



**ADDIS ABABA UNIVERSITY
COLLEGE OF MEDICAL AND HEALTH SCIENCE
SCHOOL OF MEDICINE
DEPARTMENT OF EMERGENCY AND CRITICAL CARE MEDICINE**

**ASSESSMENT OF KNOWLEDGE, ATTITUDE AND ASSOCIATED FACTORS
TOWARDS ADVANCED CARDIAC LIFE SUPPORT AMONG HEALTH CARE
PROFESSIONALS PRACTICING IN SELECTED REFERRAL HOSPITALS IN
ADDIS ABABA, ETHIOPIA.**

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ABBREVIATION AND ACRONYMS

AA	Addis Ababa
ACLS	Advanced cardiac life support
CPR	Cardiopulmonary resuscitation
BLS	Basic life support
AED	Automated external defibrillator
IHCA	Intra hospital cardiac arrest
OHCA	Out of hospital cardiac arrest
HCP	Health care professionals
KAP	Knowledge, Attitude and Practice

PHCP	Primary health care professional
SSA	Sub-Saharan Africa
WHO	World Health Organization

ABSTRACT

Background: Cardiac arrest is the abrupt loss of heart function in a person who may or may not have been diagnosed with heart disease which is the most frequent causes of death in the world. Advanced cardiac life support (ACLS) encompasses a comprehensive array of protocols and techniques designed to promptly address life-threatening conditions leading to cardiac arrest. It is possible to reduce the high mortality rate associated with cardiac emergencies by ensuring adequate knowledge and practice of basic life support (BLS) and advanced cardiac life support (ACLS) skills (2,3).

Objective: This research sought to assess knowledge, attitude and associated factors towards advanced cardiac life support among health care professional practicing in selected referral hospitals in Addis Ababa, Ethiopia,

Method and Materials: Cross sectional study conducted using convenience sampling to select the referral hospitals and individual participants were selected by simple random sampling from October 2024 to November, 2024. A pre-tested self-administered structured questionnaire was

used to collect Socio-demographic, knowledge and attitude data. Data were entered, interpreted, and analyzed using SPSS version 27. Logistic regression was the statistical method employed. The relationship between independent and dependent variables was deemed statistically significant if the p-value was below 0.05.

Results: 379 health professionals working at four selected referral hospitals. Slightly more than half 57.8% (219) of the study participants were male. The age of majority healthcare workers (74.4%) lies between 18- 30 years, with mean age of 29.18 ± 3.468 . Of the participants, 47% had good knowledge and 43.3% of the participants had positive attitude towards ACLS. Being a nurse and having a degree had association with good knowledge, most of the nurses who participated in this study worked in emergency department when compared to other health professionals. Experience above 10 years is associated with positive attitude of the health care professionals towards ACLS.

Conclusion: Majority of the HCP had less understanding about Advanced cardiac life support with only less than half of them had positive attitude. Being a nurse and having a degree had significant associated with knowledge and participants with higher year of experience had positive attitude towards ACLS.

Key Words: Attitude, health care professionals, knowledge, advanced cardiac life support, Addis Ababa, Ethiopia.

1. INTRODUCTION

1.1. Background

Cardiac arrest is the abrupt loss of heart function in a person who may or may not have been diagnosed with heart disease and it is one of the most frequent causes of death in the world. It can come on suddenly or in the wake of other symptoms (1,3). It is common and deadly affecting around 700,000 people in United states annually and often fatal if appropriate steps aren't taken immediately (2). Cardiac arrest can occur both inside and outside the hospital setting, which necessitates the need for early recognition and treatment. It is possible to reduce the high mortality rate associated with cardiac emergencies by ensuring adequate knowledge and practice of basic life support (BLS) and advanced cardiac life support (ACLS) skills. The American Heart Association (AHA) has issued comprehensive guidelines for both in and out of hospital management, adult cardiac arrest chain of survival includes immediate recognition of cardiac arrest, early activation of emergency medical services (EMS), early cardiopulmonary resuscitation (CPR), early defibrillation, advanced life support, post arrest care and recovery. In hospital cardiac arrest (IHCA) is associated with poor survival and a high risk of neurologic impairment among survivors. (4)

Advanced cardiac life support (ACLS) encompasses a comprehensive array of protocols and techniques designed to promptly address life-threatening conditions leading to cardiac arrest. It entails the application of advanced medical procedures, medications, and methods. It also includes early recognition of cardiac arrest symptoms, administration of cardiopulmonary resuscitation (CPR), and utilization of automated external defibrillators (AEDs) for defibrillation. The American Heart Association first introduced ACLS guidelines in 1974, with subsequent updates until 2020. ACLS significantly influences patient outcomes, as proficient resuscitation skills can revive life or consciousness. Prompt initiation of ACLS interventions within the initial minute of cardiac arrest can elevate survival rates to two to four times higher levels (13-18).

Cardiopulmonary resuscitation (CPR) is a critical, life-saving skill for healthcare professionals (HCPs) in emergency departments (EDs) and other health care settings. Although the clinical outcome of CPR depends on multiple factors, such as the initial condition of the patient and the duration of cardiac arrest, performing high-quality CPR significantly improves patient outcomes.

Presentation to the ED with cardiac arrest is most commonly seen among adults; however, it can also occur and is particularly challenging for HCPs to manage in children and neonates (5).

Many countries have established Advanced Cardiac Life Support (ACLS) guidelines, usually developed by their medical professional organizations. It's vital to educate healthcare workers about these guidelines to ensure rapid response to cardiac arrest. Hospital cardiac arrests are often initially handled by medical staff, and their knowledge of and adherence to current ACLS protocols is critical for successful resuscitation. In Ethiopia, ACLS development is less advanced compared to developed countries, largely due to limited access to modern medical equipment and insufficient training (3). However, Addis Ababa, Ethiopia's capital, benefits from government-provided medical equipment and training for healthcare professionals like doctors and nurses. International and private organizations also contribute vital training and equipment (3). For Basic Life Support (BLS) and ACLS providers to begin resuscitation quickly, they must possess the knowledge and skills to recognize clinical symptoms, thus shortening the time between identifying symptoms and starting CPR (6). Healthcare personnel are ultimately responsible for effective emergency management. Insufficient training and inability to handle medical emergencies can result in tragic outcomes and legal issues. Therefore, healthcare professionals directly involved in patient care must be well-prepared for medical emergencies. Adhering to the updated Chain of Survival, which includes ACLS, is crucial for effective patient care (7).

1.2. Statement of the Problem

In hospital cardiac arrest (IHCA) affects nearly 290,000 hospitalized patients each year in united states and the prevalence of in hospital cardiac arrest in Africa can vary depending on factors such as region, access to health care and population demographics. Generally, the rate tends to be higher

in Africa compared to developed regions due to various reasons including limited health care resource, lack of preventive measures and higher prevalence of cardiovascular risk factors.

Healthcare providers are ultimately accountable for the effective management of emergencies like cardiac arrest. A strong grasp of Advanced Cardiac Life Support (ACLS) is essential for medical professionals before they perform complex procedures such as administering powerful drugs, rapid sequence intubation, and cardiac resuscitation. Unfortunately, research indicates that many healthcare professionals lack sufficient knowledge and have less than ideal attitudes regarding ACLS. Adequate knowledge and skills are necessary for rapid initiation of resuscitation and improved patient outcomes. (3,29) Starting ACLS interventions immediately after cardiac arrest can dramatically improve survival rates, potentially by two to four times. (13)

The lack of training and inability to cope with medical emergencies can lead to tragic consequences and legal complications so, it is imperative for all healthcare practitioners—whether doctors, anesthetists, paramedics, or nurses—involved in emergency situations to have adequate knowledge and good attitude towards ACLS. This readiness ensures prompt intervention, saving lives and enhancing the effectiveness of cardiac resuscitation efforts. (3,7)

1.3. Significances of the Study

This study aims to assess the knowledge, attitudes, and associated factors related to Advanced Cardiac Life Support (ACLS) among healthcare providers in selected referral hospitals in Addis Ababa, Ethiopia. To the best of the investigator's knowledge, no multicenter study of this kind has been conducted in referral hospitals in Addis Ababa. Therefore, this research provides valuable insights to enhance the knowledge and attitudes of healthcare professionals toward ACLS. Furthermore, identifying the factors influencing their knowledge and attitudes can help policymakers

and other stakeholders design targeted training programs and facilitate knowledge-sharing among healthcare facilities. Ultimately, this can improve the quality of care for patients presenting with cardiac arrest. Additionally, this study can serve as baseline data for future research.

2. LITERATURE REVIEW

Cardiac arrest remains a huge medical problem as well as a public health concern. In hospital cardiac arrest is common and associated with high mortality, despite this it has received little attention compared with high-risk cardiovascular conditions like stroke, myocardial infarction and out of hospital cardiac arrest. With all the recent advances, cardiac arrest is a leading cause of death in most parts of the world (14,29).

Advanced Cardiac Life Support (ACLS) training teaches healthcare providers how to identify and respond to critical medical emergencies such as sudden cardiac arrest (SCA), heart attacks, and blocked airways. This includes performing cardiopulmonary resuscitation (CPR), using an automated external defibrillator (AED), and administering various medical treatments with specialized equipment and medications. ACLS techniques involve advanced procedures like inserting a breathing tube into the trachea (tracheal intubation), rapidly preparing a patient for intubation (rapid sequence induction), delivering an electrical shock to the heart (cardiac defibrillation), pacing the heart externally (transcutaneous pacing), establishing intravenous access (intravenous cannulation), and administering medications. A key global priority is ensuring that medical professionals are well-versed in and follow the adult and pediatric Chain of Survival, which integrates both Basic Life Support (BLS) and ACLS, to effectively provide life-saving care in emergencies. (7-15)

A cross-sectional study done on Assessing the Proficiency in Basic and Advanced Life Support Among Physicians in Ecuador, 2023 signifies a knowledge score of $4.7/10 \pm 1.8$ for advanced life support and Physicians with less than 3 years of work experience exhibited higher knowledge scores. Similarly, the knowledge score was $4.3/10 \pm 1.8$ points in a study done on the assessment and proficiency in basic and advanced life support among nurses in Ecuador, 2024 with Participants who had obtained BLS certification and those who used evidence-based summaries as a source of extracurricular training achieved higher BLS and ALS knowledge scores. (20,24).

A study published in 2016, on knowledge and attitude on advanced life support among medical students and medical officers in a tertiary hospital at Sri Lanka signifies 43% of the participants have good knowledge towards ACLS from which only 27% of them are medical officers, and

12.7% have poor knowledge and the rest have average knowledge. About 45% of medical officers are confident on saving lives with their current knowledge . In contrary to the above studies age of the participants was one of the factors affecting the knowledge towards ACLS with only 25.5% of the participants greater than 30 years of age had a good knowledge,42.3% and 47.8% had good knowledge for age less than 24 and between 24-29 years of age. (21) Similarly on a study which was done on knowledge of BLS and ACLS among health care professionals at North Kerala in 2016 shows that out of 20 questions (15 on BLS and 5 on ACLS) the mean score of the participants was 8.9+4.7 and majority (51.4%) of the participants scored less than 50 % with physicians scoring less (8.6 +3.4) than nurses (9+3.6) which signifies inadequate knowledge towards BLS and ACLS more among physicians. Up on this, trained nurses, nurses at private sector, physicians having less than 5 years' experience scored higher (2).

Another study which was done on Knowledge attitude and practice of ACLS in health care professionals and medical students in Majmaah university, Saudi Arabia in 2019 concluded that 51% of the participants do not know ACLS by using third Likert scale for assessing the knowledge, attitude and practice of the health professionals. (28)

A 2022 study conducted at Felege Hiwot Referral Hospital, Ethiopia, on the knowledge and attitude of healthcare workers toward ACLS found that 59.5% of participants had poor knowledge and 44.75% had a poor attitude toward ACLS. The study also identified significant associations between good ACLS knowledge and factors such as being a physician and having work experience of more than six years, being emergency department for more than ten years, and receiving ACLS training.

3. OBJECTIVES

3.1 General Objective

To assess the knowledge, attitude and associated factors towards advanced cardiac life support in selected referral hospitals in Addis Ababa, Ethiopia, 2024.

3.2 Specific Objectives

1. To assess the knowledge of health care workers in referral hospitals at Addis Ababa towards advanced cardiac life support.
2. To assess the attitudes of health care workers in referral hospitals at Addis Ababa towards advanced cardiac life support.
3. To assess the factors affecting the knowledge of health care workers towards advanced cardiac life support.

4. METHODS AND MATERIALS

4.1. Study Area

This study was conducted on selected referral hospitals in Addis Ababa, capital of Ethiopia located at $9^{\circ}1'29.89''N$, $38^{\circ}44'48.8''E$. As of 2014, there are 12 state run hospitals, and more than 40 private hospitals. The 12 referral hospitals are Tikur Anbesa Specialized Hospital, Zewditu memorial hospital, Yekatit 12 hospital medical college, St. Paul's hospital millennium medical college, St. Peter Referral Hospital, ALERT comprehensive specialized hospital, Amanuel Mental specialized hospital, EKA Kotebe general hospital, Tirunesh Beijing hospital, Gandhi memorial hospital, Menelik II referral hospital and Ras Desta Damtew Hospital. From those mentioned above Tikur Anbesa Specialized Hospital , the largest referral and teaching hospital, providing both clinical and preclinical training across most disciplines, also serves as a national center for specialized clinical services that are unavailable in other public or private institutions , have approximately 1729 health professionals as noted at the human resource office, Zewditu memorial hospital which is a teaching and general referral hospital affiliated to college of health sciences,

AAU having approximately 1176 health professionals taken from unpublished study, St. Paul's hospital millennium medical college is the second largest public hospital in the nation having 1200 clinical staffs taken from the hospital page and ALERT comprehensive specialized hospital which is the third largest hospital known by addressing health problem related to leprosy in the county and has been the only medical research center in the field for the past ninety years having 1950 health professionals taken from the hospital page, are selected conveniently.

4.2. Study Design and Period

Institutional based cross-sectional study was conducted at the selected referral hospitals in Addis Ababa, Ethiopia from June, 2024 to November ,2024.

4.3. Population

4.3.1. Target population

All medical professionals employed at a referral hospital in Addis Ababa, Ethiopia.

4.3.2 Source Population

All medical professionals employed at a selected referral hospital in Addis Ababa, Ethiopia.

4.3.3 Study Population

Selected health care workers who are working in selected referral hospitals in Addis Ababa, Ethiopia.

4.4. Inclusion and Exclusion Criteria

4.4.1. Inclusion Criteria

All licensed health care workers who are working at a referral hospital who are directly involved in clinical practice (nurses, physicians, Anesthesia, midwives) will be included in the study.

4.4.2. Exclusion Criteria

Health workers who are giving free service, who are on sick leave, annual leave during the data collection period and those who are not directly involved in clinical practice. (laboratory, pharmacists, radiologists) will be excluded.

4.5. Sample Size Determination and Sampling Techniques

4.5.1. Sample Size Determination

The sample size for assessing the knowledge was determined by using a single population proportion formula, $n = z^2 p (1 - p) / d^2$, where n = sample size, Z = standardized normal distribution value at the 95% CI, which is 1.96, P = taking prevalence 40.5% for knowledge which is taken from previous research done at Felege hiwot referral hospital. [3] and d = margin of error 5%.

$$\frac{n = Z^2 P (1 - P)}{d^2}$$

$$\frac{(1.96)^2 * 0.405(1 - 0.405)}{(0.05)^2}$$

$$(0.05)^2$$

$$= 370$$

The Sample size for the assessing the attitude was determined by single population proportion formula and it became 379.

The largest sample size was taken, which is 379 and since the sample frame is less than 10,000, **adjustment formula**, $n_{adj.} = n / (1 + (n/N))$. Where $n_{adj.}$ = Adjusted sample size, n = calculated sample size (379) and N = study population (6055),

$$n_{adj.} = 379 / (1 + 379/6055) = 357$$

Accounting for a potential 10% non-participation rate, the study's target sample size was determined to be 397 individuals.

4.5.2. Sampling Techniques

A convenience sampling technique was used to select the referral hospital from the 12-referral hospital and random sampling was done to select participants.

4.6. Variables of the Study

4.6.1. Dependent Variable

Knowledge status and attitude of health care workers towards ACLS.

4.6.2. Independent Variable

Age, sex, profession, educational level, experience, Work place (assigned department), ever taking training, Previous exposure and institution related (availability and accessibility of equipment and medication) to be used in the study.

4.7. Operational Definitions

The variables were operationalized based on the previous study on the knowledge and attitude of healthcare workers towards advanced life support (3).

- Good knowledge:** Healthcare workers who correctly answered 50% or more of the knowledge questions.
- Poor knowledge:** Healthcare workers who correctly answered less than 50% of the knowledge questions.
- Positive attitude:** Healthcare workers who scored 50% or higher on attitude-related questions.
- Negative attitude:** Healthcare workers who scored less than 50% on attitude-related questions.

4.8. Data Collection methods

Socio-demographic factors, knowledge, and attitude were assessed using a pre-tested structured questionnaire adapted from previous research and ACLS guidelines. The self-administered questionnaire was developed in English and prepared using the Kobo Tool data collection application. Before data collection, the questionnaire was tested on 5% of eligible study participants from one of the selected referral hospitals to assess its feasibility. Following the pretest, any ambiguous or unsuitable questions were modified accordingly. After finalizing the questionnaire, primary data was collected by individuals who received one day of training on ensuring completeness. The principal investigator continuously supervised the data collection process, reviewing the questionnaires for completeness and clarity.

Data quality control; The investigator continuously supervised the data collection process, ensuring accuracy, completeness, and clarity of the questionnaires.

4.9. Data Analysis

Data were managed and analyzed using SPSS version 27. This included cleaning, coding, entering, and analyzing the data. Descriptive statistics, such as means, percentages, and frequencies, were generated. Bivariate logistic regression was performed after verifying necessary assumptions. Variables with a p-value of 0.25 or less in the bivariate analysis were then included in a multivariate logistic regression model to account for potential confounding effects. The Hosmer-Lemeshow test was used to evaluate how well the model fit the data; a p-value above 0.05 indicated a good fit. Odds ratios (both crude and adjusted) were calculated to determine the association between outcome variables and predictor variables. Statistical significance was established at a p-value of less than 0.05, and 95% confidence intervals were calculated. Findings are presented in tabular format.

4.10. Ethical Consideration

Ethical approval for the study was obtained from the Emergency and Critical Care Medicine Ethics Review Committee in accordance with Addis Ababa University's directive, followed by approval from the Addis Ababa Health Bureau. Eligible study participants were fully informed about the study's objectives and methods. They were also made aware that participation was voluntary, and any information collected would remain confidential, with no personal identifying details such as names or phone numbers required. The data would be used exclusively for the purpose of the study.

4.11. Dissemination of Results

The completed research will be presented to and defended before the Department of Emergency and Critical Care Medicine and the Faculty of Medicine and Health Sciences at Addis Ababa University School of Medicine. The study's findings will then be prepared for publication in a peer-reviewed journal, either locally or internationally. The results will also be disseminated to relevant stakeholders, including the Addis Ababa Health Bureau, the Public Health and Emergency Management Directorate, the Department of Emergency and Critical Care at the College of Medicine and Health Sciences, and Addis Ababa University.

5. RESULTS

5.1. The respondents' sociodemographic characteristics

This survey comprised 379 health professionals working at four selected referral hospitals. Slightly more than half 57.8% (219) of the study participants were male. Most of healthcare workers (74.4%) were between the ages of 18- 30, with mean age of 29.18 ± 3.468 . Two hundred eighty-two (59.9%) of the participants were single. There were Two hundred sixty (68.6%) and one hundred six (28%) healthcare workers who were nurses and physicians respectively. 59.9% of the participant works at the emergency from which 174(76.6%) and 48 (21%) were nurses and physicians respectively and 69.9% of those working at the emergency has 0- 3 years of emergency experience, with only 1 participant having above 10 years of emergency experience. out of 85 participants working in wards 42 (49%) of them were physicians. 289(76.3%) of participants has degree. 39.3% of the participants has an experience of 2 -5 years and 127(33.5%) has experience of less than two years in total. About 63.9% of the participants had not been trained for ACLS in the past years from which 137(60.3%) and 56 (65%) of the participants works at the emergency and ward respectively, as shown in table 1.

Table 1:- Frequency distribution of Socio-demographic Characteristics of Study Participants in selected referral hospitals in Addis Ababa, Ethiopia 2024.

	Variables	Frequency (%)
Age	18-30	206(76.6)
	31-40	54(20.1)
Gender	Male	219(57.8)
	Female	160(42.2)
Marital status	Single	227(59.9)
	Married	150(39.6)
	Widowed	2(0.5)
Profession	Physicians	106(28)
	Nurses	260(68.6)
	Anesthetists	6(1.6)
	Midwives	7(1.8)
Educational level	MSC	39(10.3)
	Degree	289(76.2)
	Diploma	51(13.5)
Experience in months	0-23	127(33.5)
	24-59	149(39.3)
	60-120	92(24.3)
	Above 120	11(2.9)
Ever taking training	Yes	137(36.1)
	No	242(63.9)
Participants current working	Emergency	227 (59.9)

Department	ICU	54 (14.2)
	OR	13(3.4)
	Ward	85(22.4)

5.2. Knowledge of Respondents towards Advanced cardiac life support

Participant knowledge was categorized as either "good" or "poor" based on a comparison with the average response rate, which served as the overall knowledge benchmark. A majority of those surveyed, specifically 201 individuals (representing 53% of the total), demonstrated a lack of understanding regarding advanced cardiac life support, while 178 (47%) had good knowledge. The mean score was 29.42 ± 2.2 (out of 14 knowledge questions). The majority of participants, 73.9%, correctly identified the immediate intervention to perform when a victim has no pulse, and 67% provided the correct answer regarding the depth of chest compressions. Detailed results are presented in Table 2.

Table 2: - Knowledge of health professionals on Advanced cardiac life support in selected referral hospitals of Addis Ababa, Ethiopia 2024.

Questions	Knowledge level (with correct answer and %)
Abbreviation of advanced cardiac life support	106(28)
What is your immediate intervention (treatment) if the victim has no pulse?	280(73.9)
What is location of chest compression?	151(39.8)
What is depth of chest compression for adults?	254(67)
What is adult advanced cardiac life support maximum joule for shockable rhythm	117(30.9)
What are non-shockable rhythms?	160(42.2)
What are shockable rhythms?	136(35.9)
What is the CPR rate of compression for adults?	76(20)
What are the reversible causes of cardiac arrest?	60(15.8)
What is the dose and frequency of adrenalin for advanced cardiac life support?	196(51.7)
What is the dose of amiodarone for advanced cardiac life support?	236(62.3)
Is magnesium sulfate used for advanced cardiac life support?	83(21.9)
Which is included in post-cardiac arrest care?	162(42.7)

5.3. Attitude of Participants toward Advanced cardiac life support

Out of the 379 participants in the study, a majority (215 individuals, or 56.7%) expressed a negative attitude towards advanced cardiac life support, while 164 participants (43.3%) held a positive view. Attitude was assessed using a Likert scale, and individual mean scores were used to categorize respondents as having either a positive or negative attitude.

Table 3: - Attitude of health professionals on Advanced cardiac life support in selected referral hospitals in Addis Ababa, Ethiopia 2024.

5.4. Factors Associated with Advanced cardiac life support

5.4.1. Factors Associated with Knowledge Towards ACLS

The Hosmer-Lemeshow test indicated a strong model fit, with the independent variables explaining 98% of the variability in the dependent variables. Bivariate logistic regression analysis identified profession, education level, and ACLS training as factors associated with advanced cardiac life support knowledge ($p < 0.25$). These factors were then included in a multivariate analysis. After adjusting for potential confounders, the multivariate analysis showed that nurses had twice the level of knowledge compared to physicians (AOR=2.085, CI 1.26-3.42, $p=0.004$). Healthcare workers with a degree demonstrated 61.6% higher knowledge than those with an MSc (AOR=0.384, CI 0.159-0.92, $p=0.033$), while participants with ACLS training had 24% lower knowledge compared to those without training, though this result was not statistically significant (AOR=0.751, CI 0.487-1.15, $p=0.195$), as shown in Table 4.

Question	Response	Attitude (%)
Both nurses and physicians have a role in ACLS	Strongly disagree	7(1.8)
	Disagree	-
	Neutral	4(1.1)
	Agree	31(8.2)
	Strongly agree	337(88.9)
I have considered learning more about ACLS	Strongly disagree	1(0.3)
	Disagree	4(1.1)
	Neutral	12(3.2)
	Agree	121(31.9)
	Strongly agree	241(63.6)
I can document patient care thoroughly during cardiac arrest	Strongly disagree	-
	Disagree	6(1.6)
	Neutral	11(2.9)
	Agree	148(39.1)
	Strongly agree	214(56.5)
I can communicate effectively during advanced cardiac life support care	Strongly disagree	44(11.6)
	Disagree	61(16.1)
	Neutral	8(2.1)
	Agree	118(31.1)
	Strongly agree	148(39.1)
I thought advanced cardiac life support has legal and ethical issues	Strongly disagree	4(1.1)
	Disagree	5(1.3)
	Neutral	18(4.7)
	Agree	155(40.9)
	Strongly agree	197(52)
I can recognize the sign and symptoms of cardiac arrest as a physician or nurse	Strongly disagree	8(2.1)
	Disagree	4(1.1)
	Neutral	5(1.3)
	Agree	156(41.2)
	Strongly agree	206(54.4)
I can prioritize actions for advanced cardiac life support	Strongly disagree	3(0.8)
	Disagree	11(2.9)

	Neutral	132(34.8)
	Agree	233(61.5)
	Strongly agree	
I understood the principle of ACLS	Strongly disagree	10(2.6)
	Disagree	-
	Neutral	36(9.5)
	Agree	182(48)
	Strongly agree	151(39.8)
I think I succeeded on advanced cardiac life support	Strongly disagree	11(2.9)
	Disagree	-
	Neutral	57(15)
	Agree	195(51.5)
	Strongly agree	116(30.6)

Table 4: - Logistic regression analysis showing factors associated with knowledge towards ACLS in selected referral hospitals in Addis Ababa, Ethiopia 2024.

Variables	Knowledge		COR (95%CI)	p-Value	AOR (95%CI)	p-Value
	Good	Poor				
Age	18-40	175	199	0.970 (0.914-1.029)	0.305	
Gender	Male	102	117			
	Female	76	84	1.038(0.690-1.561)	0.859	
Profession	physicians	38	68			
	Nurse	134	126	0.52(0.33-0.837)	0.007	2.085(1.26-3.42) .004
	Anesthetist	5	1	2.794(0.315-24.8)	0.356	0.411(0.045-3.76) 0.43
	Midwives	5	2	0.224(0.041-1.20)	0.082	3.941(0.711-21.85) 0.11
Working department	Emergency	109	118	1.057(0.62-1.74)	0.826	
	ICU	26	28	1.052(0.532-2.08)	0.885	
	OR	1	12	11.72(1.45-94.18)	0.021	
	ward	42	43			
Educational level	MSc	13	26	1.753(0.867-3.54)	0.118	0.384(0.159-0.92) .033
	Degree	135	154			
	Diploma	30	21	0.614(0.33-1.12)	0.113	0.806(0.426-1.52) .506
Experience in months	0-23	71	56	0.946(0.275-3.26)	0.931	
	24-59	61	88	1.731(0.506-5.92)	0.382	
	60-120	40	52	1.560(0.4445.48)	0.488	

	Above 120	6	5				
Took training	Yes	70	67	1.296(0.852-1.97)	0.226	0.751(0.487-1.15)	.195
	No	108	134				

5.5.2. Factors Associated with the Attitude towards ACLS

As demonstrated by a binary logistic regression, the respondents' profession, education level, experience year, and training of healthcare professionals were all strongly correlated with their mindset toward ACLS at a P value ≤ 0.25 . Additionally, any factors demonstrating a statistically significant association with ACLS attitude (below a p-value of 0.25) were considered for inclusion in a multivariate logistic regression analysis. Accordingly, only participants having experience of 60 - 120 months had 83% (AOR=0.16, CI (0.04-0.711) P-value 0.015) less attitude than having experience more than 120 months (10 years) had significant association with attitude as shown in Table 5.

Table 5: - Logistic regression analysis showing factors associated with attitude of health care professionals in selected referral hospitals in Addis Ababa, Ethiopia 2024.

Variables		Attitude		COR (95%CI)	p-Value	AOR (95%CI)	p-Value
		Positive	Negative				
Age	18-30	119	163	1			
	31-40	44	48	0.796(0.497- 1.277)	0.829		
Gender	Male	102	117	1	0.797		
	Female	62	98	0.72(0.48-1.098)	0.129		
Profession	physician	35	71	1			
	Nurses	123	137	1.821(1.136-2.921)	0.013	1.90(0.32-11.02)	0.47
	Anesthetist	4	2	4.057(0.709-23.23)	0.116	2.84(0.51-15.7)	0.231
	midwives	2	5	0.811(0.150-4.394)	0.808	8.04(0.690-93.7)	0.096
Educational level	MSC	20	19	1.664(0.850-3.254)	0.137	0.549(0.23-1.3)	0.17
	Degree	112	177	1			
	Diploma	32	19	2.662(1.439-4.923)	0.002	0.407(0.21-0.78)	0.007
Experience	0-23	53	74	0.269(0.068-1.06)	0.061	0.20(0.049-0.84)	0.028

	24-59	72	77	0.351(0.09-1.373)	0.132	0.352(0.086-1.436)	0.146
	60-120	31	61	0.191(0.047-0.769)	0.020	0.168(0.04-0.711)	0.015
	Above `120	8	3	1			
Ever taking training	Yes	53	84	0.745(0.486-1.14)	0.176	0.679(0.431-1.069)	0.095
	No	111	131	1			
Current working department	Emergency	100	127	1.241(0.746-2.064)	0.406		
	ICU	24	30	1.261(0.631-2.517)	0.512		
	OR	7	6	1.838(0.568-5.950)	0.310		
	ward	33	52	1			

6. DISCUSSION

This study may be the first to assess the knowledge and attitude of healthcare professionals toward ACLS in selected referral government hospitals in Addis Ababa. A total of 379 healthcare professionals from four referral hospitals participated, with 57.8% being male and 76.6% aged between 18 and 30 years. Nurses represented 68.6% of the participants, with 76.2% holding a degree and 24.3% having 5-10 years of experience.

The study found that 47% of healthcare professionals had good knowledge of ACLS. This finding is consistent with similar research conducted in tertiary hospitals in Sri Lanka, North Kerala, and Felege Hiwot, where 43%, 48.6%, and 40.5% of participants, respectively, demonstrated good knowledge of ACLS.

In contrast to this study, where age did not show a significant association with ACLS knowledge, a 2016 study on medical students and officers in a tertiary hospital in Sri Lanka found that age was a significant factor. In that study, only 25.5% of participants older than 30 years had good knowledge of ACLS, while 42.3% of those younger than 24 and 47.8% of those aged 24-29 years had good knowledge.

On this study nurses has 2.1 times greater knowledge than physicians which is similar to studies done in Sri Lanka and North Kerala in 2016 on knowledge of BLS and ACLS, with physicians scoring less than nurses.(20,21) On this study, only being a nurse and having a degree, have significant association with good knowledge towards ACLS, although in this study most of the (76.6%) nurses do work at the emergency when compared to other professionals. This is different to the study done at Ecuador in 2023, north Kerala in 2016 and Felege Hiwot referral Hospital, Ethiopia in 2022 in which, work experience has significant association with knowledge towards ACLS. (2,20,24). Specifically, to the study done at Felege Hiwot referral Hospital, being physician, having greater than 6 years of experience, working in the emergency for more than 10 years and ACLS training has significant association with good knowledge towards ACLS which is not similar to this study. (3)

43.3% of participants had positive attitude towards ACLS which is comparable result to a study which was done on Knowledge attitude and practice of ACLS in health care professionals and medical students in Majmaah university, Saudi Arabia in 2019 which concluded that 49% of the participants do not know ACLS by using third Likert scale for assessing the attitude and practice of the health professionals (28). Similarly, 55% of the participants have positive attitude on a study done in Felege hiwot Hospitals. (3)

7. CONCLUSION AND RECOMMENDATION

7.1. Conclusion

The majority of participants had a limited understanding and attitude toward advanced cardiac life support. The knowledge of healthcare professionals regarding ACLS was significantly associated with their profession and educational level. In contrast, only years of experience were strongly linked to participants' attitudes toward ACLS.

7.2. Recommendation

Based on the results of this study, we recommend continuous assessment of Continuing Professional Development (CPD) programs to enhance healthcare professionals' knowledge of advanced life support. Additionally, we encourage policymakers and future researchers to

explore how ACLS training is currently delivered and how it should be improved to further elevate the knowledge and attitude of health professionals toward ACLS.

8. LIMITATIONS

This study uses only self-administered questionnaire which assess knowledge and attitude of the participant but not supported by observation of their practice which is due to time and financial constrain and it was conducted exclusively in governmental health care settings.

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ANNEXES

Annex-I

Information sheet for participants and consent form

The project's title: knowledge, attitude and associated factors towards advanced cardiac life support Among health professionals employed in selected referral hospitals in Addis Ababa, Ethiopia.

Principal investigator: **Dr. Hiwot shewangizaw** (MD)

Advisors: Dr. Yohannes (MD ,Assistant professor) and Dr. Biruk (MD, Assistant Professor)

Department: Addis Ababa University, School of Medicine, Department of Emergency and Critical Care, College of Medical and Health Science.

Introduction: My name is Dr. Hiwot shewangizaw, and I work as an emergency and critical care resident in the department of emergency and critical care at Addis Ababa University College of Medical and Health Sciences. I am studying medical staff members at selected referral hospitals in Addis Ababa, Ethiopia, with regard to their knowledge, attitudes, and associated factors towards advanced cardiac life support.

Purpose- This thesis evaluated primary healthcare practitioners' knowledge and attitude towards ACLS in Addis Ababa, Ethiopia's selected referral hospitals. This research will offer baseline data for the scientific community and other concerned bodies to understand the level of knowledge and attitude of health professionals to implement a possible intervention for appropriate ACLS delivery.

Study procedure-To achieve the planned objective, the structured questionnaire was utilized to gather necessary information regarding knowledge and attitude towards ACLS.

Participant's right: I kindly request your voluntary participation in this research. Should you want to take part, you will be required to answer a brief survey.

Confidentiality: Every piece of information you provide and any information gathered from the participants will be kept private. The data you give will be used for this research only and cannot be utilized for any other purpose.

Benefit: Your involvement in this research will benefit you to know knowledge, attitude and practice regarding emergency medical service delivery for trauma patients.

Risk: Participating in this study carries no risk other than a maximum 30-minute time commitment.

Inducement, Incentive, and Compensation: You will not receive any unique rewards, benefits, or remuneration for taking part in this study.

Freedom to withdraw: The participants in the study are informed that they are free to quit the research at any time.

Person to contact: To obtain further details and inquire about this initiative, please get in touch with the individuals listed below

Addis Ababa University, College of Medical and Health Science, Office Tel: _____

Principal Investigator Name and Address

Dr. Hiwot shewangizaw Tel: **+251910557774** Email **shewangizawhiwot@gmail.com**

Advisors Name and Address: Dr. Yohannes Feleke (MD, Assistant Professor)

Dr. Biruk Girma (MD, Assistant professor)

Annex II
Participant Consent Form

Study Participant code: _____ Date _____, have gotten I was aware that any information gathered about me would be kept private and that I may decline or leave the study at any moment without it having an impact on my employment.

The information above has either been read to me in a language I can understand or I have personally read it. I got a chance to ask questions about it and any other questions that I had, and I got satisfactory answers to all of them. My voluntary consent to be a study subject has been given.

Name and Signature of study participant: _____

Name and Signature of principal investigator: _____

Annex III

QUESTIONNAIRES

Knowledge on ACLS

1. Abbreviation of advanced cardiac life support
2. What is your immediate intervention if the victim has no pulse?
 - A. activate emergency response team
 - B. start chest compression
 - C. use AED
 - D. I don't know
3. What is location of chest compression?
 - A. over the sternum
 - B. over the left anterior chest
 - C. over the Right anterior chest
 - D. I don't know
4. What is depth of chest compression for adults?
 - A. 3-4 cm
 - B. 5-6 cm
 - C. 7-10 cm
 - D. I don't know
5. What is adult advanced cardiac life support maximum joule for biphasic, shockable rhythm?
 - A. 25KJ
 - B. 50KJ
 - C. 200KJ
 - D. I don't know
6. What are non-shockable rhythms?
 - A. Ventricular fibrillation and ventricular tachycardia

B. pulseless electrical activity and Asystole

Ventricular Fibrillation and Asystole

D.I don't know

7.What is the CPR rate of compression for adults?

A. 80 -90

B. 90 -100

C. 100 -120

D. I don't know

8. What are shockable rhythms

A. Ventricular fibrillation and ventricular tachycardia

B. pulseless electrical activity and Asystole

C. Ventricular Fibrillation and Asystole

D.I don't know

9. What are the reversible causes of cardiac arrest?

A. Hypoxia

B. Hypothermia

C. Tension pneumothorax

D. All

E I don't know

10 What is the dose and frequency of adrenalin for advanced cardiac life support?

A. 0.1 mg, q 1-2 mins

B. 1 mg, q 3-5 mins

C. 0.2 mg, q 3-5 mins

D.I don't know

11. What is the dose of amiodarone for advanced cardiac life support?

A. 150 mg dilute in 20 ml, may be repeated as needed.

B. 300 mg dilute in 20 to 30 mL, may repeat 150 mg in 3 to 5 min

C. 500 mg dilute in 20 to 30ml repeat 300 mg in 3 to 5 min.

D. I don't know

12. Is magnesium sulphate used for advanced cardiac life support?

A. yes

B. No

13. which is included in post-cardiac arrest care?

A. Air way management

B Blood pressure support

C hypothermia

D all except C

E. All

ATTITUDE

A. Strongly disagree C. Neutral E. strongly agree

B. disagree Agree D. Agree

1. I understand the role of nurses or physicians in advanced cardiac life support

2. I think advanced cardiac life support can be perform as a physician or nurse

3. I have considered learning more about advanced cardiac life support

4. I can document patient care thoroughly

5. I can communicate effectively during advanced cardiac life support care

6. I think advanced cardiac life support has legal and ethical issues

7. I can recognize the signs and symptoms of cardiac arrest as a physician or nurse
8. I can prioritize actions for advanced cardiac life support
9. I can take advanced cardiac life support action based on the patients' condition
10. I have understood the principle of advanced cardiac life support
11. we can evaluate patient responses based on the advanced cardiac life support protocol
12. I think I succeeded as a physician/nurse on advanced cardiac life support

DECLARATION

The goal of the study is to Assess the knowledge, attitude and associated factors towards advanced cardiac life support among health professionals working in selected referral hospitals in Addis Ababa, Ethiopia. The signatory affirms that they are the author of this research project. The thesis concept is entirely original with no presentation at other universities all references to materials used in its creation have been properly cited.

Principal Investigator

Dr. Hiwot Shewangizaw (MD, EMCC Resident) signatureDate.....

Advisors

Dr. Yohannes Feleke (MD, Assistant professor) Signature..... Date.....

Dr. Biruk Girma (MD, Assistant professor) signature..... Date.....

Examiner

Name signatureDate.....

Place

School of medicine department of emergency and critical care, college of medicine and health science, Addis Ababa university, Addis Ababa, Ethiopia.