 56.7% had a positive attitude, 14.2% had practiced BLS, and 78.6% had good practice. 95.3% were willing to undergo BLS training, and 92.7% wanted it included in the curriculum.

**Conclusion:** Most students had poor knowledge and practice of BLS, but many had a positive attitude. Many were willing to be trained and desired BLS training in the curriculum. Comprehensive strategic plans should be developed in the institution to ensure all students are trained, and re-trained in BLS, irrespective of gender, age, department and faculty of study.

**Keywords:** Basic Life Support, Practice, Knowledge, Attitude, Students.

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## Introduction

The knowledge, attitude and practice of Basic Life Support (BLS) among the public, including undergraduate students, are crucial for improving the chances of survival in cardiac arrest emergencies.

Life-threatening conditions, such as cardiopulmonary arrest, can occur unexpectedly[1]. BLS is defined as the level of medical care for patients with life-threatening illnesses or conditions until a standard full-scale care is available[2]. It is a series of treatments to maintain respiration and circulation in the victim[2]. The immediate care received by individuals in such emergencies is crucial in determining their survival[2]. The "chain of survival" for these patients includes early recognition of medical emergencies, initiation of BLS, defibrillation, advanced life support, and post-recovery care[3]. There are five basic steps involved in BLS, and they include Assessing the safety of the environment and checking responsiveness, assessing the patient's airway, breathing and circulation, call for help, chest compressions and use of Automated external defibrillators (AED)[2, 3].

Non-communicable diseases (NCDs), including cardiovascular diseases (CVDs), are on the rise globally, with sudden cardiac arrests accounting for 30% of the cause[4]. In a study conducted in India, 70% of deaths in 2015 were due to NCDs[5]. While infectious diseases have traditionally been a public health focus in Africa, NCDs, particularly CVDs, are becoming leading causes of morbidity and mortality[6]. The World Health Organization (WHO) has highlighted that NCDs now account for a significant burden in Africa, with cardiovascular diseases contributing to 50% of that burden[7]. In Nigeria, the problem is not only the rising incidence of CVDs but also a substantial gap in BLS knowledge and practice, particularly among non-health workers, including university students[8]. Although medical schools in developed countries provide BLS training as part of their curriculum, this is not standard practice in Nigeria, where BLS training is not typically included in the national curriculum[8].

Global studies show that despite a positive attitude towards BLS, undergraduate students, particularly non-medical ones, often have average knowledge and poor practice of these skills[1]. BLS knowledge among students varies across regions: 39.2% in Saudi Arabia, 43.7% in Iran, 74.3% in Egypt, and 44.0% in Iraq[9, 10]. Similarly, studies from Saudi Arabia and Addis Ababa reported BLS knowledge levels of 50.0%, 45.8%, 40%, and 50.3%, respectively[9, 11, 12]. In Ethiopia, a study among non-medical participants found that 44.4% had good knowledge of BLS, while a Ugandan study among medical students showed only 29.3% had good knowledge[13, 14]. However, 97.7% expressed interest in incorporating BLS into their curriculum[14], reflecting a broad consensus on the need for BLS training. In Nigeria, a study in Ibadan reported 82.5% awareness of BLS among final-year undergraduate students across various faculties[15]. Another study among medical students in Southwest Nigeria revealed 79.2% awareness, but only 29% had good knowledge, and many lacked confidences in performing BLS (67.1%) or using an AED (85.7%)[16].

Despite this, most students supported the integration of BLS training into the university curriculum to improve participation and accessibility[16]. In response to this gap in knowledge and practice, international organizations like the International Liaison Committee on Resuscitation (ILCOR), the European Parliament, and the World Health Organization (WHO) have recommended including Cardiopulmonary Resuscitation (CPR) and BLS training in school curricula[2]. This strategy has been successfully implemented in several schools across Europe and the United States, increasing BLS knowledge and skills[16]. However, such programs are rare in Nigeria, where BLS training is typically limited to medical trainees, healthcare professionals, and paramedics.

A French retrospective cohort study of 52,303 patients who experienced out-of-hospital cardiac arrest (OHCA) between July 2011 and September 2021 revealed that 56.2% of patients received bystander BLS, and 7.6% of those survived for over 30 days[17]. In contrast, only 2.5% of those who did not receive bystander BLS survived for 30 days[17]. This finding underscores the critical role that bystander BLS plays in improving survival outcomes for cardiac arrest victims.

Despite the importance of BLS, there is a lack of studies and training programs focused on BLS in Nigeria, especially within institutions of higher learning such as the University of Port Harcourt[18]. This gap puts the population at high risk for morbidity and mortality associated with sudden cardiac arrest. Therefore, this study seeks to assess the knowledge, attitude, and practice of BLS among University of Port Harcourt students to improve available data and encourage the adoption of BLS training within the university. This, in turn, could help reduce the risk of morbidity and mortality linked to out-of-hospital cardiac arrests, both within and outside the university community.

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## Methods

### Study Design

A descriptive cross-sectional study was employed for this study.

### Study Settings

The study was conducted in the University of Port-Harcourt popularly known as UNIPORT[19] It is in Choba in Port-Harcourt, Obio-Akpor Local Government Area, Rivers state[20]. It is in the north-western part of Port Harcourt, the capital city of Rivers State[21]. The university which provides numerous academic and non-academic services and facilities to students currently has 14 faculties which are located amongst the three campuses of the university namely Abuja, Delta and Choba campuses, all occupying approximately 3.84 square kilometer of built-up land area[19]. The healthcare services available to the students and staff of the University of Port Harcourt include the O. B. Lulu-Briggs Health Center, primarily, and the University of Port Harcourt Teaching Hospital (UPTH)[22][23].

### Study Participants

The participants for this study included all undergraduate students currently enrolled in the university of Port-Harcourt.

### Sample Size

To get the minimum sample size. The minimum sample size was determined using the Cochran's formula:

$$n = \frac{z^2 pq}{e^2}$$

n is the sample size in terms of number of students, e is the error tolerance (level) or margin of error set at 0.05, a prevalence rate (p) was estimated as 0.383 from a previous study that was carried out among public health nurse practitioners in Cross-River's state[24], q = (1-p), z is z-score value found on the z-score table (1.96). The calculated sample size was adjusted for non-response assuming a non-response rate of 10%. Hence the minimum sample size for this study was estimated to be 403 students.

### Sampling Technique

A multi-stage sampling technique was used. The University has 14 faculties which are Basic medical sciences, Clinical sciences, Humanities, Social sciences, Science, Science laboratory technology, Education, Engineering, Management sciences, Agriculture, Pharmaceutical science, Dentistry, Law, and Communication and media studies[30]. **The first stage** was the selection of four faculties from the list of fourteen faculties in the university using simple random sampling by balloting, **the second stage** was selection of 2 departments from the list of departments in each of the four faculties through simple random sampling by balloting. Department of sociology and department of geography and environmental management were selected out of the 5 departments in faculty of social sciences, department of petroleum engineering and electrical and electronic engineering department were selected out of the 7 departments in faculty of engineering, faculty of dentistry has only one department (department of dentistry) so it was automatically chosen, physiology department and pharmacology department were selected out of the 5 departments in faculty of basic medical sciences. **The third stage** was selection of the classes/levels to be studied from each department and all levels were selected from each department. Proportional allocation of the stratified random sampling method was used to determine the number of students that will be gotten from each department and levels

### Study Instrument

It was a semi-structured self-administered questionnaire adapted from questionnaires used in previous related studies[9][14][25][26][27][28]. The questionnaire was divided into four sub-sections starting with a brief introduction of the study and the principal investigators. It also sought the consent of participants. The first section covered the Socio-demographic information of the participants, the second section assessed the knowledge of BLS skills of the participants, the third section assessed the attitude of BLS skills among the participants and the fourth section assessed the practice of BLS skills among the participants.

The questionnaires were designed using "Microsoft forms" and distributed online. The aim of the research was explained to the students, as well as the instructions on how to fill the questionnaire. The link to the questionnaire was then sent to each selected respondent, and each respondent was followed up until all the responses were received.

### Data Analysis

The data was cleaned by inspecting the questionnaires for completeness and analyzed using IBM Statistical Product for Service Solutions (SPSS) version 27 [29]. Numerical variables were summarized as means and standard deviations, while categorical data was summarized using proportions and percentages.
The association between categorical variables was analyzed using the Chi square test (or Fischer's test,

when necessary) and bivariate logistic regression analysis to characterize the dependence of each response variable on explanatory variable and describe the outcome or response variable. A P value < 0.05 will be considered statistically significant.

### Study Duration
This study was carried out from January 2024 to July 2024

### Results

**Table 1:** Social Demographic Characteristics

| Variables | Frequency | Percentage |
|---|---|---|
| Age group | | |
| 16-20 years | 215 | 43.5 |
| 21-25 years | 231 | 46.8 |
| 26-30 years | 42 | 8.5 |
| >30 years | 6 | 1.2 |
| Gender | | |
| Female | 204 | 41.3 |
| Male | 290 | 58.7 |
| Religion | | |
| Christianity | 482 | 97.6 |
| Muslim | 6 | 1.2 |
| Others | 6 | 1.2 |
| Ethnicity | | |
| Bonny | 6 | 1.2 |
| Etche | 19 | 3.8 |
| Hausa | 2 | 0.4 |
| Igbo | 164 | 33.2 |
| Ikwere | 58 | 11.7 |
| Ogoni | 28 | 5.7 |
| Okrika | 25 | 5.1 |
| Others | 124 | 25.1 |
| Urhobo | 37 | 7.5 |
| Yoruba | 31 | 6.3 |
| Faculty | | |
| Basic Medical Science | 172 | 34.8 |
| Dentistry | 52 | 10.5 |
| Engineering | 135 | 27.3 |

| Variables | Frequency | Percentage |
|---|---|---|
| Social Science | 135 | 27.3 |
| Department | | |
| Medicine | 32 | 6.5 |
| Dentistry | 52 | 10.5 |
| Electrical and Electronics | 57 | 11.5 |
| Geography | 69 | 14.0 |
| Petroleum Engineering | 78 | 15.8 |
| Physiology | 141 | 28.5 |
| Sociology | 65 | 13.2 |

The table shows that the ages of the respondents were between 16 and 38 years, with most of them between 21 and 25 years (46.8%), and the mean age +/- SD was 21.33 +/- 3.31 years. 58.7% of the respondents were males while the rest were females. 97.6% (482) of the participants were Christians, 1.2% (6) were Muslims, and 1.2% (6) were neither Christians nor Muslims. 33.2% (164) were Igbos, 11.7% were Ikwerre, and 0.4%(2) were Hausa.

172 (34.8%) participants were students from the faculty of basic medical science; 52 (10.5%) from the faculty of dentistry, and 27.3% (135) from the faculty of engineering and social sciences.
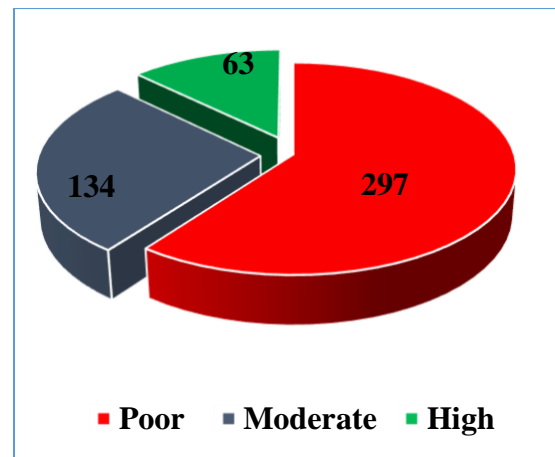


**Figure 1:** Chart showing level of Knowledge of BLS among study participants

The figure shows that 60.1% (297) of the respondents had poor knowledge of BLS, 27.1% (134) had moderate knowledge, and 12.8% (63) had good knowledge of BLS.
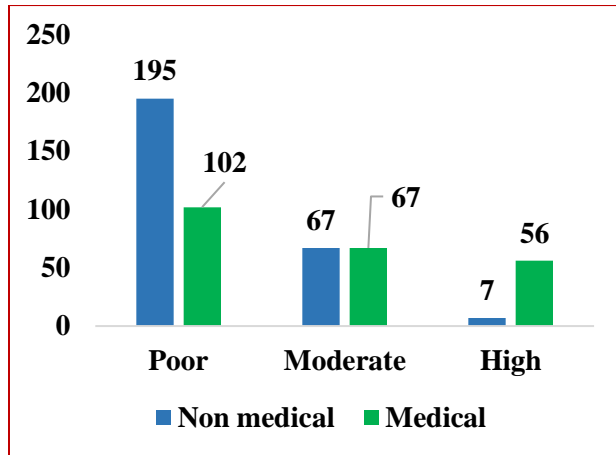
**Figure 2:** Bar chart showing Level of Knowledge of BLS among medical and non-medical students in the study ($\chi2$=63.820; p value=0.0001*)

The figure shows that 34.5% (102) and 65.7% (195) of medical and non-medical students had poor knowledge of BLS, respectively; 50% (67) each of medical and non-medical students had moderate knowledge of BLS; and

88.9% (56) and 11.1% (7) of medical and non-medical students had good knowledge of BLS.

**Table 2:** Attitude of undergraduate students towards BLS

| Variables | Frequency | Percentage |
|---|---|---|
| Attitude towards BLS (n=494) | | |
| Positive attitude | 280 | 56.7 |
| Negative attitude | 214 | 43.3 |

The table shows 56.7% (280) of the participants had a positive attitude towards BLS, while 43.3% (214) had a negative attitude.

**Table 3:** Practice of BLS among undergraduate students

| Variables | Frequency | Percentage |
|---|---|---|
| Practice of BLS (n=70) | | |
| Good practice | 55 | 78.6 |
| Poor Practice | 15 | 21.4 |

The result shows that 78.6% (55; n = 70) had good practice of BLS, while 21.4% (15; n = 70) had poor practice.

**Table 4. Relationship between level of knowledge of BLS with proper attitude and practice of BLS**

| Variables | Level of Knowledge n (%) | | | Df | Test Statistics | p-value |
|---|---|---|---|---|---|---|
| | Poor n (%) | Average n (%) | Good n (%) | | | |
| Attitude towards BLS | | | | | | |
| Positive attitude | 151 (50.8) | 81 (60.4) | 48 (76.2) | 2 | $\chi2$=14.665 | 0.001* |
| Negative attitude | 146 (49.2) | 53 (39.6) | 15 (23.8) | | | |
| Practice of BLS | | | | | | |
| Good practice | 35 (76.1) | 12 (85.7) | 8 (80.0) | 2 | $\chi2$=0.605 | 0.739 |
| Poor practice | 11 (23.9) | 2 (14.3) | 2 (20.0) | | | |

The result shows that there is a significant association between the level of knowledge of BLS and the attitude towards BLS (df=2; $x^2$=14.665; p-value=0.001), however there is no significant

**Discussion**

This study assessed the knowledge, attitude and practice of Basic life support (BLS) among University of Port Harcourt students, Rivers State, Nigeria. The findings showed that majority (three-fifth) of the students had poor knowledge, with medical students having a higher level of good knowledge than non-medical students. The majority of the respondents had positive attitude towards BLS. Very few respondents had practiced BLS, of which majority of those that have practiced BLS had good practice.

This study revealed that the majority of the undergraduate students at the University of Port Harcourt are grossly deficient in their knowledge of BLS. Out of the respondents, only about thirteen percent had good knowledge of BLS, while three-fifth had poor knowledge of the subject. This is in keeping with other studies done in South-South Nigeria such as the study conducted in 2013 among clinical medical students in Rivers State[30] and another done in Calabar on the knowledge and practice of CPR among healthcare practitioners[24].

On the other hand, the level of knowledge was much lower compared to that observed in research on the knowledge, attitude, and skills of CPR among healthcare workers in Ibadan showed that over half of them had good knowledge of CPR[31], while another study conducted among medical schools in South Western Nigeria showed twenty-nine percentage had good knowledge of BLS[10]. It shows that healthcare workers have better knowledge than medical students, and this could be because healthcare workers have more exposure to situations that require BLS skills while at work. Higher level of knowledge was observed in studies in other African countries, a study done across private and public universities in Uganda, another among final-year students at Dilla University in Ethiopia[28], and this is similar to findings gotten from a study carried out among nine Arab countries[32]. This could be due to the different teaching methods and curricula employed in the different countries. Final-year medical students know more than medical students in lower classes due to the nature of the courses taken in the final year, which are more clinical and are presumed to cover topics like CPR. In another study done in India among students and doctors in a tertiary hospital, it was noted that 46.1% of the participants had received training on BLS[32], and the participants that had received training were more knowledgeable than those that were not trained despite being in the medical profession[54]. In this study, it was observed that a higher level of knowledge was noted among medical students compared to non-medical

students in the study[32]. The reason for this wide disparity can be attributed to the fact that non-medical students are less likely to learn about basic life support in school because of the curriculum and may not be interested in learning about it if it is not added as part of the school curriculum for all students. Basic life support skills are a must-have for all citizens of every nation, regardless of profession or course of study. It is imperative to have them added as part of the university's curriculum, not just the theoretical aspect but also practical sessions.

This study revealed that about three-fifth of the study participants had a positive attitude toward BLS, while a significant proportion, about two-fifth of them, had a negative attitude toward BLS. Majority of the study population acknowledged that good knowledge of BLS was necessary, willing to undergo training in BLS, and agreed that BLS should be incorporated into the university curriculum. These findings were similar to those from a descriptive cross-sectional study that was carried out on CPR in secondary schools in Rivers State, Nigeria, which showed that most of the participants had a positive attitude toward CPR; majority of the participants agreed to learn CPR[33]. The current study also supports a cross-sectional quantitative study that was carried out among medical students across 8 private and public universities in Uganda to determine the knowledge and attitude of medical students on BLS[8].

Although, more than half of the total study participants have heard of BLS, only a very low proportion of them have performed BLS for victims in cardiopulmonary emergencies. This is contrary to a study that was conducted at Babcock University Teaching Hospital to determine the knowledge, attitude, and practice of CPR among one hundred and thirty-five staff nurses, which showed that nearly four-fifth of the study participants had performed CPR on victims that needed it[34]. Also, about eighty-eight percent of the participants had performed CPR on victims that needed it, as observed in a similar study that was conducted among public health nurses in Calabar Metropolis, Cross Rivers, Nigeria[24]. These higher proportions seen in these studies compared to the low value observed in the present study could have been attributed to the nature of the study participants (staff nurses), who are expected to have a higher level of willingness to perform BLS or CPR on affected individuals.

The study environment (the hospital) could also have been a contributing factor to the high rate of performance of CPR observed in the study compared to that of the present study. Out of few of those who had performed BLS on affected victims in the present study,

over three-fifth of them had good practice of BLS, while about one-fifth had poor practice of BLS. This is relatively better than what was observed in a similar study conducted at Babcock University Teaching Hospital, Illishan-Remo, Ogun State, Nigeria, in which about sixty-five percent of the staff nurse participants had good practice[34]. This does not tarry with the higher level of good practice that was expected among staff nurses compared to student participants in the present study.

Another similar study conducted in Malaysia showed that only close to half of the study participants had good practice of BLS, while none had poor practice[35], compared to the proportion of the participants in the present study who had good practice of BLS. This is contrary to the practice reported in a similar study that was conducted in Ghana among health workers[36]. This is not in line with the higher proportion that should have been expected in a study among health workers compared to the present study conducted among undergraduate students. This observed discrepancy in proportion could have occurred due to the inaccuracy of the study tool (questionnaire) that was used in the Ghanaian study, which did not make provision for the option of checking the victim's pulse rate before initiating CPR. Thus, it could have left the study participants to choose starting chest compression as the initial step upon meeting a victim of cardiopulmonary failure[36].

Approximately three-fifth of the study participants in this study pinched the nose before mouth-to-mouth ventilation, while only about one-fifth of the study population in a similar study conducted in Ghana knew that they were supposed to pinch the nose before starting mouth-to-mouth ventilation[36]. This poor practice observed among the participants of the reviewed study could have owed to the poor level of knowledge observed on BLS among the participants in the study[36].

### Limitations of the study
The study is a descriptive cross-sectional study however efforts were made to ensure accurate data was collected.

### Implications of the findings of the study
The findings of this study reveal a wide gap in the knowledge and practice of an important subject matter, one whose utilization is capable of decreasing morbidity and mortality rates. Incorporating BLS trainings in the school curriculum will serve a great need. The training should be incorporated from the primary education, then the secondary and tertiary institutions. This in a bid to begin resounding the importance of basic life support skills from an early age such it becomes common knowledge available to every member of the society regardless of their career.

The government include basic life support (BLS) training in the curriculum of tertiary institutions and incorporate regular assessment, accreditation, and evaluation of the BLS training centers, equipment, and staff of the institutions. The school authority should integrate BLS training into the university's curriculum. It should be a course on its own, just like general studies (GES) courses for every student in the school and at every level in the institution. The programs should be comprehensive and all-inclusive for all students of all ages, genders, and departments. Adequate, standard, and quality resources and equipment should be provided for BLS training in the institution. BLS training centers on all the campuses of the institution should be established and there should be frequent hands-on skills practice and confidence building to facilitate the transfer of knowledge to practice. Students should be encouraged to take advantage of BLS training opportunities on campus, practice and reinforce BLS skills through regular training sessions, encourage peers to learn and practice BLS and participate in BLS certification programs.

### Conclusion
The findings of this study reveal a wide gap in the knowledge and practice of an important subject matter, one whose utilization is capable of decreasing morbidity and mortality rates. From the study, majority of the students have poor knowledge of BLS however many have a positive attitude towards it. Most of the participants had never received any BLS training though showed a willingness to acquire knowledge on the subject. The few that have received BLS trainings in the past did so voluntarily due to their willingness to acquire the knowledge. A high proportion of the of study participants showed willingness to undergo BLS training if such opportunity presents with low level of practice of BLS observed among study participants.

### Declarations

*Ethical Consideration:* Ethical approval was obtained from the ethical committee of University of Port Harcourt following laid down protocol. Informed consent was obtained from each of the respondents before proceeding with data collection.

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