

Assessment of Knowledge, Awareness, Attitude, and Perceived Barriers Regarding Cardiac arrest and Cardiopulmonary Resuscitation CPR Among Medical and Non-Medical Undergraduate Students in Kohat, Pakistan

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Abstract

Background: Cardiac arrest is a major global public health concern and one of the leading causes of sudden death worldwide. Early recognition and immediate initiation of cardiopulmonary resuscitation (CPR) significantly improve survival outcomes. University students represent a large and potentially responsive segment of the population who can act as bystanders during emergencies. However, limited data are available regarding their preparedness to respond to cardiac arrest, particularly in developing regions of Pakistan.

Objective: This study aimed to assess the knowledge, awareness, attitude, and perceived barriers regarding cardiac arrest and CPR among medical and non-medical undergraduate students in Kohat, Pakistan.

Methods: A cross-sectional study design was employed, and data were collected from undergraduate students of Khyber Medical University (KMU) and Kohat University of Science and Technology (KUST). A structured and validated questionnaire was used to data. Data were

analyzed using descriptive and inferential statistics, including independent sample t-tests and one-way ANOVA, to determine differences across gender, faculty, and academic year.

Results: The findings revealed that overall knowledge and awareness levels were moderate but not satisfactory. Medical students demonstrated significantly higher knowledge and awareness scores compared to non-medical students ($p < 0.001$).

Author Details

Keywords: Cardiopulmonary Resuscitation; Undergraduate Students; Cardiac Arrest; Knowledge And Awareness; Attitude And Perceived Barriers; Pakistan

Received on 15 May 2026

Accepted on 20 Jun 2026

Published on 30 Jun 2026

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Awareness levels also increased significantly with academic year, indicating that academic progression positively influences understanding of CPR. However, no statistically significant differences were observed between male and female students. Despite generally positive attitudes toward learning and performing CPR, participants reported several perceived barriers, including lack of confidence, fear of causing harm, and insufficient practical training.

Conclusion: The findings highlight the need to integrate structured CPR and basic life support training into undergraduate curricula, particularly for non-medical students. Regular hands-on workshops and awareness programs could improve students' preparedness and potentially enhance survival outcomes in cardiac arrest cases within the community.

Introduction

Cardiac arrest is a sudden and life threatening medical emergency condition which is characterized by the sudden cessation of mechanical cardiac activity, which can result to loss in systemic circulation and even death if untreated (1). Around the world, it remains the major public health concern due to its high incidence and poor outcomes. Outside hospital cardiac arrest (OHCA) affects significant portion of population, with an estimated global incidence range of 50 to 60 cases per 100,000 individuals annually (2). This represents hundreds of thousand cases occurred each year worldwide, most of which occur in public community outside the healthcare facilities (3). survival of cardiac arrest victim remains very low, often below 10% despite of advancement in medical treatment for cardiac arrest and emergency response systems. This highlights the need of immediate interventions and knowledge of recognizing the cardiac arrest timely (4).

The pathophysiology of cardiac arrest is a complex cascade of multiple events, which includes ventricular fibrillation (VF) and asystole, Ventricular tachycardia and pulseless electrical activity (PEA) with an end result of oxygen deprivation of vital organ including the brain (5). without prompt restoration of systemic circulation, irreversible brain damage can happen within a few minutes, this secondary damage to brain due to lack of oxygen emphasize the time sensitive nature of this condition (6). Multiple studies reported that Outside hospital cardiac arrest (OHCA) is the leading cause of preventable deaths with survival heavily depended on the chain of survival, early recognition of the condition, immediate cardiopulmonary resuscitation (CPR), rapid availability of defibrillator and advanced cardiovascular care (7). This initial chain of survival is most of the time broken or not followed due to bystander inaction and lack of knowledge and skills, which exacerbates poor outcomes. Developed countries have shown improved survival of the condition with public health initiatives (public awareness about the cardiac arrest and Basic life support trainings). Denmark and some part of the united states, widespread CPR training programs integrated into schools and communities and this initiative have increased bystander interventions rates leading to survival improvements of cardiac arrest upto 20-30% in witnessed victims (8). these outcomes are attributed to comprehensive and structured educational programs of the community which build knowledge, confidence and reduce hesitation. In contrast to this, developing countries face challenges where emergency medical services (EMS) are mostly underdeveloped and public awareness about the recognition of the cardiac arrest and intervention is limited, resulting very low survival rates even near zero in some area (9).

Among all these steps of chain of survival early CPR by bystander has been consistently identified as the most influential determinants of the survival and favorable outcomes (10). CPR is a life saving procedure which aimed to sustain circulation and ventilation during cardiac arrest until the return of spontaneous circulation or the arrival of advanced medical professional team (11). It has basically two components, which is chest compression and rescue breathing, adult chest

compression should be provided at a rate of 100 – 120 compression per minute, with chest compression and rescue breath ratio of 30:2. If provided ideally and timely within first few minutes it can increase the survival chances double to triple (12).

Despite of its importance CPR faces numerous of barriers around the world. Including public fear of causing harm, lack of skills and training, culture norms and misconceptions about the legal liability (13). However, this issue is greatly amplified in some countries where cultures and social norms, gender related discomfort, and poor structure of emergency medical services further worse the participation (14). Knowledge regarding the CPR is often revealed as below 10% among general population Asian countries (14, 15). Even CPR by bystander, which means CPR by layperson, before the EMS team can double or triple the chances of survival in OHSA victims (15).

Survival of cardiac arrest is highly depended on the timely recognition of the condition, rapid intervention including CPR and defibrillator (10,11,12). The American heart association (AHA) introduced the concept of “chain of survival” which emphasizes on the early recognition of the event, early CPR, Rapid defibrillator, effective advance cardiac life support Among all these steps early CPR by bystander has been consistently identified as the most influential determinants of the survival and favorable outcomes (13). Multiple studies have reported that the survival rates is significantly improve when the CPR is initiated by bystander before the arrival of emergency medical service team (16, 17). The survival rate is decrease for every minute without CPR, approximately 7-10% of survival decrease for every minute without CPR (18). Therefore, community awareness about the recognition and early CPR are the crucial in improving the outcomes of cardiac arrest victims.

In pakistan previous studies conducted among university students reported inadequate knowledge, low confidence of performing CPR, with largely these findings are from online survey (19). Kohat is a semi urban district in KPK Pakistan, reflects similar challenges and there is lack of filed based studies regarding CPR knowledge, awareness and attitudes among university students. Therefore this study was aimed to evaluate the CPR knowledge, awareness, attitudes and perceived barriers among medical and non medical undergraduate students in kohat.

Research objectives

The objectives of this study were:

To assess the level of awareness and knowledge regarding cardiac arrest and cardiopulmonary resuscitation (CPR) among undergraduate students in Kohat

To evaluate students’ attitudes toward performing cardiopulmonary resuscitation (CPR) and perceived barriers that may prevent them from performing CPR during emergency situations.

To compare Knowledge, Awareness, Attitude and perceived barriers between medical and non-medical undergraduate students

Method and methodology:

Descriptive Cross sectional study was conducted from December 2025 to February 2026 among undergraduate students at Khyber Medical University, kohat campus and kohat university of science and technology, kohat, pakistan, yo assess knowledge, awareness, attitudes, and perceived barriers regarding Cardiac arrest and CPR. Registered undergraduate students who were present during the data collection period and provided written informed consent were included, while postgraduate students and those who declined or withdrew consent were excluded.

A total sample of 400 partcipatants was selected using stratified random sampling, with equal representation from eight academic discipline, including four medical (MBBS, BDS, Allied Health sciences and nursing) and four non medical (Arts, Computer science , and social sciences strata). the sample size of 384 was determined

using the single population proportion formula (95% confidence level, 5% margin of error) and increased to 400 to ensure balanced subgroup representations. Data was collected using structured questionnaire, followed by data entry, statistical analysis, and report writing.

Results:

The majority of participants were male (74.8%), while females constituted 25.3% of the sample. Regarding university affiliation, 62.5% of the respondents were from KUST and 37.5% were from KMU. The sample was equally distributed between medical (50%) and non-medical (50%) faculties. In terms of academic year, most students were enrolled in the 3rd year (46%), followed by 2nd year (34%), 4th year (15.5%), 1st year (3.8%), and 5th year (0.8%).

Table 1: Socio-demographic characteristics of participants (N = 400)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	299	74.8
	Female	101	25.3
University	KMU	150	37.5
	KUST	250	62.5
Faculty	Medical	200	50.0
	Non-Medical	200	50.0
Academic Year	1st Year	15	3.8
	2nd Year	136	34.0
	3rd Year	184	46.0
	4th Year	62	15.5
	5th Year	3	0.8

Socio-demographic characteristics

The descriptive statistics for awareness, knowledge, attitude, and perceived barriers are presented in Table 3.2. The mean awareness score was 3.45 ± 1.94 (range: 0–7), while the mean knowledge score was 2.44 ± 1.99 (range: 0–6). The mean attitude score was 16.63 ± 1.86 (range: 8–20). The mean perceived barriers score was 14.18 ± 2.46 (range: 4–20), indicating a moderate level of barriers to performing CPR.

Comparison of scores by gender

In the current study, although female students showed higher knowledge score and awareness when compared to males students. Therefore, gender was not found to have significant factors influencing knowledge, awareness, attitude and perceived barriers regarding cardiac arrest, its symptoms and effective CPR.

Table 2: Comparison of scores by gender

Variable	Male (Mean ± SD)	Female (Mean ± SD)	t-value	p-value
Awareness	3.42 ± 1.99	3.51 ± 1.81	-0.402	0.688
Knowledge	2.34 ± 2.01	2.71 ± 1.94	-1.619	0.106
Attitude	16.71 ± 1.80	16.39 ± 2.01	1.511	0.132
Barriers	14.16 ± 2.49	14.23 ± 2.38	-0.237	0.813

Comparison of scores by faculty.

We observed statistically significant difference between medical and non medical students across the variables of study ($p < 0.001$) (table 5.4). Medical students demonstrated significantly higher awareness (4.93 ± 1.53) and knowledge scores (3.98 ± 1.49) compared to non-medical students (1.97 ± 0.92 and 0.90 ± 1.00 , respectively). In addition, Medical students showed more positive attitude toward effective CPR (17.25 ± 1.66) when compared to non medical students (16.01 ± 1.84). also, no medical students reported significantly higher perceived barriers (15.59 ± 0.89) compared to medical students (12.77 ± 2.70).

Table 3: comparison of scores between faculty

Variable	Medical (n=200) Mean ± SD	Non-Medical (n=200) Mean ± SD	t (df=398)	p-value
Awareness	4.93 ± 1.53	1.97 ± 0.92	23.418	<0.001
Knowledge	3.98 ± 1.49	0.90 ± 1.00	24.182	<0.001
Attitude	17.25 ± 1.66	16.01 ± 1.84	7.098	<0.001
Barriers	12.77 ± 2.70	15.59 ± 0.89	-14.027	<0.001

Comparison of mean scores between KMU and KUST students

comparison of awareness, knowledge, attitude, and perceived barriers between students of Khyber Medical University (KMU) and Kohat University of Science and Technology (KUST) A sample t-test analysis revealed that statistically significant differences between the two groups across all variables of study ($p < 0.001$). KMU students demonstrated significantly higher mean scores in awareness regarding CPR (4.77 ± 1.60) as well as knowledge (3.90 ± 1.65) compared to the students of KUST (2.66 ± 1.69 and 1.56 ± 1.65 respectively).

Similarly the KMU students showed slightly higher attitude scores (17.17 ± 1.84) compared to the students of KUST (16.30 ± 1.80). But the KUST students reported higher perceived barriers (15.03 ± 1.66) compared to the KMU students (12.75 ± 2.88).

Table 5.5: comparison of scores between KUST and KMU students.

Variable	KMU (Mean \pm SD)	KUST (Mean \pm SD)	t-value	p-value
Awareness	4.77 \pm 1.60	2.66 \pm 1.69	12.353	<0.001
Knowledge	3.90 \pm 1.65	1.56 \pm 1.65	13.783	<0.001
Attitude	17.17 \pm 1.84	16.30 \pm 1.80	4.604	<0.001
Barriers	12.75 \pm 2.88	15.03 \pm 1.66	-10.031	<0.001

Comparison of scores by academic year and discipline.

Analysis showed statistically significant difference among academic year for all variable of the study. Awareness scores is different significantly across the academic years ($f= 44.783$, $p < 0.001$). furthermore, knowledge score also showed significant variation among students with different academic year ($= 52.748$, $p < 0.001$). Attitude regarding CPR also demonstrated significant across academic years ($f= 11.735$, $p < 0.001$).

In addition to all these, perceived barriers showed a statistically difference among academic levels or years ($f= 21.165$, $p < 0.001$).

4th-year students demonstrated significantly higher awareness and knowledge scores compared to 1st- and 2nd-year students ($p < 0.001$). No significant difference was observed between 2nd- and 3rd-year students in certain comparisons. perceived barriers were significantly higher among 1st-year students compared to senior students, suggesting that increased academic exposure may reduces perceived obstacles and improve confidence in performing CPR. Overall, the findings demonstrate that both academic discipline and year of study significantly influence students' awareness, knowledge, attitudes, and perceived barriers related to cardiopulmonary resuscitation.

Discussion

this study assessed the knowledge, arawrness, attitude and perceived barriers regarding cardiac arrest and cardiopulmonary resuscitation (CPR) among undergraduate students in kohat, pakistan. Study was conducted at Khyber medical University (KMU) and Kohat University of Science and Technology (KUST), and the findings highlights significant disparities between medical and non-medical students, underscoring the influence of academic discipline on emergency preparedness. The findings demonstrated moderate awareness, low knowledge, positive attitudes, and

moderate perceived barriers, with significant differences between medical and non-medical students.

Study mean knowledge score of 2.44 out of 6 indicates a substantial gap in factual understanding of cardiac arrest recognition and CPR techniques among undergraduate students. This concerning given that early recognition and intervention are critical components of the “Chain of Survival”. Participants struggled with key elements such as correct chest compression rate (100-120 per minutes) and hand placement, which are essential for effective CPR. Awareness levels were slightly better but still moderate, with many students familiar with CPR conceptually yet lacking specifics like emergency help line numbers or Automated External Defibrillator (AED) usage. These findings echo prior research in low- and middle-income countries (LMICs), including study from Pakistan, China and Malaysia, where bystander CPR knowledge is often below 20-30% (16,20). In contrast to high income countries like Denmark and United States, where public education campaigns have boosted awareness to over 50% and improved survival rates to 20-30% (18)

Attitude towards CPR were predominantly positive, with a mean score of 16.63 out of 20, indicating willingness to learn and perform CPR, particularly under guidance. This aligns with international studies showing university students’ general enthusiasm for CPR training. However, the moderate barriers score (14.18 out of 20) reveals persistent obstacles, including fear of causing harm, lack of confidence, legal concerns and panic. Fear of mistakes emerged as the most cited barrier, consistent with global literature. In conservative societies like Pakistan, gender-related discomfort added a cultural dimension, especially in mixed-gender scenarios. This hesitation could explain the national bystander CPR rate of only 2.3% (63), despite 90% of out-of-hospital cardiac arrest (OHCAs) being witnessed (22).

Another findings was the significant disparity between medical and non-medical faculties ($p < .001$ across all variables). Medical students exhibited higher awareness ($M = 4.93 \pm 1.53$ vs. $M = 1.97 \pm 0.92$), knowledge ($M = 3.98 \pm 1.49$ vs. $M = 0.90 \pm 1.00$), and attitude ($M = 17.25 \pm 1.66$ vs. $M = 16.01 \pm 1.84$), alongside lower barriers ($M = 12.77 \pm 2.70$ vs. $M = 15.59 \pm 0.89$). This is attributable to curriculum integration of basic life support (BLS) in programs such as MBBS, BDS, Allied Health Sciences (AHS), and Nursing. MBBS and Nursing students outperformed non-medical disciplines like Computer Sciences and Arts, with mean differences exceeding 3-4 points in knowledge and awareness. These results corroborate comparative studies globally and in Pakistan, where medical students score 20-50% higher due to formal exposure (13). However, even among medical students, knowledge was not optimal ($M = 3.98/6$), suggesting deficiency in skill retention without regular practice. Non-medical students, comprising a larger societal segment, represent an untapped resource for community dissemination (23). The wider gaps in kohat may stem from the districts semi-urban nature with fewer training opportunities compare to urban center.

Currently study revealed no significant gender differences were observed ($p > 0.05$), females showing slightly higher but statistically non-significant awareness and knowledge scores. this contrast with some studies in conservative contexts, where female report greater hesitation due to cultural norms (24). The male dominated sample (74.8%) may have influenced this, though it reflects enrollment patterns in Pakistan universities.

Limitations

Limitation of the study includes, cross sectional study design which capture a snapshot and limits the causality inferences. self-reported data may introduce social desirability bias to the study, however, conducting data collection in a supervised field helped to reduce this. Also the sample was male dominated and restricted to two universities in kohat, this may limit the generalizability of the study findings. Pilot

testing ensured questionnaire validity, but cultural adaptation could enhance sensitivity.

The assessment of the knowledge was based on theoretical responses rather than practical skills evaluations, which may not reflect the participant actual CPR abilities.

Recommendations

Findings of the study highlights that the need to strengthen CPR knowledge and skills among students through training and educational interventions. CPR and BLS training should be made compulsory part of the undergraduate curricula in both medical and non-medical universities or institutes. With regular hand on workshop, simulation-based training and awareness seminars should conduct on regular bases to improve the skills and confidence of handling real life emergency situation such as cardiac arrest.

Future research should be done with larger and more diverse population and practical assessment for better evaluation of the knowledge, skills and attitude regarding CPR and cardiac arrest.

Conclusion:

The current study found that the undergraduate student of Kohat university of science and technology (KUST) and Khyber medical University (kohat Campus) had low Knowledge especially the non medical students of KUST, moderate awareness, Barriers regarding cardiac arrest and cardiopulmonary resuscitations. The study also found positive attitudes in both universities students. Medical students were found to have better awareness, knowledge and attitudes and few perceived barriers in comparison of non medical students while no significant gender differences were observed in the study. Study also found that academic year was positively associated with improved scores of knowledge and confidence however no improvement in recognition of cardiac arrest especially in non medical students. Despite positive attitude of learning CPR important barriers such as fear of causing harm, lack of confidence, and limited training were the most identified perceived barriers. This highlights the need of basic life support programs initiation in undergraduate programs particularly for non-medical students with regular hand on practice and awareness programs to improve bystander CPR and enhanced survival following out of hospital cardiac arrest in Pakistan.

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