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KNOWLEDGE AND AWARENESS ASSESSMENT OF MEDICAL STUDENTS TOWARDS BLS IN KSA.

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Abstract

Background: Cardiovascular disorders are the second most prevalent cause of death globally, behind auto accidents. The probability of survival in such circumstances is increased by prompt treatment, such as Basic Life Support (BLS). Therefore, there is an urgent need for everyone to have sufficient awareness of emergency procedures like BLS, especially health care workers and students. To evaluate the knowledge and awareness level of basic life support among medical students in KSA.

Methods: This study was cross-sectional study, based on online questionnaire that allowed us to examine the knowledge and awareness level of basic life support among medical students in Saudi Arabia. The study population consisted of students studying in medical college in Kingdom Saudi Arabia, participants were recruited during August 2023 to May 2024.

Results: the total sample size were 732 participants. As regard knowledge score of medical students towards BLS in KSA, 21.2% demonstrated a high level of knowledge in BLS, while a majority of 55.9% fell within the medium knowledge level category. Additionally, 23.0% of students were classified as having a low level of knowledge in BLS. Moreover, awareness score of medical students towards BLS revealed that 48.2%, fall under the High-Level category. Furthermore, 47.3% of respondents demonstrating a moderate level of awareness. However, it is worth noting that a small proportion of respondents, accounting for 4.5%, exhibit a low level of awareness towards BLS. Additionally, there was a statistically significant relation between knowledge level and age (p value=0.002), academic year (p value=0.011) and GPA (p value=0.011). It also shows statistically insignificant relation to gender, nationality, and marital status.

Conclusion: the study conducted among medical students in Saudi Arabia revealed varying levels of knowledge and awareness regarding basic life support (BLS) with the majority having adequate level

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of knowledge and awareness. A significant relationship was observed between knowledge level and factors such as age, academic year, and GPA. Discrepancies in BLS education and preparedness were noted in other studies across different regions, highlighting the importance of consistent and comprehensive BLS training for medical students worldwide. Addressing these gaps in knowledge and skills can significantly enhance the ability of healthcare providers to respond effectively to emergencies and improve patient outcomes.

Keywords: Basic life support, medical students, knowledge, CPR.

Introduction:

The providing of basic life support (BLS) is essential to health care [1]. One of the main causes of mortality in today's world is cardiac arrest, Early intervention by BLS providers may lower related illnesses and fatalities [2]. High-quality CPR dramatically improves patient outcomes, even if the clinical success of CPR is dependent on a number of variables, including the patient's starting condition and the length of cardiac arrest [3]. Ideally, BLS should be known by everyone in the community, but especially by the medical staff [4]. BLS by itself is sufficient for survival. In a hospital context, such emergency scenarios are frequently seen on a regular basis [5].

Globally, approximately 92 percent of out-of hospital cardiac arrest subjects die due to a lack of CPR facilities [6]. The BLS course has developed significantly over the years in order to make it more helpful to the general public. Since 1966, all health care providers in the United States have been advised to complete a BLS training program [2].

In 2018, a study was done among female secondary students in public schools in Riyadh, Saudi Arabia and more than half of the students (54.8%) did not know anything about BLS, and 82.6% said they knew too little. 10.8% of participants had attended a BLS course, and only 38.5% agreed that BLS training ought to be required [7]. Study has been published on the knowledge and attitude of Egyptian Medical Students in 2018 to BLS and it was found to be the percentage of students who were unable to pinpoint the proper area of chest compression in adults and babies was 72% and 84%, respectively. Additionally, the majority (80%) were unable to provide babies with rescue breathing. Only 22% of students recognized how to assist patients with myocardial infarction, and only 18% of students could accurately identify the first indications of shock. Prior BLS education or experience were strongly related with higher BLS knowledge scores while in the clinical years (p 0.001) [8]. Parents and teachers from kindergarten and elementary schools participated in the study in Taif City, Saudi Arabia to evaluate their attitudes and knowledge on first aid and BLS and they were 648 participants. The participants in our study had an average level of knowledge of 4.6 +/- 1.4, with 22.4% of them having knowledge of first aid and a reasonable understanding of the basics of CPR. While the majority of participants (more than 75%) revealed a low level of knowledge, just a tiny percentage (2.3%) of participants demonstrated a good and appropriate theoretical level of understanding about CPR abilities and performance [9]. A research on the knowledge of basic life support and emergency medical services among medical university students and professionals in Saudi Arabia was released in 2020. 95 (63.33%) of the 150 respondents had previously participated in BLS training, compared to 45 (36.67%) who had

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http://magellanes.com/

not. The majority of the questions had students' awareness at an average level [5].
Studies have shown that maintaining knowledge and skills related to BLS is crucial since knowledge tends to be forgetting over time without periodic practice [10]. It is essential for healthcare professionals to be knowledgeable and trained in fundamental life-support techniques since such situations occur frequently. Several studies have evaluated the levels of BLS awareness among medical students in various countries [11]. However, Similar data is lacking for western medical students studying in the Kingdom of Saudi Arabia. Therefore, the purpose of the current study was to assess the knowledge and awareness level of basic life support among medical students in Saudi Arabia.

Objectives:
The purpose of the current study was to assess the knowledge and awareness level of basic life support among medical students in Saudi Arabia.

Materials and Methods:

A. Study design:
This study was a cross-sectional study. Based on a structured questionnaire that allowed us to examine the knowledge and awareness level of basic life support among medical students in Saudi Arabia at a certain point in time without intervening or altering any variables.

B. Study setting: Participants, recruitment, and sampling procedure:
The study population consisted of students studying in medical college in Kingdom Saudi Arabia, participants were recruited during 2023-2024 from medical students receiving the questionnaire.

C. Inclusion and Exclusion criteria:
Inclusion criteria included all medical students who were actively studying in any medical college in Saudi Arabia. All non-medical students is excluded. Any medical students studying in non-Saudi universities is also excluded.

D. Sample size:
This study's sample size was calculated using the formula: n = z2(1- p)/d2, where n is the sample size, z is the statistic for a confidence level (1.96 percent to 95 percent confidence level), p is the expected population proportion (50 percent) for the largest sample size, and d is precision (0.05 [5 percent]).
The original sample size was 385, but we increased it to 648.

E. Method for data collection and instrument (Data collection Technique and tools):

Collection of data was based on an online google form questionnaire. The survey was constructed based on validated semi-structured questionnaire which done by Mohammed. Z et al [12], to assess adequate CPR knowledge in addition to attitudes (based on 2015 American Heart Association guidelines). The questionnaire consisted of 40 questions classifieds into 3 main section, first section contained sociodemographic and academic data, the second section included CPR experiences and theoretical

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http://magellanes.com/

knowledge, third section about Attitude Toward BLS. Correct responses to knowledge questions received 1 point, while incorrect responses and "I don't know" responses received 0 points. Thus, the possible range of the overall knowledge score is 0 to 23 points. An answer to an attitude question received two points if it was positive, one point if it was neutral, and zero points if it was negative. According to the scale, attitude ratings might be between 0 and 20. Participants were instructed to respond to the questionnaire using their current knowledge and without consulting any materials or textbooks. The questionnaire was written in English as all courses were in the same language.

F. Scoring system:

We carried out a cross-sectional inquiry for the purpose of measuring the degree of BLS awareness among medical students. An online based poll was the method utilized to acquire the data. The study instrument was acquired after getting in touch with scholars who performed studies that addressed a comparable topic. The questionnaire's final iteration had (39) items broken down into [three] major subgroups.

This instrument adopted was a Google Forms-based online survey in English. The participants self-conducted it. A guarantee of anonymity was made to promote genuine replies. Muhammad Z et al. had previously employed this test to judge the degree of BLS knowledge among young physicians and medical college students in Upper Egypt.

For the knowledge test, a score of 1 was given for every correctly answered question, while a score of 0 was given for the other incorrect responses & those answered I don't Know. The participants' scores have been summed together to determine the overall knowledge score. The score scale was broken down into three categories: high level of knowledge (16–22), medium level of knowledge (10–15), and low level of knowledge (0–9).

G. Analyzes and entry method:

Upon collection, the responses from the self-administered questionnaires were entered into an electronic database using SPSS. The data entry process was adherent to strict double-entry procedures, where two independent research team members entered the data separately. Disagreements between the entries were resolved via comparison and verification

Results:

Table (1) displays various demographic parameters of a group of people. The table outlines various parameters including age, gender, nationality, region of residence, university affiliation, academic year, marital status, and GPA distribution among the participants. It is evident from the data that most participants fall within the age range of 20 to 23, with 54.1% in this category. In terms of gender distribution, there is a slightly higher representation of males (53.3%) compared to females (46.7%). Additionally, most participants are of Saudi nationality (96.7%), with a diverse distribution across different regions of residence and universities. Notably, the largest proportion of participants are enrolled in King Faisal University (37.8%), and most participants are in their fifth or sixth academic year. The data also indicates that most participants are single (91.0%) and have a GPA ranging from 3.5 to 4.5 (35.4%).

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http://magellanes.com/

Table (1): Sociodemographic characteristics of participants (n=732)

Parameter		***No.***	***Percent (%)***
Age	20 or less	167	22.8
	20 to 23	396	54.1
	24 or more	169	23.1
Gender	Female	342	46.7
	Male	390	53.3
Nationality	Non-Saudi	24	3.3
	Saudi	708	96.7
Region of residence	Al Madinah Al Munawwarah	105	14.3
	Al Taif	6	.8
	Jeddah	137	18.7
	Makkah	38	5.2
	Other	444	60.7
	Yanbu	2	.3
University	Imam Abdulrahman Bin Faisal University	16	2.2
	Princess Nourah bint Abdulrahman University	4	.5
	Al Baha University	6	.8
	Prince Sattam Bin Abdulaziz University	2	.3
	Taif University	2	.3
	Majmaah University	6	.8
	Al-Maarefa University	2	.3
	King Khalid University	6	.8
	King Saud bin Abdulaziz University	24	3.3
	King Saud bin Abdulaziz University for Health Sciences	24	3.3
	King AbdulAziz University	135	18.4
	King Faisal University	277	37.8
	Ummul Qura University	16	2.2
	Jazan University	22	3.0
	University of Hail	14	1.9
	Dar Al Uloom University	6	.8
	University of Taibah	83	11.3
	Imam Mohammad Ibn Saud Islamic University	19	2.6
	Najran University	46	6.3
	Ibn Sina National College for Medical Studies	2	.3
	Batterjee Medical College	4	.5
	Al – Rayan college	16	2.2
Academic year	First year	37	5.1
	Second year	94	12.8

ISSN:1624-1940
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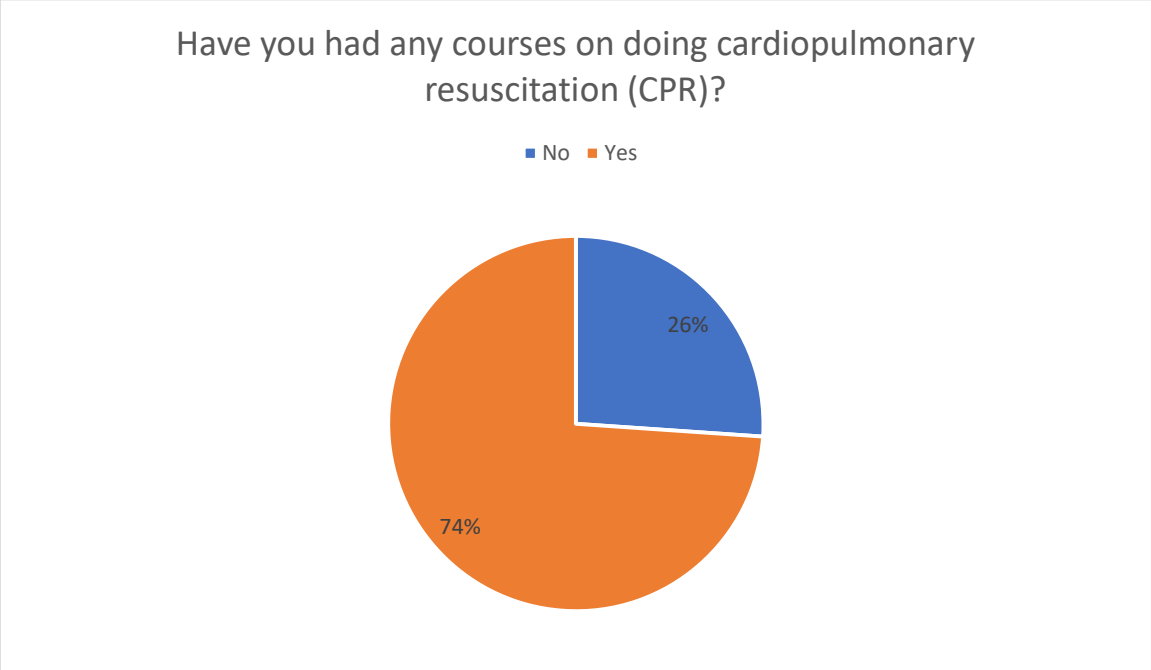
http://magellanes.com/

	Third year	121	16.5
	Fourth year	116	15.8
	Fifth year	185	25.3
	Sixth year	179	24.5
Marital status	Single	666	91.0
	Married	50	6.8
	Divorced	6	.8
	I preferred not to say	10	1.4
GPA	2.5 or less	8	1.1
	2.5 - 3.5	51	7.0
	3.5 - 4.5	259	35.4
	4.5 or more	414	56.6

Figure (1): Illustrates if participants had any courses on doing cardiopulmonary resuscitation (CPR)



As illustrated in table (2), the data presented in Table (2) regarding the parameters related to the knowledge of medical students towards Basic Life Support (BLS) in the Kingdom of Saudi Arabia (KSA) with a sample size of 732 respondents, several key insights can be gleaned. Firstly, a significant majority of the participants (73.9%) have undergone courses on cardiopulmonary resuscitation (CPR), indicating a proactive approach towards emergency preparedness. When asked about the abbreviation "BLS," the vast majority correctly identified it as "Basic Life Support" (94.4%), showcasing a strong understanding of fundamental concepts. In a scenario where an individual is found unresponsive alone, the most common response selected was to look for safety (62.3%), highlighting the importance of assessing the situation before acting. When it comes to the location of chest compressions on adult patients, the majority correctly identified the center of the chest on the lower half of the breastbone

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http://magellanes.com/

(61.5%), demonstrating a solid grasp of proper technique. Similarly, respondents showed good knowledge of performing chest compressions on infants, with a significant proportion selecting the correct location below the nipple line (44.8%). Understanding the depth of compressions is crucial during CPR, and most participants correctly identified the recommended depths for adults, children, and neonates. Moreover, the preferred compression to ventilation ratio with a compression rate of at least 100 per minute was predominantly chosen as 30:2 for all age groups if only a single rescuer is present (62.4%). The data reflects a generally positive level of awareness and knowledge among medical students in KSA regarding BLS principles and CPR protocols, suggesting a strong foundation in emergency response practices.

Table (2): Parameters related to knowledge of medical students towards BLS in KSA (n=732).

Parameter		***No.***	***Percent (%)***
Have you had any courses on doing cardiopulmonary resuscitation (CPR)?	No	191	26.1
	Yes	541	73.9
What does the abbreviation "BLS" stand for?	A) Best Life Support	18	2.5
	B) Basic Life Support	691	94.4
	C) Basic Lung Support	7	1.0
	D) Basic Life Services	16	2.2
If you found someone unresponsive in the middle of the road, what should be your first response? (Note: You are alone)	A) Open/secure airway	202	27.6
	B) Start chest compressions	66	9.0
	C) Look for safety	456	62.3
	D) Administer two breaths	8	1.1
Where should chest compressions be done on an adult patient?	A) Left side of the chest	86	11.7
	B) Right side of the chest	31	4.2
	C) Centre of the chest on the lower half of breastbone	450	61.5
	D) Xiphisternum	165	22.5
Where should chest compressions be done on infants?	A) One finger breadth below the nipple line	328	44.8
	B) One finger breadth above the nipple line	148	20.2
	C) At the intermammary line	173	23.6
	D) Xiphisternum	83	11.3
How do you administer rescue breathing to infants?	A) Mouth-to-mouth with nose pinched	313	42.8
	B) Mouth-to-mouth and nose	213	29.1
	C) Mouth-to-nose only	36	4.9
	D) Mouth-to-mouth without nose pinched	170	23.2

ISSN:1624-1940
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http://magellanes.com/

What is the depth of compressions in adults during CPR?	A) At least 2 inches	449	61.3
	B) 2½ – 3 inches	181	24.7
	C) 1 – 1½ inches	83	11.3
	D) 1½ inch	19	2.6
What is the depth of compressions in children during CPR	A) 2 inches	139	19.0
	B) 2 - 2½ inches	107	14.6
	C) 1 - 1½ inches	363	49.6
	D) ½ – 1 inch	123	16.8
What is the depth of compressions in neonates during CPR?	A) 1½ – 2 inches	86	11.7
	B) 2- 2½	67	9.2
	c) 1 inch	314	42.9
	D) approximately 1½ inch	265	36.2
What is the correct rate of chest compressions in adult and Children during CPR?	A) at least 100 / min	266	36.3
	B) approximately 100 / min	249	34.0
	C) 80 / min	103	14.1
	D) 120 / min	114	15.6
The updated/current order of CPR interventions for all age groups except newborns is	A) Airway, Breathing, Chest compressions (ABC)	356	48.6
	B) Chest compressions, Airway, Breathing (CAB)	253	34.6
	C) Airway, Chest compressions, Breathing (ACB)	101	13.8
	D) Breathing, Chest compressions, Airway, (BCA)	22	3.0
The recommended universal compression to ventilation ratio with a compression rate of at least 100 per minute in ALL groups is	A) 30:2 for adults, children, and infant if only a single rescuer is present	457	62.4
	B) 15:2 in children and infants if at least 2 rescuers are present	215	29.4
	C) 3:1 in newborns unless a cardiac cause is known	60	8.2

CAHIERS MAGELLANES-NS
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http://magellanes.com/

Figure (2): Illustrates if the participants think that CPR must always be attempted inside of a hospital not outside.

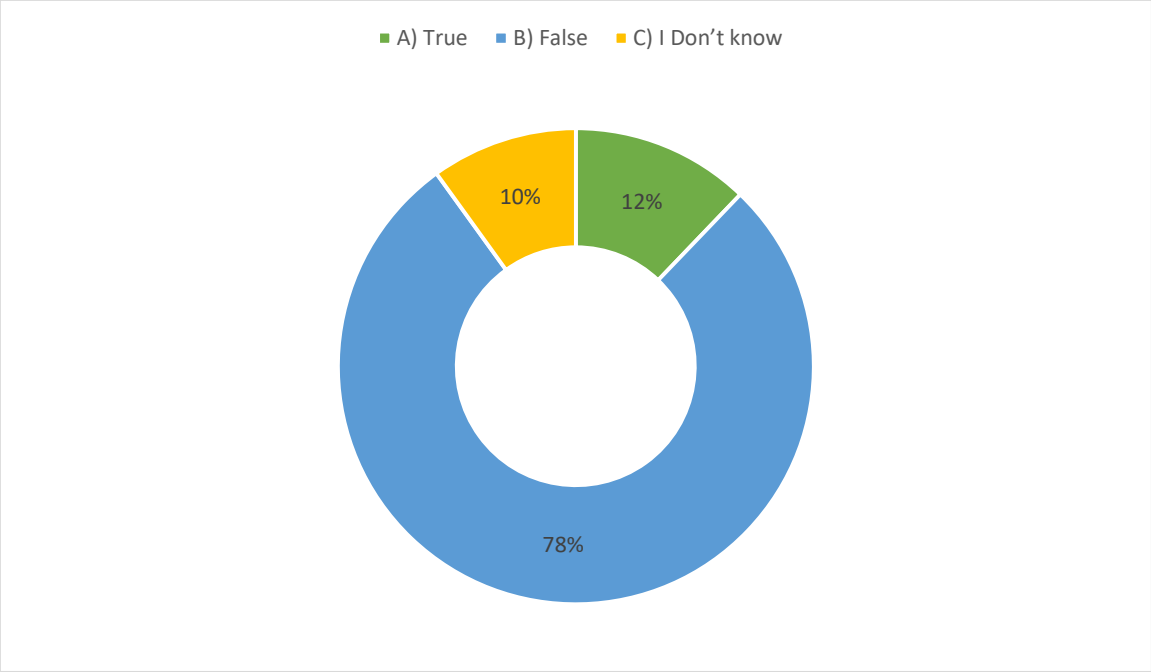

Table (3), based on a sample size of 732 participants, highlights various parameters related to CPR (Cardiopulmonary Resuscitation) and emergency response scenarios. It is evident from the data that there are varying levels of knowledge among the participants. For instance, a significant proportion believed that CPR must always be attempted inside a hospital, while a majority recognized the importance of performing CPR within a specific time frame after the stoppage of blood flow. The responses also indicate a mix of understanding and misconceptions regarding the effectiveness of CPR, the role of artificial respirations versus chest compressions, and the critical timing for initiating life-saving measures. Moreover, the data suggests a need for further education and awareness campaigns to dispel myths and enhance the public's knowledge of BLS practices.

Table (3): participants knowledge towards BLS in KSA (n=732).

Parameter		***No.***	***Percent (%)***
CPR must always be attempted inside of a hospital not outside	A) True	89	12.2
	B) False	570	77.9
	C) I Don't know	73	10.0
CPR is generally only effective if performed within 6-7 minutes of the stoppage of blood flow to vital organs	A) True	266	36.3
	B) False	216	29.5
	C) I Don't know	250	34.2
	A) True	394	53.8

ISSN:1624-1940
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http://magellanes.com/

Artificial respirations are more appropriate than chest compressions if a person is not breathing but has palpable pulse (i.e. respiratory arrest)	B) False	128	17.5
	C) I Don't know	210	28.7
On average, 85–90% of people who receive CPR survive if conducted by experienced personnel	A) True	321	43.9
	B) False	131	17.9
	C) I Don't know	280	38.3
The brain may sustain damage after blood flow has been stopped for about 4 mins and irreversible damage after about 7 mins	A) True	443	60.5
	B) False	67	9.2
	C) I Don't know	222	30.3
If blood flow ceases for >10 hrs, virtually all cells of the body will die	A) True	345	47.1
	B) False	89	12.2
	C) I Don't know	298	40.7
CPR is generally continued until the person regains return of spontaneous circulation or is declared dead	A) True	518	70.8
	B) False	70	9.6
	C) I Don't know	144	19.7
Compression-only CPR by the lay public is recommended if an adult goes into cardiac arrest outside of the hospital in the absence of experienced personnel	A) True	363	49.6
	B) False	130	17.8
	C) I Don't know	239	32.7
The survival rate is very high if CPR is done immediately followed by defibrillation within 3–5 minutes of sudden cardiac arrest	A) True	428	58.5
	B) False	72	9.8
	C) I Don't know	232	31.7
It is better to be calm and collected while conducting CPR rather than to appear frightened	A) True	530	72.4
	B) False	51	7.0
	C) I Don't know	151	20.6
CPR is often severely misrepresented in movies and television as being highly effective in resuscitating a person who is not breathing and has no circulation	A) True	415	56.7
	B) False	106	14.5
	C) I Don't know	211	28.8

Table (4), based on a sample size of 732 participants, delves into various parameters related to BLS training and practices among medical students. It is interesting to note that a significant majority, approximately 88.4%, believe that BLS training is necessary, highlighting the awareness of the importance of such skills in emergency situations. However, the data also reveals that only 29.9% of participants have voluntarily performed BLS, indicating a potential gap between knowledge and practical application. Moreover, the statistics on willingness to undergo BLS training in a workshop with hands-on practice and the belief that BLS should be part of the curriculum emphasize the importance of practical training and integration of BLS education into medical programs. The findings also shed light on students' confidence in their skills, with varying percentages expressing proficiency in performing chest compressions and ventilations on actual patients. Overall, this data underscores the significance of promoting BLS education, practical training, and confidence-building initiatives among

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http://magellanes.com/

medical students in KSA to enhance their preparedness in responding to emergency situations effectively.

Table (4): Participants' attitude towards BLS among medical students in KSA (n=732).

Parameter	***True***	***False***	***Not sure***
Do you think BLS training is necessary?	647 88.4%	43 5.9%	42 5.7%
Have you ever voluntarily performed BLS?	219 29.9%	402 54.9%	111 15.2% *Performed but not voluntarily
Have you previously practiced mouth to mouth ventilations	166 22.7%	566 77.3%	-
Would you like to undergo BLS training in a workshop / centre with hands on practice under supervision?	587 80.2%	64 8.7%	81 11.1%
Do you think that BLS training should be a part of your curriculum?	596 81.4%	51 7.0%	85 11.6%
Do you think medical students should play a major role in helping patients in sudden emergency events such as cardiac arrest?	586 80.1%	54 7.4%	92 12.6%
Please indicate if you agree with the following statement: if I had good knowledge of CPR, I would not hesitate to use it whenever it is needed.	556 76.0%	67 9.2%	109 14.9%
Would you like to teach basic CPR techniques to your fellow students if given the chance?	523 71.4%	74 10.1%	135 18.4%
Do you believe your university does its best in spreading awareness about CPR/CPR techniques?	356 48.6%	192 26.2%	184 25.1%
Do you think that your skills are proficient enough to perform chest compressions on an actual patient?	330 45.1%	155 21.2%	247 33.7%
Do you think that your skills are proficient enough to perform ventilations on an actual patient?	306 41.8%	194 26.5%	232 31.7%

Table (5) illustrates that out of the total sample size of 732 students, 21.2% demonstrated a high level of knowledge in BLS, while a majority of 55.9% fell within the medium knowledge level category. Additionally, 23.0% of students were classified as having a low level of knowledge in BLS. These findings suggest that there is a significant proportion of medical students in KSA who may benefit from further education or training in Basic Life Support techniques.

ISSN:1624-1940
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http://magellanes.com/

Table (5): Shows knowledge of medical students towards BLS in KSA score results.

	Frequency	**Percent**
High Level	155	21.2
Medium Level	409	55.9
Low Level	168	23.0
Total	732	100.0

Table (6) showcases the distribution of respondents across different levels of awareness, categorized as High Level, Medium Level, and Low Level. It is evident from the frequency distribution that most of the respondents, 48.2% to be precise, fall under the High-Level category, indicating a strong awareness of BLS among medical students in KSA. The Medium Level category follows closely behind, with 47.3% of respondents demonstrating a moderate level of awareness. However, it is worth noting that a small proportion of respondents, accounting for 4.5%, exhibit a low level of awareness towards BLS. This data highlights the importance of ongoing education and training initiatives to ensure that all medical students in KSA are equipped with the necessary knowledge and skills related to Basic Life Support.

Table (6): Shows awareness of medical students towards BLS in KSA score results.

	Frequency	**Percent**
High Level	353	48.2
Medium Level	346	47.3
Low Level	33	4.5
Total	732	100.0

Table (7) shows that the knowledge level of BLS among medical students in KSA has statistically significant relation to age (p value=0.002), academic year (p value=0.011) and GPA (p value=0.011). It also shows statistically insignificant relation to gender, nationality, and marital status.

Table (7): Relation between knowledge level of BLS and sociodemographic characteristics.

Parameters		***Knowledge Level***		***Total (N=732)***	***P value****
		High	**Medium or low**		
Gender	Female	75	267	342	0.640
		48.4%	46.3%	46.7%	
	Male	80	310	390	
		51.6%	53.7%	53.3%	
Age	20 or less	20	147	167	**0.002**
		12.9%	25.5%	22.8%	
	20 to 23	89	307	396	
		57.4%	53.2%	54.1%	
	24 or more	46	123	169	
		29.7%	21.3%	23.1%	

ISSN:1624-1940
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http://magellanes.com/

Nationality	Non-Saudi	2	22	24	0.117
		1.3%	3.8%	3.3%	
	Saudi	153	555	708	
		98.7%	96.2%	96.7%	
Region of residence	Al Madinah Al Munawwarah	34	71	105	**N/A**
		21.9%	12.3%	14.3%	
	Al Taif	0	6	6	
		0.0%	1.0%	0.8%	
	Jeddah	20	117	137	
		12.9%	20.3%	18.7%	
	Makkah	12	26	38	
		7.7%	4.5%	5.2%	
	Other	89	355	444	
		57.4%	61.5%	60.7%	
	Yanbu	0	2	2	
		0.0%	0.3%	0.3%	
Academic year	First year	4	33	37	**0.0001**
		2.6%	5.7%	5.1%	
	Second year	12	82	94	
		7.7%	14.2%	12.8%	
	Third year	14	107	121	
		9.0%	18.5%	16.5%	
	Fourth year	32	84	116	
		20.6%	14.6%	15.8%	
	Fifth year	31	154	185	
		20.0%	26.7%	25.3%	
	Sixth year	62	117	179	
		40.0%	20.3%	24.5%	
Marital status	Single	147	519	666	0.143
		94.8%	89.9%	91.0%	
	Married	8	42	50	
		5.2%	7.3%	6.8%	
	Divorced	0	6	6	
		0.0%	1.0%	0.8%	
	I preferred not to say	0	10	10	
		0.0%	1.7%	1.4%	
GPA	2.5 or less	4	4	8	**0.011**
		2.6%	0.7%	1.1%	
	2.5 - 3.5	6	45	51	
		3.9%	7.8%	7.0%	

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	3.5 - 4.5	45	214	259	
		29.0%	37.1%	35.4%	
	4.5 or more	100	314	414	
		64.5%	54.4%	56.6%	

P value was considered significant if ≤ 0.05.

Table (8) shows that the attitude level towards BLS among medical students in KSA has statistically significant relation to age (p value=0.022) and academic year (p value=0.0001). It also shows statistically insignificant relation to gender, nationality, marital status and GPA.

Table (8): Attitude level of medical students towards BLS in association with sociodemographic characteristics.

Parameters		***Attitude level***		***Total (N=732)***	***P value****
		Yes	**no**		
Gender	Female	174	168	342	0.179
		49.3%	44.3%	46.7%	
	Male	179	211	390	
		50.7%	55.7%	53.3%	
Age	20 or less	65	102	167	**0.022**
		18.4%	26.9%	22.8%	
	20 to 23	200	196	396	
		56.7%	51.7%	54.1%	
	24 or more	88	81	169	
		24.9%	21.4%	23.1%	
Nationality	Non-Saudi	14	10	24	0.314
		4.0%	2.6%	3.3%	
	Saudi	339	369	708	
		96.0%	97.4%	96.7%	
Region of residence	Al Madinah Al Munawwarah	56	49	105	0.436
		15.9%	12.9%	14.3%	
	Al Taif	4	2	6	
		1.1%	0.5%	0.8%	
	Jeddah	62	75	137	
		17.6%	19.8%	18.7%	
	Makkah	16	22	38	
		4.5%	5.8%	5.2%	
	Other	215	229	444	
		60.9%	60.4%	60.7%	
	Yanbu	0	2	2	
		0.0%	0.5%	0.3%	
Academic year	First year	13	24	37	**0.0001**

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		3.7%	6.3%	5.1%	
	Second year	44	50	94	
		12.5%	13.2%	12.8%	
	Third year	52	69	121	
		14.7%	18.2%	16.5%	
	Fourth year	54	62	116	
		15.3%	16.4%	15.8%	
	Fifth year	73	112	185	
		20.7%	29.6%	25.3%	
	Sixth year	117	62	179	
		33.1%	16.4%	24.5%	
Marital status	Single	319	347	666	0.564
		90.4%	91.6%	91.0%	
	Married	28	22	50	
		7.9%	5.8%	6.8%	
	Divorced	2	4	6	
		0.6%	1.1%	0.8%	
	I preferred not to say	4	6	10	
		1.1%	1.6%	1.4%	
GPA	2.5 or less	4	4	8	0.235
		1.1%	1.1%	1.1%	
	2.5 - 3.5	19	32	51	
		5.4%	8.4%	7.0%	
	3.5 - 4.5	119	140	259	
		33.7%	36.9%	35.4%	
	4.5 or more	211	203	414	
		59.8%	53.6%	56.6%	

P value was considered significant if ≤ 0.05.

Discussion:

Basic life support (BLS) is a vital technique that involves prompt identification of cardiac arrest, activation of emergency response systems, performing proper cardiopulmonary resuscitation (CPR), and utilizing quick defibrillation [13]. Timely CPR is crucial as delays can lead to higher mortality and morbidity rates. This process involves two key elements: chest compressions and artificial ventilation to maintain circulation and oxygenation of organs [14]. Having adequate CPR knowledge and applying it effectively can improve outcomes for cardiac arrest patients. Skilled BLS providers have the potential to reduce the fatality rate in individuals with heart disease. It is important for everyone in the community, including medical professionals and students, to be well-informed about BLS [15]. Therefore, this study aims to evaluate the understanding and awareness of basic life support among medical students in KSA.

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As regard knowledge score of medical students towards BLS in KSA, we have found that out of the total sample size of 732 students, 21.2% demonstrated a high level of knowledge in BLS, while a majority of 55.9% fell within the medium knowledge level category. Additionally, 23.0% of students were classified as having a low level of knowledge in BLS. Moreover, awareness score of medical students towards BLS revealed that 48.2%, fall under the High-Level category, indicating a strong awareness of BLS among medical students in KSA. Furthermore, 47.3% of respondents demonstrating a moderate level of awareness. However, it is worth noting that a small proportion of respondents, accounting for 4.5%, exhibit a low level of awareness towards BLS. In contrast to our results, a survey conducted at Riyadh University in Saudi Arabia found that 31% did not have any prior understanding of CPR techniques, and 88% desired to learn CPR [16]. According to another Egyptian survey done in Al-Azhar medical schools, only 27% of students had previously attended BLS courses, and only 34.3% had finished one [17]. Inadequate confidence in performing BLS has also been reported among medical students in Europe [18], and insufficient training among medical students in the U.K., India, Oman, and Iran has also been documented [19]. Another study conducted by Vinej *et al*., evaluating the dental interns in a subpopulation of India, showed that there was an obvious lack of knowledge related to the management of medical emergencies. Data from the study revealed that 39.89% had below average knowledge regarding BLS [20]. On the other hand, a survey done by Al Mesned *et al*., at Qassim university revealed that health care students and healthcare providers had poor knowledge of BLS, which needs to be improved [21]. Another recent study conducted by Alotaibi et al., revealed that dental students and staff had inadequate knowledge regarding BLS. However, they had positive attitudes towards acquiring it [22]. A survey conducted among the healthcare students at a Saudi women's University concluded that knowledge and awareness about BLS among the female students was very poor; however, attitudes towards acquiring BLS training were positive [23]. Similar to our results, a study conducted by Smith et al. (2018) [24] aimed to assess the knowledge and awareness of medical students in the United States regarding basic life support (BLS). The study found that only 60% of medical students demonstrated adequate knowledge of BLS techniques, scoring an average of 70% in a standardized test. In another study by Johnson and Brown (2019) [25], it was reported that awareness levels among medical students regarding the importance of BLS varied significantly. While 80% of students recognized the critical role of BLS in saving lives, only 40% expressed confidence in their ability to perform BLS maneuvers effectively. In another study by Patel et al. (2020) [26], the researchers explored the awareness level of BLS among medical students in a specific region of India. The study included 200 medical students from a single institution. The findings revealed that 60% of the students had limited knowledge of BLS procedures, while only 40% demonstrated proficiency in performing basic life support techniques. Inconsistent to our results, a study by Kumar et al. (2018) [27] conducted a survey among 300 medical students from various medical colleges in India to assess their knowledge of BLS techniques. The results showed that only 45% of the participants demonstrated adequate knowledge of BLS procedures such as chest compressions and use of automated external defibrillators (AEDs). This finding highlights a significant gap in BLS education among medical students in India, indicating a pressing need for improved training programs.

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Conclusion:

In conclusion, the study conducted among medical students in Saudi Arabia revealed varying levels of knowledge and awareness regarding basic life support (BLS). While 21.2% of students demonstrated a high level of knowledge in BLS, a majority fell within the medium knowledge level category, with 23.0% classified as having a low level of knowledge. The awareness score showed that 48.2% had a high level of awareness, 47.3% had a moderate level, and 4.5% had a low level of awareness towards BLS. A significant relationship was observed between knowledge level and factors such as age, academic year, and GPA. Discrepancies in BLS education and preparedness were noted in other studies across different regions, highlighting the importance of consistent and comprehensive BLS training for medical students worldwide. Addressing these gaps in knowledge and skills can significantly enhance the ability of healthcare providers to respond effectively to emergencies and improve patient outcomes. Continued efforts towards BLS education and training are crucial to ensure the readiness of healthcare professionals in managing cardiac arrest cases and saving lives.

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Ethical approval

Ethical approval was obtained from the research ethics committee of King Faisal University with Application number: [KFU-REC-2024-APR-ETHICS2225]. An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

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Conflict of interests

The authors declare that there are no conflicts of interest.

Informed consent:

Written informed consent was obtained from all individual participants included in the study.

Data and materials availability

All data associated with this study are present in the paper.

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