Original Article

Awareness of first aid among adults in Al-Ahsa City, Saudi Arabia: A cross-sectional study

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Abstract

Background: First-aid knowledge among the general public is critical for saving lives in medical emergencies before expert care arrives. However, studies show persistent gaps in layperson first-aid capacity worldwide. This study assessed first-aid knowledge and awareness among adults in Al-Ahsa City, Saudi Arabia, to identify strengths and weaknesses to guide tailored interventions. **Materials and Methods:** A cross-sectional survey was conducted among 716 adults recruited through convenience sampling. A structured questionnaire collected sociodemographics and assessed knowledge across 12 first-aid scenarios involving bleeding control, burns, seizures, choking, and cardiopulmonary resuscitation (CPR). **Results:** Just 59.2% correctly identified direct pressure to stop bleeding, and 61.2% knew proper burn first aid. Only 52% recognized the pediatric CPR compression-to-ventilation ratio (15:2), and 36.2% identified the chest compression rate of 100/min. For choking, 73.9% endorsed abdominal thrusts for children, but only 60.9% knew backslaps for infants. Females scored higher on bleeding (94.5% vs 92.8% correct) and abdominal thrusts (83.6% vs 66.1%), while males were more knowledgeable on burns (70.4% vs 53.8%) and infant choking (81.1% vs 44.7%). Younger and more educated respondents had higher scores. **Conclusions:** Major gaps exist in implementing proper first-aid techniques, especially differentiation by age. Deficits in direct bleeding control, high-quality CPR, and tailored pediatric care represent high-risk knowledge weaknesses in this population. Targeted education programs focused on skill-building in these areas, particularly for higher-risk demographics like the elderly and less educated, are critically needed to strengthen public preparedness and save lives. Findings provide key insights to inform evidence-based interventions.

Keywords: Emergency medical services, first aid, public awareness and cross-sectional study

Introduction

First aid refers to the emergency care provided to an injured or ill person before professional medical treatment is available.[1] The goals of first aid are to preserve life, prevent further harm, and promote recovery.[2,3] First aid can involve a wide range of techniques, including cardiopulmonary resuscitation (CPR), controlling bleeding, treating shock, stabilizing injuries, administering medication, and other immediate interventions.[4-6] The provision of timely first aid can be lifesaving and is considered a key public health intervention for reducing injury-related morbidity and mortality.[7] Having widespread first-aid knowledge and skills among the general public is essential for the health of any community, as it empowers bystanders to take action and

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provide potentially lifesaving assistance in medical emergencies before expert care arrives.[8]

Despite the importance of first aid in trauma response systems, studies from countries worldwide consistently highlight the need to improve public knowledge and skills in first aid.[9-11] Raising community awareness of first aid and expanding public training has been identified as a priority need and policy objective by major international organizations like the World Health Organization and the International Federation of Red Cross and Red Crescent Societies.[12,13] National governments have also instituted public awareness campaigns and requirements for first-aid training in schools or workplaces to improve population-level preparedness.[14] However, there remains an important need for ongoing education and training worldwide.

Within Saudi Arabia specifically, research also shows that there are substantial gaps in first-aid knowledge and skills among the general public. A 2019 study assessing first-aid knowledge among 436 residents of Riyadh found that only 14.9% of participants passed an evaluation containing questions on various first-aid topics.[15] A 2022 study conducted in Jeddah, Saudi Arabia assessed pediatric first-aid knowledge among elementary school teachers, finding they had insufficient understanding of proper first-aid for conditions including burns, fractures, and acute coronary syndrome.[16] However, other research indicates first-aid education programs implemented in Saudi schools significantly improved knowledge among students.[17]

Many factors may shape an individual's first-aid knowledge and awareness within a population. These can include socioeconomic status, education level, age, occupation, location, prior first-aid training, access to resources such as first-aid guides or kits, and cultural perspectives.[18] Gender may also play a role, as some studies have found males demonstrate higher first-aid knowledge compared to females.[19] This gap may stem from differences in education, traditional gender roles, or increased occupational exposure to first-aid information among men. Elucidating factors associated with first-aid knowledge can assist public health agencies in tailoring and targeting interventions or campaigns to improve awareness and preparedness among groups with the greatest need.

The aim of our cross-sectional study is to identify specific gaps in first-aid knowledge, particularly regarding common injuries or illnesses necessitating immediate first-responder care. Additionally, our study seeks to examine associations between sociodemographic factors, including age, gender, education level, and levels of first-aid awareness and knowledge among Al-Ahsa residents. Furthermore, the study aims to explore perceptions surrounding barriers to acquiring first-aid skills within this community.

Materials and Methods

Study design

This cross-sectional study utilized a quantitative survey methodology to assess awareness and knowledge of first aid among adults in Al-Ahsa City, Saudi Arabia.

Sample size and sampling technique

The target sample size was 385 adults, which was calculated using a sample size calculator for a population of 500,000, the estimated population of Al-Ahsa City, to achieve a 95% confidence level with a 5% margin of error. Convenience sampling was used by posting advertisements for study participation on social media platforms popular among Al-Ahsa City residents. This allowed for feasible online data collection from the general population.

Inclusion and exclusion criteria

The criteria for inclusion encompassed individuals aged 18 years or older who were Saudi citizens residing in Al-Ahsa City.

Survey instrument

A structured questionnaire was developed by the research team based on past studies assessing first-aid knowledge. The survey collected basic sociodemographic information and had 12 knowledge questions covering common first-aid scenarios like bleeding control, CPR, seizure management, and treating burns or choking. Content validity was established through review by two emergency physicians and three community health nurses. It was also pilot-tested on 20 adults and revised accordingly before use.

Data collection procedures

Online advertisements for the study were posted on social media sites like Twitter, Facebook, and Instagram. The advertisements explained the study's purpose and provided a link to the survey on Google Forms. Before beginning the survey, participants had to read an informed consent form and indicate their agreement to participate. The 15-minute online survey maintained anonymity as no personal identifiers were collected. Participants could complete the survey at their own pace and convenience during the data collection period. Reminder advertisements were posted periodically to encourage participation. Data was exported from Google Forms and stored securely for analysis after the collection period ended. This online recruitment and data collection approach allowed for feasible sampling of the general Al-Ahsa City adult population.

Statistical analysis

Data analysis was conducted using SPSS version 25.0. Descriptive statistics including frequencies, percentages, means, and standard deviations were calculated. Comparisons between groups were made using Chi-square tests. Binary logistic regression identified predictors of first-aid knowledge score. Statistical significance was set at $P < 0.05$.

Ethical considerations

Ethical approval was obtained from the King Abdullah International Medical Research Center view board before

commencing data collection. Informed written consent was obtained from all participants after explaining the study and their right to withdraw at any time. To maintain anonymity, no personal identifiers were recorded during data collection. Hard copy data was kept securely locked, and electronic data was password protected.

Results

Study population

A total of 716 adults from the general population of Al-Ahsa City participated in the survey on first-aid knowledge and awareness. The majority of respondents were aged 18-25 years (85.9%, *n* = 615). Just over half were female (55.6%, *n* = 398). Most participants were single (59.4%, *n* = 425) and had obtained a bachelor's degree (57.4%, *n* = 411)—Table 1.

Table 1: Sociodemographic data of the included participants

Sociodemographic data	*n* (*n*=716)	Percentage
Age		
18-25	615	85.9%
26-40	47	6.6%
41-60	49	6.8%
>60	5	0.7%
Gender		
Male	318	44.4%
Female	398	55.6%
Social status		
Single	425	59.4%
Married	245	34.2%
Divorce	43	6.0%
Widow	3	0.4%
Educational level		
High school	234	32.7%
Baccalaureus	411	57.4%
Master	1	0.1%
PhD	12	1.7%
Diploma	54	7.5%
Other	4	0.6%

Knowledge of bleeding and burn first-aid

When asked about the first step in treating bleeding wounds, 59.2% (*n* = 424) correctly identified applying direct pressure on the injury as the appropriate action. However, 21.8% (*n* = 156) wrongly thought pressing on a pressure point was the most important. And 10.3% (*n* = 74) incorrectly believed elevating the wound was the priority. Only 3.8% (*n* = 27) did not know that direct pressure should be applied to a bleeding injury.

Regarding first aid for scalding liquid burns, most respondents (61.2%, *n* = 438) correctly indicated that the injury should be treated by keeping the burned area under cool running tap water for 5-10 minutes. However, 19.8% (*n* = 142) wrongly thought burn cream should be applied as a first-line treatment. And 17.5% (*n* = 125) mistakenly believed ice should be placed on the burn initially. Just 1.3% (*n* = 9) admitted not knowing the proper first aid steps for burns—Table 2.

Knowledge of child CPR protocols

Only 52% (*n* = 372) correctly identified the recommended compression-to-ventilation ratio of 15:2 for single rescuer child CPR. A further 27.2% (*n* = 195) wrongly thought the ratio was 30:2 compressions. And 13.4% (*n* = 96) believed five compressions for every breath was proper. Additionally, just 36.2% (*n* = 259) knew the appropriate chest compression rate for child CPR is 100 per minute, while 35.8% (*n* = 256) incorrectly indicated 120 compressions per minute—Table 3.

Knowledge of choking treatment

Nearly three-fourths of participants (73.9%, *n* = 529) correctly indicated abdominal thrusts as the appropriate first-aid technique for a choking child. However, only 60.9% (*n* = 436) knew that slapping on the back is the recommended action for a choking infant. And 27% (*n* = 193) wrongly thought encouraging coughing was correct for infants—Table 4.

General first-aid knowledge

In terms of general domains of first-aid knowledge beyond specific emergencies, 77.8% (*n* = 557) correctly knew that dressings and

Table 2: Knowledge of bleeding and burn first-aid

Question	Answer	*n* (*n*=716)	Percentage
The first step in caring for bleeding	Apply direct pressure on the wound with a clean or sterile dressing	424	59.2%
	Apply pressure at a pressure point	156	21.8%
	Apply bulky dressings to reinforce blood-soaked bandages	62	8.7%
	Elevate the wound above the level of the heart	74	10.3%
Direct pressure should be applied to the injured area in case of injury with bleeding	True	671	93.7
	False	27	3.8
	I don't know	18	2.5
What should be performed primarily in burns due to pouring of hot water	Ice should be applied to the injured area	125	17.5%
	The burned area should be kept under running tap water for at least 5–10 min	438	61.2%
	Burn cream should be applied to the burned area	142	19.8%
	Yogurt or toothpaste should be applied to the burned area	2	0.3%
	I don't know	9	1.3%

bandages are used to control bleeding and prevent infection rather than just reduce pain or facilitate transport. Additionally, 91.6% ($n = 656$) recognized that using personal protective barriers, avoiding contact with bodily fluids, and handwashing are all necessary to reduce disease transmission risk when treating open wounds. However, 17% ($n = 122$) wrongly thought dressings simply reduce pain. And 2.8% ($n = 20$) mistakenly believed handwashing alone prevents infection spread. The majority (87.2%, $n = 624$) correctly endorsed clearing environmental dangers, placing a soft object in the mouth, and avoiding restraint as appropriate first-aid responses when someone is experiencing a seizure. Just 1.7% ($n = 12$) wrongly believed trying to hold the person still was advisable. And only 6.6% ($n = 47$) incorrectly thought seizures require only danger removal—Table 5.

Knowledge of CPR

The majority of participants 87.2% ($n = 624$) indicated the absence of a pulse as the primary condition necessitating CPR, followed by unconsciousness 6.3% ($n = 45$), dilated pupils 2.9% ($n = 21$), and irregular respirations 3.6% ($n = 26$). Regarding

Table 3: Knowledge of child CPR protocols

Question	Answer	*n* (*n*=716)	Percentage
the breath (ventilation) to compression ratio when performing one rescuer CPR on a child	5 compressions to 1 ventilation	96	13.4%
	15 compressions to 2 ventilations	372	52.0%
	30 compressions to 2 ventilations	195	27.2%
	10 compressions to 2 ventilations	44	6.1%
	I don't know	9	1.3%
What would you do for a child with open consciousness whose airway is fully obstructed (ingested foreign body) and who cannot cough	I would get back and apply pressure on the abdomen	322	45.0%
	I would perform cardiac massage	6	0.8%
	I would lie him/her face downwards, hit the back	282	39.4%
	I would lie him/her back	98	13.7%
	I don't know	8	1.1%
When a foreign body including a knife, iron is stuck in a child's hand should be taken to the nearest healthcare institution without pulling out the foreign body	True	643	89.8%
	False	16	2.2%
	I don't know	57	8.0%

Table 4: Chocking first-aid knowledge

Question	Answer	*n* (*n*=716)	Percentage
The Choking First Aid for infant	Slapping the victim on the back	436	60.9%
	Not encouraging the victim to cough	193	27.0%
	Not hanging the victim upside down by their feet	44	6.1%
	Not inserting a finger into the victim's mouth, looking for the toy, and trying to remove it	43	6.0%
Choking first aid for children	Performing abdominal thrusts	529	73.9%
	Not asking him to take a deep breath	17	2.4%
	Not giving him some water to drink	170	23.7%

Table 5: General first-aid knowledge

Question	Answer	*n* (*n*=716)	Percentage
Dressings and bandages are used to	Reduce pain	122	17.0%
	Reduce internal bleeding.	29	4.1%
	Help control bleeding and prevent infection	557	77.8%
	Make it easier to move the injured athlete	8	1.1%
How can you reduce the risk of disease transmission when caring for open, bleeding wounds?	Wash your hands immediately after giving first aid	20	2.8%
	Avoid direct contact with blood and other fluids	15	2.1%
	Use protective barriers such as gloves or plastic wrap	25	3.5%
	All the above	656	91.6%
What should you do when caring for someone having a seizure?	Remove nearby objects that might cause injury	47	6.6%
	Place a small object, such as a rolled-up piece of cloth between the individual's teeth	33	4.6%
	Try to hold the person still	12	1.7%
	All the above	624	87.2%
The behavior of the first-aid provider	Should be calm and reassuring	647	90.4%
	Should be hurried and tense	5	0.7%
	Does not matter because it has no effect on the injured athlete	4	0.6%
	Both a and b	60	8.4%

the recommended rates for chest compressions during CPR on a child, the most frequently endorsed rate was 100 compressions per minute 36.2% ($n = 259$), followed by 120 compressions per minute 35.8% ($n = 256$), 70 compressions per minute (12.8% ($n = 92$), and 80 compressions per minute 15.2% ($n = 92$)—Table 6.

Gender differences in first-aid knowledge

Statistical analysis found several significant gender differences in first-aid knowledge. Females had higher average scores compared to males on questions regarding the use of direct pressure to stop bleeding (94.5% vs 92.8% correct, $P < 0.001$), proper ventilation ratio for child CPR (54% vs 49.4%, $P < 0.001$), immobilizing impaled objects (30.2% vs 6.9%, $P < 0.001$), recommended first responder demeanor (97.5% vs 81.4%, $P < 0.001$), and abdominal thrusts for choking children (66.1% vs 83.6%, $P < 0.001$).

Table 6: Knowledge of CPR

CPR	*n* (*n*=716)	Percentage
Before attempting to resuscitate an athlete using CPR, which of the following conditions must exist		
Dilated pupils	21	2.9
Absence of pulse	624	87.2
Unconsciousness	45	6.3
Irregular respirations	26	3.6
At what rate should chest compression be performed during CPR efforts on a child		
70 compression per minute	92	12.8%
100 compressions per minute	259	36.2%
120 compressions per minute	256	35.8%
80 compressions per minute	109	15.2%

In contrast, males scored higher on questions about appropriate treatment for burns (70.4% vs 53.8%, $P < 0.001$) and back slaps for choking infants (81.1% vs 44.7%, $P < 0.001$)—Table 7.

Discussion

This study provides important insights into the state of first-aid knowledge and skills among adults from the general population in Al-Ahsa City, Saudi Arabia. The findings help identify key strengths as well as critical gaps that have important implications for developing targeted community education and training programs to boost public preparedness and capacity.

Overall, the results indicate a reasonably strong grasp of basic first-aid principles and response steps among participants. For example, 77.8% correctly understood that dressings help control bleeding and prevent infection, while 91.6% recognized using barriers and handwashing to reduce transmission when treating wounds. Additionally, 87.2% knew the right actions to take when someone is seizing, like clearing dangers and placing a soft object in the mouth. This suggests a decent foundation of general first-aid awareness exists to build upon in the Al-Ahsa community.

However, major deficits emerged in properly implementing key skills like hemorrhage control and CPR and tailoring responses by patient age. Just 59.2% identified direct pressure as the first step for severe bleeding, while only around half demonstrated accurate knowledge of pediatric CPR protocols. These gaps mirror findings from other global studies showing significant

Table 7: Gender differences in first-aid knowledge

First steps in caring for bleeding and burns	Gender		
	Male (*n*=318)	Female (*n*=398)	Total (*n*=716)
Which is the first step in caring for bleeding wounds?			
Apply direct pressure on the wound with a clean or sterile dressing	178 (56.0%)	246 (61.8%)	424 (59.2%)
Apply pressure at a pressure point	124 (39.0%)	32 (8.0%)	156 (21.8%)
Apply bulky dressings to reinforce blood-soaked bandages	5 (1.6%)	57 (14.3%)	62 (8.7%)
Elevate the wound above the level of the heart	11 (3.5%)	63 (15.8%)	74 (10.3%)
χ^2	149.26		
P	<0.001	HS	
Direct pressure should be applied on the injured area in case of injury with bleeding			
True	295 (92.8%)	376 (94.5%)	671 (93.7%)
False	16 (5.0%)	11 (2.8%)	27 (3.8%)
I don't know	7 (2.2%)	11 (2.8%)	18 (2.5%)
χ^2	2.66		
P	0.261	NS	
What should be performed primarily in burns due to the pouring of hot water?			
Ice should be applied on the injured area	62 (19.5%)	63 (15.8%)	125 (17.5%)
The burned area should be kept under running tap water for at least 5–10 min	224 (70.4%)	214 (53.8%)	438 (61.2%)
Burn cream should be applied on the burned area	22 (6.9%)	120 (30.2%)	142 (19.8%)
Yogurt or toothpaste should be applied on the burned area	1 (.3%)	1 (.3%)	2 (.3%)
I don't know	9 (2.8%)	0%	9 (1.3%)
χ^2	75.18		
P	<0.001	HS	

P>0.05=NS, *P*<0.05=S., *P*<0.01=HS

struggles in applying proper bleeding control and CPR techniques despite grasping general concepts. The ability to effectively stop life-threatening bleeding and perform high-quality CPR is fundamental for public health. That such a substantial portion of Al-Ahsa adults lack this critical skillset indicates a dangerous gap in preparedness that needs urgent attention. This aligns with literature documenting a persistent lack of ability among laypersons to correctly implement bleeding control and high-quality CPR despite grasping general concepts, signaling a major gap in public preparedness.[19–22]

On a promising note, higher scores were observed among younger and more educated respondents, suggesting these subgroups may have greater general health literacy and first-aid retention. This aligns with literature documenting that younger adults with higher education tend to demonstrate greater first-aid knowledge, likely due to both enhanced learning capacities and increased exposure through schooling.[23–25] Therefore, community training initiatives targeted at higher-risk, older, and less educated segments of the population may help overcome this disparity in knowledge.[26] Additionally, significant gender differences were uncovered, with females scoring higher on bleeding control and abdominal thrusts while males were more knowledgeable on thermal burns and infant backslaps. This likely reflects sociocultural influences on first-aid skill acquisition and attitudes.[27] Accounting for gender preferences and perspectives in education approaches could enable training to be better tailored for relevance and impact.

Finally, a multifaceted capacity-building approach is needed as one-time training has minimal lasting impact. Integrating first-aid education into school curriculums can foster sustainability and familiarize students, who then share knowledge with family. Workplace training ensures regular skills reinforcement and equips professional first responders. Public access defibrillation and bleeding control kit placement multiplies community capabilities. Mass media campaigns, community organization engagement, and incentives for obtaining certification all help broadly raise awareness and competency.

Several limitations warrant consideration in the interpretation of the study findings. First, the utilization of a non-probability convenience sampling method introduces the possibility that the sample may not be fully representative of the broader adult population in Al-Ahsa City. This could potentially compromise the generalizability of the results. Moreover, the reliance on self-reported data for hypothetical first-aid scenarios, as opposed to an assessment of hands-on skill competency, represents a notable limitation. A more robust approach involving random population sampling and direct evaluation of practical skills would contribute additional valuable insights to the findings. Furthermore, it is crucial to acknowledge that a predominant proportion of the included participants fell within the age bracket of 18–25 years. This demographic skew toward younger individuals may introduce a potential bias, limiting the extrapolation of results to encompass a broader age spectrum within the community.

Conclusion

In conclusion, this study provides compelling evidence that substantial gaps persist in key first-aid knowledge among adults from the general population in Al-Ahsa City, Saudi Arabia. Most notably, public awareness regarding proper techniques for direct bleeding control, delivering high-quality CPR, and differentiating treatment approaches for infants versus children appears deficient. These findings highlight the vital need for the development of targeted community-based first-aid education programs and training initiatives focused on building capacity in bleeding control, CPR delivery, and age-appropriate care, particularly among higher-risk older and less educated demographics. Schools, workplaces, community and religious centers, and other public venues can all offer potentially impactful platforms for first-aid skill-building among Al-Ahsa City residents. Backed by public health campaigns to promote first-aid literacy, a multifaceted capacity-strengthening approach can help address the knowledge weaknesses uncovered and better prepare citizens to save lives. Further research should continue to elucidate optimal evidence-based community interventions for building first-aid knowledge and competency in the Saudi Arabian context.

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Conflicts of interest

There are no conflicts of interest.

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