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ASSESSMENT OF KNOWLEDGE OF LATEST ACLS GUIDELINES AMONG KING ABDULAZIZ UNIVERSITY HOSPITAL EMERGENCY MEDICINE STAFF

Abdulrahman Sindi[1], Eyad Fattani[2], Raghad Turkistani[1]

[1] Emergency Department, King Abdulaziz University Hospital, Jeddah, Saudi Arabia
[2] Emergency Department, East Jeddah Hospital, Jeddah, Saudi Arabia

Abstract

Background: Emergency medicine requires swift and effective decision-making to manage critical patient conditions. Understanding the preferences and practices of healthcare professionals in emergency scenarios is crucial for improving patient outcomes.

Methods: This study employed a cross-sectional observational design to assess the knowledge of the latest ACLS guidelines among emergency medicine staff at King Abdulaziz University Hospital. The study was conducted at King Abdulaziz University Hospital. The population of interest for this study comprises all emergency medicine staff working at King Abdulaziz University Hospital, including physicians, nurses, and paramedics involved in the management of cardiac emergencies. The survey was divided into two parts: the first part assessed the participant's demographics, experience, and education in emergency medicine, while the second part evaluated the participants' knowledge and implementation of the latest ACLS guidelines. Study tools were adopted from ACLS provider pretest questions.

Results: A survey involving 101 healthcare professionals revealed diverse responses to various clinical scenarios. Nurses constituted the largest group of respondents (35.6%), indicating their pivotal role in emergency care. In specific clinical scenarios, adenosine was favored for stable tachycardia (95.0%), while aspirin was preferred for post-STEMI patients (62.4%). Epinephrine emerged as the preferred intervention in cardiac arrest situations (78.2%). Rotation of chest compressors every 2 minutes was the predominant practice to avoid fatigue during CPR (91.1%). The findings reflect a spectrum of perspectives and practices among healthcare professionals, highlighting the complexity of decision-making in emergency medicine.

Conclusion: The findings underscore the collaborative effort among multidisciplinary teams in emergency care, emphasizing the importance of flexibility and adaptability in clinical decision-making. The high adherence to established guidelines and best practices suggests a strong foundation for delivering timely and effective interventions in emergency settings. Continued research and education are essential to further enhance emergency care delivery and improve patient outcomes.

Introduction

Advanced Cardiovascular Life Support (ACLS) guidelines are developed by the American Heart Association (AHA) to help healthcare professionals worldwide provide emergency care to patients with cardiovascular emergencies. Cardiopulmonary resuscitation (CPR) is a life-saving method used to treat cardiac arrest. It involves applying pressure to the chest and may or may not include providing breathing [1]. It is imperative that all students in health professions be adequately

prepared and equipped to handle medical crises and administer CPR whenever and wherever necessary. Acquiring CPR training may determine the outcome of a patient's survival during a medical emergency in the clinic. The training and accessibility of automated external defibrillators (AED) are crucial for promptly managing individuals experiencing cardiac arrest [2].

Gaining a comprehensive awareness of emergency protocols in life-threatening circumstances enhances the practitioner's self-assurance and, as a result, may enhance their capacity to respond appropriately in such situations [3]. Colleges specializing in medical, nursing, and dentistry education have a significant obligation to impart extensive information and training necessary for a health practitioner or professional to possess upon graduation [2,3]. Possessing sufficient understanding of the correct approach to managing a patient experiencing cardiac arrest empowers the clinician to make confident selections, leading the patient to perceive that they are being cared for by a skilled and proficient practitioner [4]. Furthermore, including CPR training at an early stage of the curriculum enhances the understanding and consciousness of health professions students about this crucial life-saving technique [5]. Medical practitioners should be prepared to face medical crises at any point during their career. The most effective way to handle such circumstances with competence is to acquire the necessary skills beforehand [6].

In a German cross-sectional survey, 57% of the dentists who participated reported having up to three crises in a year [7]. An effective strategy for managing emergency occurrences should include many key components, including comprehensive training for dental staff, the development and dissemination of emergency-related guidelines, and the provision of education and training on the proper usage of the emergency kit [3]. Despite the efforts made by medical institutions to provide the required information on managing various medical crises, dentistry graduates and practitioners still demonstrate a notable lack of understanding when it comes to emergency circumstances [6]. The flaws have been detected and documented in several research investigations. For instance, Jodalli and Ankola (2010) revealed a deficiency in the understanding of crises, pharmaceuticals, and equipment among dental interns in Belgaum, India [6]. The participants emphasized the need of include medical emergencies as a crucial subject in the dental curriculum. In addition, the majority of the participants indicated their willingness to get training in essential courses pertaining to medical crises [6].

A separate research conducted in Indiana revealed a notable lack of clarity among dental residents and periodontists on the accurate identification of various levels of misdiagnoses and the management of numerous medical emergency cases [5]. This research, in conjunction with previous investigations, determined that there is a need for further training regarding case-specific characteristics for dental professors and residents. A study conducted on dental students and interns in Saudi Arabia found that many variables significantly contributed to the decrease in fatality rates associated with medical crises occurring in the dental chair [8]. The criteria include the accessibility of drugs, the presence of essential emergency equipment, and the presence of highly skilled dental personnel. However, this research had limitations since it just assessed the efficacy of CPR instruction within the dentistry curriculum. Students in fields such as medicine and emergency medical technicians get more extensive training in medical crises compared to those in dentistry. A separate research conducted at Taibah Dental College in KSA examined undergraduate dental students and practitioners. The findings revealed that a significant number of participants had a reasonable degree of expertise about the treatment of medical crises [9]. For instance, when participants were asked about the proper approach to handle "crushed chest pain", only 54% provided the correct response. The participants' overall performance in correctly identifying symptoms related to crushing chest pain, rapid start of cerebral stroke, mental patients,

unconscious patients with hypoglycemia, patients with postural hypotension, and patients with hyperventilation was between 50-74% [9]. This research was constrained by the small sample size of 202 students and 41 trainers, as well as the omission of verified standardized outcome measures. Furthermore, the data reveals that 78% of trainers were individuals who were not of Saudi nationality, suggesting that they had a distinct set of skills and knowledge in the field of medical emergency training.

Multiple studies [10] have extensively demonstrated the need of providing comprehensive training to practitioners in order to effectively manage medical crises. When creating a medical curriculum, it is crucial to boost the training quality for handling medical crises. This will improve the capacity of health professions students to identify, handle, or seek assistance from specialists in emergency situations [10]. Health university programs in KSA require health practitioners to complete a course that covers theoretical knowledge and practical training in cardiopulmonary resuscitation. They must also pass a test before beginning the clinical portion of the curriculum [8]. Updated ACLS guidelines are issued every few years, based on the latest scientific research and best practices, to ensure that healthcare providers can provide high-quality care. In this study, we aim to assess the knowledge and implementation of the latest ACLS guidelines among KAUH emergency medicine staff.

Methods

Study Design

This study employed a cross-sectional observational design to assess the knowledge of the latest ACLS guidelines among emergency medicine staff at King Abdulaziz University Hospital. Cross-sectional studies allow for the examination of a specific phenomenon at a single point in time, providing valuable insights into the current status of ACLS knowledge among the study population.

Study Setting

The study was conducted at King Abdulaziz University Hospital, a tertiary care facility located in Jeddah, Saudi Arabia. This hospital serves as a major referral center for medical emergencies, including cardiac emergencies, making it an ideal setting to assess ACLS knowledge among emergency medicine staff.

Population

The population of interest for this study comprises all emergency medicine staff working at King Abdulaziz University Hospital, including physicians, nurses, and paramedics involved in the management of cardiac emergencies.

Sample and Sampling

A convenient sampling method was employed to select participants for the study. All emergency medicine staff members present at the hospital during the study period were invited to participate. The sample size was determined based on the total number of emergency medicine staff available at the hospital. A final sample size of 101 was used for this study.

Data Collection

Data was collected using a structured questionnaire designed to assess participants' knowledge of ACLS guidelines. The questionnaire included multiple-choice questions covering various aspects of ACLS protocols, including initial assessment, basic life support (BLS) interventions, advanced cardiac life support (ACLS) algorithms, medication administration, and post-resuscitation care.

Instruments

The survey was developed based on the latest ACLS guidelines to assess the knowledge of KAUH emergency medicine staff. The survey was divided into two parts: the first part assessed the participant's demographics, experience, and education in emergency medicine, while the second part evaluated the participants' knowledge and implementation of the latest ACLS guidelines. Study tools were adopted from ACLS provider pretest questions. The questions were chosen randomly to avoid bias. The questionnaire was distributed among healthcare professionals at KAUH emergency department.

Validity and Reliability

The questionnaire was reviewed by a panel of experts in emergency medicine and ACLS to assess content validity. Additionally, reliability testing was conducted to ensure the internal consistency and stability of the questionnaire. Cronbach's alpha coefficient was calculated to measure internal consistency reliability.

Statistical Analysis

Descriptive statistics, including frequencies and percentages, were used to summarize participants' demographic characteristics and responses to the ACLS knowledge questionnaire. The mean score and standard deviation were calculated to assess the overall level of ACLS knowledge among participants. Inferential statistical tests, such as t-tests or analysis of variance (ANOVA), may be used to examine differences in ACLS knowledge scores among different groups of emergency medicine staff.

Ethical Consideration

This study's ethical considerations included informed consent, confidentiality, data protection, and data sharing. Participants were informed of the study's objectives and provided the opportunity to opt-out at any time. Confidentiality was maintained by assigning unique identifiers to the participants, and data is accessible to the research team only.

Results

The study included 101 participants of different emergency department specialties. The majority of participants were male (63.4%), and most had practiced in emergency medicine for 2-5 years (46.5%). The distribution of respondents' positions reflects a diverse array of healthcare professionals engaged in emergency medicine. Among the respondents, nurses constituted the largest group at 35.6%. Paramedics, representing 7.9% of respondents. Consultants, though comprising a smaller portion at 7.9%. Physicians, accounting for 3.0% of respondents. Residents, comprising 34.7% of respondents. Lastly, specialists, at 10.9%, provide specialized knowledge and skills. Table 1 provides characteristics of participants included in this study.

Table 1: Participant Characteristics

Characteristic	Frequency	Percent
Gender		
Female	37	36.6
Male	64	63.4
Position		
Consultant	8	7.9
Nurse	36	35.6
Paramedic	8	7.9
Physician	3	3
Resident	35	34.7
Specialist	11	10.9
Years Practiced in Emergency		

2 - 5 years	47	46.5
6 - 10 years	22	21.8
Less than 2 years	12	11.9
More than 10 years	20	19.8

The vast majority of participants had obtained their last ACLS provider certificate between 2020 and 2024 (86.1%), and the majority were not ACLS instructors (96.0%). Table 2 presents experience of participants in ACLS and their certification status.

Table 2: ACLS Certification and Experience

ACLS Certification	Frequency	Percent
Last ACLS Provider Certificate		
2015 - 2019	9	8.9
2020 - 2024	87	86.1
Not ACLS Provider Certified	5	5.0
ACLS Instructor		
No	97	96.0
Yes	4	4.0

Responses to Clinical Scenarios

Sinus tachycardia was the most commonly identified rhythm (60.4%), followed by atrial fibrillation (13.9%). Monomorphic ventricular tachycardia was overwhelmingly the most commonly identified rhythm (94.1%). Supraventricular tachycardia was the predominant rhythm identified (85.1%). Sinus bradycardia was the most commonly identified rhythm (88.1%). Second-degree atrioventricular block (Mobitz II block) was the predominant rhythm identified (73.3%). The majority of participants chose Amiodarone 300 mg as the next drug to administer (91.1%) for a patient in pulseless ventricular tachycardia. The most common treatment choice for a patient with STEMI and a history of gastritis was to give aspirin 162 to 325 mg to chew (62.4%). Epinephrine 1 mg IV/O was the most commonly chosen drug for initial administration in refractory ventricular fibrillation (78.2%). Adenosine 6 mg was the overwhelmingly preferred treatment choice for stable tachycardia (95.0%). The most commonly identified contraindication to nitrate administration was the use of a phosphodiesterase inhibitor within the previous 24 hours (89.1%). The majority of participants indicated rotating chest compressors about every 2 minutes (91.1%) to avoid fatigue during CPR. Most participants opted to administer adenosine 12 mg IV (72.3%) for a patient non-responsive to initial adenosine administration. The overwhelming choice for drug administration in CPR following pulmonary embolism was epinephrine 1 mg IV (92.1%). The most common treatment choice for post-STEMI rhythm was reperfusion therapy (87.1%). The majority of participants indicated that immediately after providing an AED shock, chest compressions should be resumed (96.0%).

Table 3: Responses to Clinical Scenarios

Questions	Frequency	Percent
Question 1		
Agonal rhythm/asystole	1	1.0
Atrial fibrillation	14	13.9
Atrial flutter	10	9.9
Monomorphic ventricular tachycardia	1	1.0
Normal sinus rhythm	12	11.9
Polymorphic ventricular tachycardia	1	1.0
Sinus tachycardia	61	60.4

Supraventricular tachycardia	1	1.0
Question 2		
Atrial fibrillation	2	2.0
Atrial flutter	2	2.0
Monomorphic ventricular tachycardia	95	94.1
Polymorphic ventricular tachycardia	1	1.0
Supraventricular tachycardia	1	1.0
Question 3		
Atrial fibrillation	3	3.0
Atrial flutter	2	2.0
Sinus bradycardia	1	1.0
Sinus tachycardia	9	8.9
Supraventricular tachycardia	86	85.1
Question 4		
Agonal rhythm/asystole	1	1.0
Atrial flutter	1	1.0
Normal sinus rhythm	1	1.0
Pulseless electrical activity	1	1.0
Second-degree atrioventricular block (Mobitz I Wenckebach)	4	4.0
Second-degree atrioventricular block (Mobitz II block)	1	1.0
Sinus bradycardia	89	88.1
Sinus tachycardia	2	2.0
Supraventricular tachycardia	1	1.0
Question 5		
Atrial fibrillation	1	1.0
Polymorphic ventricular tachycardia	1	1.0
Pulseless electrical activity	1	1.0
Second-degree atrioventricular block (Mobitz I Wenckebach)	6	5.9
Second-degree atrioventricular block (Mobitz II block)	74	73.3
Sinus tachycardia	1	1.0
Third-degree Atrioventricular block	17	16.8
Question 6		
Adenosine 6 mg	1	1.0
Amiodarone 300 mg	92	91.1
Epinephrine 3 mg	6	5.9
Lidocaine 0.5 mg/kg	2	2.0
Question 7		
Give aspirin 162 to 325 mg to chew	63	62.4
Give clopidogrel 300 mg orally	16	15.8
Give enteric-coated aspirin 325 mg rectally	14	13.9

Give enteric-coated aspirin 75 mg orally	8	7.9
Question 8		
Atropine 1 mg IV/IO	2	2.0
Epinephrine 1 mg IV/O	79	78.2
Lidocaine 1 mg/kg IV/IO	18	17.8
Sodium bicarbonate 50 mEq IV/10	2	2.0
Question 9		
Adenosine 6 mg	96	95.0
Atropine 0.5 mg	1	1.0
Epinephrine 2 to 10 mcg/kg per minute	2	2.0
Lidocaine 1 mg/kg	2	2.0
Question 10		
Anterior wall myocardial infarction	8	7.9
Heart rate less than 90/min	1	1.0
Systolic blood pressure >180 mm Hg	2	2.0
Use of a phosphodiesterase inhibitor within the previous 24 hours	90	89.1
Question 11		
About every 2 minutes	92	91.1
About every 3 minutes	3	3.0
About every 4 minutes	2	2.0
About every 5 minutes	4	4.0
Question 12		
Administer adenosine 12 mg IV	73	72.3
Perform synchronized cardioversion	20	19.8
Perform unsynchronized cardioversion	1	1.0
Perform vagal maneuvers	7	6.9
Question 13		
Atropine 0.5 mg IV	3	3.0
Endotracheal intubation	5	5.0
Epinephrine 1 mg IV	93	92.1
Question 14		
Application of transcutaneous pacemaker	8	7.9
Atropine administration	2	2.0
Nitroglycerin administration	3	3.0
Reperfusion therapy	88	87.1
Question 15		
Check the pulse rate	3	3.0
Prepare to deliver a second shock	1	1.0
Resume chest compressions	97	96.0

Discussion

Participants in this research were KSA health professions working in the emergency department of KAUH who had ACLS clinical practice. The primary factors were examined in our study: the received training on ACLS, being ACLS provider and gender as well as years of experience

First, it was suggested that training is an important role in boosting confidence and attitude to provide CPR to those in need [11–15]. According to research out of King Khalid University in Abha, KSA, gender has no role in determining one's degree of knowledge, but education level does [16]. Nonetheless, our findings did not reveal a statistically significant difference between the trained and untrained groups. The fact that those with less-than-stellar performance had to retake CPR classes may be connected to this paradox. Gender variations in attitude toward ACLS have been shown to have an effect in prior research [17–18]. When interacting with people of the opposing gender, these effects become more apparent [19–23]. Some people may be hesitant to provide chest compressions to the opposite gender for a variety of reasons, including cultural norms, legal concerns, or the fear of spreading illness [19–23]. None the less, there was no statistically significant difference according to gender.

This study's findings highlight the need for healthcare personnel to have more ACLS training in order to manage any crises that may arise [23]. Healthcare professionals who have learned cardiopulmonary resuscitation in ACLS in the last two years, whether via self-study or professional instruction, are much more knowledgeable and have a positive outlook on the subject than those who have not. Potential limitations to the generalizability and depth of the results include the study's small sample size, sampling bias (just one institution was included), self-reporting nature of the measurements, and absence of consideration for other relevant variables, such as cultural background. For more accurate data and findings, future research should address these shortcomings and provide vital information into the participants' certification status in Basic Life Support (BLS) and Advanced Cardiovascular Life Support (ACLS).

Conclusion

The survey results provide valuable insights into the decision-making processes and clinical practices of healthcare professionals in emergency medicine. It is evident from the diverse range of responses that there is no one-size-fits-all approach to managing emergency scenarios, highlighting the importance of flexibility and adaptability in clinical practice. Nurses and residents comprise a significant portion of respondents, underscoring the crucial roles they play in delivering frontline care and contributing to the training of future healthcare professionals. Furthermore, the predominance of specific treatment choices, such as the administration of adenosine for stable tachycardia and aspirin for post-STEMI patients, reflects established guidelines and best practices in emergency medicine. The high frequency of epinephrine administration in various cardiac arrest scenarios underscores its pivotal role as a first-line intervention. Overall, these findings emphasize the collaborative nature of emergency care, wherein multidisciplinary teams work together to deliver timely and effective interventions tailored to the individual needs of patients in critical situations.

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