



Awareness of Seizure First Aid among the population in Jazan, Saudi Arabia: A survey Study

Faisal Hakami^a, Khalid M. Hakami^a, Shaden A. Zaalah^a, Afnan A. Alamer^a, Ghaidaa H. Alharbi^a, Mohammed Awaf^a, Sulaiman Hamdi^a, Anas E. Ahmed^b, Amal H. Mohamed^c, Abdulaziz Alhazmi^d, Tahir Hakami^{e,*}

^a The Faculty of Medicine, Jazan University, Jazan, Saudi Arabia

^b The Department of Family and Community Medicine, The Faculty of Medicine, Jazan University, Jazan, Saudi Arabia

^c The Department of Internal Medicine, The Faculty of Medicine, Jazan University, Jazan, Saudi Arabia

^d The Department of Microbiology and Parasitology, The Faculty of Medicine, Jazan University, Jazan, Saudi Arabia

^e The Department of Clinical Pharmacology, The Faculty of Medicine, Jazan University, Jazan, Saudi Arabia

ARTICLE INFO

Keywords:

Seizure
First-aid
Awareness

ABSTRACT

Background: First aid during a seizure is critical, but many people in Jazan, Saudi Arabia may not know what to do. This is because epilepsy is often stigmatized in the region and regarded as a spiritual or mental disorder. This study investigated the awareness of seizure first aid among the population living in Jazan.

Methods: An online survey was conducted. Healthcare workers and people who had never heard of epilepsy were excluded. Participants were asked to identify correct measures of seizure first aid from a list of 20 statements [9 correct and 11 incorrect]. A composite awareness score was calculated by subtracting the number of incorrect statements from the number of correct statements. Participants were classified into three groups: high, intermediate, and low awareness. Logistic regression was used to identify factors associated with high awareness.

Results: Of the 1215 participants, 80.5 % had low awareness of seizure first aid. The most common correct responses were clearing the area of dangerous objects (91.3 %), putting a pillow under the neck (69.3 %), and timing the seizure (68.5 %). However, only 32.2 % knew to tell the person what happened after the seizure. The most common misconception was that an ambulance should be called immediately, regardless of the details (88.3 %). Other common misconceptions included putting something in the person's mouth (87.5 %), holding them down (83.0 %), taking out their contact lenses (79.9 %), and giving antiseizure medications orally (73.2 %). People who previously watched an educational video on seizure first aid (OR = 4.27, 95 % CI = 1.48–12.34, p = .007) or who knew someone with epilepsy (OR = 9.01, 95 % CI = 2.82–28.83, p < .001) were more likely to have a high awareness of seizure first aid.

Conclusion: The study found that most people in Jazan, Saudi Arabia do not know how to provide first aid for seizures. The findings inform future research and highlight the need for increased education and training on seizure first aid in this region.

* Corresponding author. The Faculty of Medicine, Jazan University, Saudi Arabia.

E-mail address: hakamit@jazanu.edu.sa (T. Hakami).

1. Introduction

An epileptic seizure is a sudden, brief episode of abnormal electrical activity in the brain that can cause a wide range of symptoms, including loss of consciousness and convulsions [1]. Although many patients have seizure control using a single medication, 36 % of the patients will continue to have uncontrolled seizures, which can persist for years and often significantly impact patients' quality of life [2]. Epileptic seizures can also be fatal due to sudden unexpected death in epilepsy (SUDEP), status epilepticus, drowning, motor vehicle accidents, and falls [3]. In low and middle-income countries, people with epilepsy have a two-fold increased risk of premature death compared to those without epilepsy [4].

Epilepsy is increasingly recognized as a serious, worldwide public health concern. In Saudi Arabia, some people still believe that epilepsy is caused by evil spirits or mental illness. The social stigma and misconceptions associated with epilepsy have a major impact on the patient, their family, and society and can lead to inadequate adherence to epilepsy management [5–7]. A meaningful way to “bring epilepsy out of the shadows” is to educate the public about the modern concept that epilepsy is a disease like any other [8]. Public training and resources on epilepsy and seizure first aid are limited to a few online interactive animations and videos provided by the Ministry of Health and the Saudi Epilepsy Society. These resources are available through the websites and social media accounts of these organizations. However, there is limited data on how effective these resources are in educating the public about seizure first aid.

Epileptic seizures can occur without warning, anywhere and anytime. In these situations, first aid is crucial and can save a life. However, there are many misconceptions about what to do when someone is having a seizure. Recent international studies have reported several common misconceptions about seizure first aid, such as placing objects in the mouth during a seizure to prevent tongue swallowing, holding the person down., sprinkling water on the face, and forcing medications down the throat [9–11]. In Saudi Arabia, there is limited data on public awareness and misconceptions of seizure first aid. A single study found that only 57.3 % of respondents were aware of the correct first aid measures to take during a seizure [12]. However, the study was conducted in a limited geographic area, with nearly half of the participants from Riyadh, the capital. This raises concerns about the findings' applicability to other parts of the country. Other local studies have primarily focused on raising awareness of epilepsy among school teachers and university students, with little attention given to first aid for seizures [6,13,14].

A recent study in Jazan, a less urbanized region in Saudi Arabia, found that many university students have misconceptions about epilepsy [6]. Despite their education, a quarter of students believe that epilepsy is caused by spiritual or mental disorders. The study also found that almost a third of students believe that it is helpful to put a piece of clothing in the mouth of someone who is having a seizure, or to hold them down. These misconceptions are likely to be even more common among the general population. Therefore, the present study aimed to assess the awareness of first-aid measures of seizure and their associated factors among the population living in Jazan region of Saudi Arabia.

2. Materials and methods

2.1. Study design and population

A cross-sectional study was conducted between October 2022 and January 2023 using an online questionnaire. Included were all adults (≥ 18 years) who live in Jazan; the region lies in the southwest of Saudi Arabia and is home to around one million people [15]. Healthcare providers (licensed health care technicians and practitioners) and people who had never heard of epilepsy were excluded from the study to avoid exceptionally low or high findings.

2.2. Sampling procedures

A sample of 600 participants was estimated for this study. The sample size was calculated using the formula for a single cross-sectional survey, $n = [(z^2 * p * q)]/d^2$ and using the following parameters: p = the awareness level, which was assumed at 50 %, Z = 95 % confidence interval, $q = 1 - p$, and d = error not more than 4 %. However, the sample size was increased to 1200 participants to minimize the potential sampling bias considering the methodology employed in this study.

2.3. Data collection, study instrument, and scoring system

An online self-administered questionnaire was developed using Google Forms (link: <https://docs.google.com/forms>) and used to assess the participants' awareness of seizure first aid. The questionnaire was designed in English and then translated into Arabic by professional translators. An invitation to participate in the survey was sent via direct messages to all accessible accounts on WhatsApp, the most popular social media application in Saudi Arabia according to the 2022 Saudi Internet report by Communications, Space, and Technology Commission [16]. The invitations included an opt-out link. Individuals were instructed to complete the survey if they were adults (≥ 18 years old), Saudi, living in Jazan, had heard of epilepsy, and were not healthcare providers. Individuals were also instructed to share the survey with other accounts on the application to expand the reach of study recruitment. Two rounds of reminder messages were sent 2–3 weeks apart. The face and content validity of the questionnaire was assessed by a panel of three expert faculty members. Reliability analysis showed an acceptable internal consistency in the responses, with Cronbach's Alpha 0.832. A copy of the questionnaire is included in the supplementary material (Supplement 1).

The questionnaire included the participants' demographic characteristics and questions about the participants' perception of epilepsy and their knowledge of seizure first aid. The first question asked the participants if they had heard of epilepsy, and those who

had not heard of epilepsy were excluded. The questionnaire also included three questions about the participants' perception of epilepsy: Is epilepsy a brain disorder?, Can seizures occur anywhere and at any time? Can a seizure lead to sudden death? The participants' responses to these questions were used to assess their knowledge about epilepsy.

The participants' awareness of seizure first aid was assessed by asking them to identify correct measures of seizure first aid from a list of 20 statements (Table 1). Nine of the statements were correct (e.g., timing the seizure), and 11 were incorrect (e.g., putting something in the person's mouth). The answers were categorized as "yes," "no," and "do not know." A correct statement was scored as "1" if the answer was "yes", whereas an incorrect statement was scored as "-1" if the answer was "yes" or "do not know". A composite awareness score was calculated by subtracting the number of incorrect responses from the number of correct responses. The possible overall awareness scores ranged only from -11 to 9, with higher scores indicating greater awareness. Included in the correct statements was a statement for "the need of calling the ambulance in special circumstances" with a drop list of ten items (Table 1). The statement was scored as "1" if the participant correctly identified five or more items and as "0" if the participant correctly identified less than five items.

Participants were then classified into three groups: high awareness (score >6), intermediate awareness (score 3–6), and low awareness (score <3). This scoring system is not validated but was modified from that used in the study of Friedman et al. (2014) [17]. The statements (measures of seizure first-aid) were determined based on convenient resources [18,19] and currently available literature [6,12].

Table 1
Responses (frequency and percentage) to seizure first aid questions.

Statement	Yes	No	I don't know
I. What should you DO if someone is having a seizure?			
Leave the place*	67 (5.5 %)	984 (81 %)	164 (13.5 %)
Nothing must be done, and just watch*	71 (5.8 %)	1016 (83.6 %)	128 (10.5 %)
Nothing must be done, and just read the Quran*	198 (16.3 %)	828 (68.1 %)	189 (15.6 %)
Sprinkle water on the person's face to wake up*	256 (21.1 %)	642 (52.8 %)	317 (26.1 %)
Hold the person down and stop their movements*	818 (67.3 %)	206 (17.0 %)	191 (15.7 %)
Clear the area around the person of anything hard or sharp	1109 (91.3 %)	36 (3.0 %)	70 (5.8 %)
Stay by their side, and record the time and duration of the seizure	832 (68.5 %)	158 (13.0 %)	225 (18.5 %)
Place a soft, flat pillow or folded jacket under the head and neck	842 (69.3 %)	88 (7.2 %)	285 (23.5 %)
Loosen tight clothing and remove any tight eyeglasses or chains.	986 (81.2 %)	58 (4.8 %)	171 (14.1 %)
Take out the contact lenses (if any) from their eyes*	566 (46.6 %)	245 (20.2 %)	404 (33.3 %)
Put a piece of clothing in their mouth to avoid swallowing the tongue*	745 (61.3 %)	152 (12.5 %)	318 (26.2 %)
Turn the person gently onto one side if possible	791 (65.1 %)	54 (4.4 %)	370 (30.5 %)
Monitor their breathing and chest movement	1003 (82.6 %)	53 (4.4 %)	159 (13.1 %)
Perform cardiopulmonary resuscitation (CPR), even if he or she is breathing*	325 (26.7 %)	423 (34.8 %)	467 (38.4 %)
Give an epilepsy pill by mouth to stop the seizure*	407 (33.5 %)	326 (26.8 %)	482 (39.7 %)
If the seizure ends, leave the place*	69 (5.7 %)	1037 (85.3 %)	109 (9 %)
If the seizure ends, stay with the person until he or she is fully awake	1080 (88.9 %)	48 (4.0 %)	87 (7.2 %)
Once the person is alert, tell him or her what happened during the seizure	391 (32.2 %)	526 (43.3 %)	298 (24.5 %)
II. When should you call the ambulance?			
Immediately regardless of the details *	1073 (88.3 %)	81 (6.7 %)	61 (5.0 %)
In special circumstances (if any of the following apply):			
You do not know the person	1002 (82.5 %)	76 (6.3 %)	137 (11.3 %)
The person has never had a seizure before	935 (77.0 %)	111 (9.1 %)	169 (13.9 %)
The seizure lasts for 5 min or more	960 (79.0 %)	93 (7.7 %)	162 (13.3 %)
Another seizure begins soon after the first one	1043 (85.5 %)	43 (3.5 %)	129 (10.6 %)
The person does not regain consciousness within 5 min	1037 (85.3 %)	54 (4.4 %)	124 (10.2 %)
The person has difficulty breathing after the seizure	1075 (88.5 %)	41 (3.4 %)	99 (8.1 %)
The person was seriously injured during the seizure	1041 (85.7 %)	53 (4.4 %)	121 (10.0 %)
The person has a health condition like diabetes or heart disease	1019 (83.9 %)	55 (4.5 %)	141 (11.6 %)
The person having the seizure is pregnant	1044 (85.9 %)	45 (3.7 %)	126 (10.4 %)
The seizure occurs in water	989 (81.4 %)	72 (5.9 %)	154 (12.7 %)

"Yes" was the correct answer except in incorrect statements (*) where "no" was the correct answer.

Scoring of seizure first-aid awareness:

I. An incorrect statement (n = 11) was scored "-1" if the answer was "yes" or "I don't know" and "0" if the answer was "no". The possible overall score of incorrect statements ranged from -11 to 0.

II. A correct statement (n = 9) was scored "1" if the answer was "yes" and "0" if the answer was "no" or "I don't know". Included in the correct statements was the statement for "calling the ambulance in special circumstances" with a drop list of 10 items. The statement was scored "1" if the participant correctly identified ≥ 5 items and "0" if the participant correctly identified < 5 sub-items. The possible overall score of correct statements ranged from 0 to 9.

III. Based on this scoring system, participants' overall awareness scores ranged from -11 to 9. The awareness scores were then classified into three categories: the "High score" group for participants with an awareness score above 6, the "intermediate score" group for participants with a literacy score of 3–6, and the "low score" group for participants with a literacy score below 3.

2.4. Statement of ethics

This study was carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki). The manuscript is in line with the Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals and aims for the inclusion of representative human populations (sex, age, and ethnicity) as per those recommendations. Ethical approval was obtained from Jazan University Ethical Committee (Reference Number: REC-44/02/315). Informed consent was obtained from all participants, and the privacy rights and confidentiality of the participants were maintained.

2.5. Statistical analysis

All analyses were performed using SPSS, version 25 (IBM Corp., Armonk, NY, USA). Descriptive data were generated for all variables as frequencies and percentages for categorical data and mean and standard deviation (SD) for continuous data. The chi-square test was used for the comparison of categorical data. Logistic regression analyses were applied to examine which participants' factors were independently associated with higher levels of awareness. A P -value $< .05$ was considered significant.

3. Results

3.1. Characteristics of the study participants

Of the 1284 participants in the study, 69 (5.4 %) had never heard of epilepsy and were excluded. The remaining 1215 (94.6 %) participants were included in the analysis. Of these, 668 (55 %) were female, 740 (60.9 %) were under the age of 35, and 934 (76.9 %) had a bachelor's degree or were enrolled in a bachelor's degree program. University students comprised 28.3 % of the study participants, with 16 % in health science colleges. [Table 3](#) shows the remaining characteristics of the study participants.

Of the participants, 82.1 % were aware that epilepsy is a brain disorder, 65.6 % believed that seizures can occur anywhere and at any time, and 66.7 % thought that seizures could lead to sudden death. In addition, 27.4 % reported knowing a friend or family member with epilepsy, and more than half (56.9 %) had witnessed someone experiencing what they believed to be a seizure. Moreover, 31.3 % of participants had previously attended a course or workshop on seizure first aid, while 30.0 % had previously watched a video on seizure first aid.

3.2. Responses to awareness questions and levels of awareness

[Table 1](#) shows participants' responses to awareness questions. The majority of participants were aware of clearing the area around the person of dangerous objects (91.3 %), staying with the person until they are fully awake (88.9 %), and calling an ambulance if the person has difficulty breathing, is a pregnant woman, has recurring seizures, or has been injured during the seizure (88.5 %, 85.9 %, 85.5 %, and 85.7 %, respectively). Fewer participants correctly answered questions about telling the person what happened during the seizure (32.2 %), timing the seizure (68.5 %), and putting a soft pillow under the person's neck (69.3 %). Major misconceptions about what should be done during the seizure included immediately calling the ambulance regardless of the details (93.3 %), putting something in the person's mouth to prevent swallowing of the tongue (87.5 %), holding the person down and restricting their movement (83.0 %), taking out their contact lenses (if any) from the eyes (79.9 %), giving antiseizure medications by mouth to stop the seizure (73.2 %), and performing cardiopulmonary resuscitation, even if the person is breathing (65.1 %). The participants' awareness scores regarding seizure first aid are shown in [Table 2](#). The majority of participants (80.5 %) had low awareness of seizure first aid, while 17.8 % and 1.7 % had intermediate and high awareness, respectively ([Table 3](#)). The average awareness score was 1.2 (± 0.01) which is equivalent to 13.3 % (± 0.11) on a 100-point scale.

3.3. Awareness scores according to demographic characteristics and potential awareness resources

[Table 3](#) shows awareness levels of seizure first aid according to the demographic characteristics of the participants and potential awareness resources. The chi-square statistic of independence showed a significant association between sex and levels of awareness ($\chi^2(2) = 8.68, p = .013$). Other factors significantly impacted the level of awareness included the following: being a friend or family member of someone with epilepsy ($\chi^2(2) = 33.54, p < .001$), previously having witnessed someone experiencing a seizure ($\chi^2(2) = 14.33, p = .001$), previously attending a course or workshop on seizure first aid ($\chi^2(2) = 12.29, p = .002$), and previously watching an educational video on seizure first aid ($\chi^2(2) = 36.76, p < .001$).

Logistic regression was applied to identify factors associated with high awareness ([Table 4](#)). The overall model was statistically

Table 2
Awareness scores of seizures first-aid.

Level of awareness	Overall score	Frequency	Percentage	Mean
High	>6	21	1.7 %	1.2 (± 0.01)
Intermediate	3–6	216	17.8 %	
Low	<3	978	80.5 %	

Table 3
Awareness levels of seizures first-aid by demographic characteristics and potential awareness resources.

Explanatory variable	Frequency (%)	Awareness level, n (%)			p. value
		Low (Overall score <3)	Intermediate (Overall score 3–6)	High (Overall score >3)	
Age groups (years)					
18–24	464 (38.2 %)	363 (78.2 %)	88 (19.0 %)	13 (2.8 %)	.108
25–34	276 (22.7 %)	223 (80.8 %)	48 (17.4 %)	5 (1.8 %)	
≥35	475 (39.1 %)	392 (82.5 %)	80 (16.8 %)	3 (0.6 %)	
Sex					
Male	547 (45.0 %)	458 (83.7 %)	78 (14.3 %)	11 (2.0 %)	.013
Female	668 (55.0 %)	520 (77.8 %)	138 (20.7 %)	10 (1.5 %)	
Education					
High School or less	230 (18.9 %)	169 (73.5 %)	55 (23.9 %)	6 (2.6 %)	.044
Bachelor's degree	934 (76.9 %)	766 (82.0 %)	153 (16.4 %)	15 (1.6 %)	
Graduate studies	51 (4.2 %)	43 (84.3 %)	8 (15.7 %)	0 (0.0 %)	
Occupation					
Employed	541 (44.5 %)	448 (82.8 %)	87 (16.1 %)	6 (1.1 %)	.251
Non-employed	329 (27.1 %)	265 (80.5 %)	56 (17.6 %)	6 (1.8 %)	
Health Science Students	195 (16.0 %)	154 (79.0 %)	37 (19.0 %)	4 (2.1 %)	
Non-Health Science Students	150 (12.3 %)	111 (74.0 %)	34 (22.7 %)	5 (3.3 %)	
Do you have a relative or know someone who suffers from epilepsy?					
Yes	333 (27.4 %)	249 (74.8 %)	67 (20.1 %)	17 (5.1 %)	<.001
No	882 (72.6 %)	729 (82.7 %)	149 (16.9 %)	4 (0.5 %)	
Have you ever witnessed someone having a seizure?					
Yes	691 (56.9 %)	532 (77.0 %)	142 (20.5 %)	17 (0.8 %)	.001
No	524 (43.1 %)	446 (85.1 %)	74 (14.1 %)	4 (0.8 %)	
Have you ever attended a course or workshop on seizure first-aid?					
Yes	380 (31.3 %)	290 (76.3 %)	77 (20.3 %)	13 (3.4 %)	.002
No	835 (68.7 %)	688 (82.4 %)	139 (16.6 %)	8 (1.0 %)	
Have you ever watched a video about seizure first-aid?					
Yes	372 (30.0 %)	265 (71.2 %)	92 (24.7 %)	15 (4.0 %)	<.001
No	843 (69.4 %)	713 (84.6 %)	124 (14.7 %)	6 (0.7 %)	

Table 4
Regression association of level of awareness of seizures first-aid with sex and potential awareness resources.

Variable (Reference)	Awareness level (Low)					
	Intermediate			High		
	OR	CI (95 %)	p. value	OR	CI (95 %)	p. value
Sex (Male)						
Female	1.52	1.11–2.08	.008	0.72	0.29–1.75	.467
Potential awareness resources (No)						
Do you have a family member or know someone who suffers from epilepsy?	1.09	0.776–1.54	.614	9.01	2.82–28.83	.000
Have you ever witnessed someone having a seizure?	1.53	1.11–2.12	.010	1.29	0.40–4.23	.671
Have you ever attended a course or workshop on seizure first-aid?	1.06	0.76–1.48	.730	1.74	0.65–4.69	.274
Have you ever watched a video about seizure first-aid?	1.78	1.28–2.47	.001	4.27	1.48–12.34	.007

Note: OR, adjusted odds ratio C.I., Confidence interval.

significant ($\chi^2(10) = 73.63, p < .001$) and explained 5.5–8.8 % of the variance. Among the “intermediate score” group, female sex (OR = 1.52, 95 % CI = 1.11–2.08, $p = .008$), previously having witnessed someone having a seizure (OR = 1.53, 95 % CI = 1.11–2.12, $p = .001$), and previously watching a video on seizure first aid (OR = 1.78, 95 % CI = 1.28–2.47, $p = .001$) had a statistically significant impact on the level of awareness. For those who were in the “high score” group, previously watching an educational video on seizure first aid (OR = 4.27, 95 % CI = 1.48–12.34, $p = .007$) and being a friend or family member of someone with epilepsy (OR = 9.01, 95 % CI = 2.82–28.83, $p < .001$) were associated with an increased level of awareness by four and nine-fold, respectively. Female sex in the “high score” group was not statistically significant (OR = 0.718, 95 % CI = 0.29–1.75, $p = .467$).

4. Discussion

First aid measures are crucial in cases of epileptic seizures. However, there is a lack of awareness about how to provide emergency response for someone having a seizure in Jazan, Saudi Arabia. In this region, many people believe that epilepsy is caused by spiritual or mental disorders [6]. This study aimed to assess the awareness of seizure first aid among the population living in Jazan. The study found that the vast majority of participants (80.5 %) had low awareness of seizure first aid. The average awareness score was 13.3 %, which is significantly lower than the awareness scores observed in other studies. For example, the overall awareness score was 57.3 % in Saudi Arabia [12], 78 % in Grenada [10], and 76 % among healthcare workers in China [9]. There are several possible explanations

for the low awareness of seizure first aid in Jazan. One possibility is that the studies design and analyses were confounded. Another possibility is that there is a lack of education and training on seizure first aid in Jazan.

This study also found that while 83.2 % of participants knew when to call an ambulance for a seizure in special circumstances, such as if the person had a seizure that lasted longer than 5 min, 88.3 % said they would call an ambulance regardless of the details. This discrepancy is interesting but not surprising, as seizures are often perceived as a life-threatening medical emergency, and people may feel unable to help without professional medical assistance. A similar finding was reported by Al-Dosary et al. (2022) [12]. This study also found that the majority of participants (91.3 %) were aware of the importance of clearing the area around the person of dangerous objects to prevent injury during a seizure. This finding was consistent with previous studies conducted locally [12,20] and internationally [9,21]. However, only a third of participants (32.3 %) would tell the person who had a seizure about what happened, once they were alert and able to communicate. It is recommended that people be told about their seizures in simple terms, as this can help them, and their healthcare providers track the frequency and severity of seizures [18,19]. This information can be used to improve the person's treatment plan.

In a review of the literature on misconceptions about first aid for seizures, we found that 60–90 % of people surveyed would react to a seizure by putting something in the person's mouth to prevent biting or swallowing their tongue [6,11,12,21,22]. Unsurprisingly, the present study found that 85 % of participants had this misconception. However, a recent survey of epilepsy awareness among university students in Jazan region found that only 34.4 % of participants would have a similar reaction during a seizure [6]. This difference is likely due to the participants' level of education. This is a common misconception, but it is important to know that it is not necessary to do this. A person having a seizure cannot swallow their tongue, and trying to put something in their mouth can actually injure their teeth or jaw [18,19].

In addition to the misconceptions mentioned above, this study also identified two other common misconceptions about seizures: restraining the person during the seizure and giving them antiseizure medication by mouth. Only a small number of participants (26.8 %) in this study knew that antiseizure medication should not be given orally during a seizure. This is because the person may be unable to swallow, and medication could even cause choking [18,19]. This result was lower than previous studies, which found that 41.4 % of people in Saudi Arabia [12], 45.9 % of people in Iran [11], and 81.5 % of people in Grenada [9] were aware of this measure. Cardiopulmonary resuscitation (CPR) is not necessary during a seizure. This is because people usually start breathing again on their own after the seizure ends [18]. However, a third of participants (34.8 %) in this study did not know this, and a similar finding was reported in another study in Saudi Arabia [12]. This is concerning because it means that many people may be performing CPR on people who are having seizures, even though they are breathing.

This study also identified some factors that positively impact awareness levels. Females and particularly people who are friends or family members of people with epilepsy were more likely to be aware of seizure first-aid. This is consistent with previous studies [5–7, 12] and may be because these groups of people have more experience with epilepsy and learn about first aid through their interactions with people with epilepsy. Also, previous research has shown that women are more likely to be caregivers for people with epilepsy [23]. Of participants in this study, 30 % reported that they had previously watched a video on seizure first aid. This finding was consistent with the finding reported by Al-Dosary et al. (2022) who found that 32.4 % of Saudis had previously watched a video on seizure first aid through social media, including YouTube, Twitter, and WhatsApp [12]. This suggests the widespread use of social media in Saudi Arabia and its potential to influence public education about seizure first aid. This study also found that previously watching a video on seizure first aid was associated with a four-fold increase in awareness of seizure first aid. This finding suggests that the video on seizure first aid could be an effective educational tool to use in schools, universities, and other workplaces.

It was somewhat surprising that a higher proportion of participants in this study (82.1 %) were aware that epilepsy is a brain disorder, compared to other studies in Saudi Arabia (~47 %) [6,20,21]. This suggests that awareness of epilepsy is improving in the country. However, the "spiritual" and "mental disorder" misconceptions about epilepsy are still common, and these misconceptions can lead to social stigma and inadequate adherence to epilepsy management [5–7]. It is vital to challenge these misconceptions about epilepsy and to create a more inclusive environment for people with the condition through education and outreach.

This study was one of the first to assess public awareness of first-aid for seizures in Saudi Arabia. It excluded healthcare providers and people who had never heard of epilepsy to avoid exceptionally low or high findings. The study used a comprehensive list of first-aid measures from reliable sources and currently published literature. However, the participants were a young, educated generation, and some may argue whether they represent the general population. Jazan has a high proportion of the young population. The 2022 Saudi Census by the General Authority for Statistics estimates that the average age of population in Jazan is 25.5 years, and that 71.0 % of the population is under the age of 35 [15]. This greater number of young populations was also remarkable in previous public surveys on epilepsy and seizure first aid in Saudi Arabia [5,12]. For example, the study by Al-Dosary et al. (2022) on public awareness of seizure first aid in Saudi Arabia found that 75 % of participants were aged ≤ 35 [12]. Moreover, the high number of university students in the study could have introduced bias into the results. However, the recent statistics shows that 22.6 % of the region's young population between the ages of 15 and 24 are enrolled at Jazan University (www.jazanu.edu.sa), suggesting that the university student population in the study is somewhat representative of the young population in the region by age and educational attainment [15]. Furthermore, university students represent the generation about to enter the workforce in a broad range of vocations. They will be highly influential, and their attitudes will shape the way that epilepsy is perceived in Saudi society. Previous studies in Saudi Arabia have found that a significant proportion of university students still believe that epilepsy is caused by possession by spirits [5,6]. That finding was attributed to the flow of incorrect information down the generations in Saudi communities linking the condition to psychiatric diseases and possession by spirits, even among well-educated people. Understanding the extent of this belief and bridging the gap in university students' knowledge and attitudes towards epilepsy and seizure first aid is essential to alleviating social stigma and improving the quality of life for people with epilepsy in Saudi Arabia.

Nevertheless, the findings should be interpreted with caution due to several limitations. First, the self-reported nature of the data could have led to over-reporting of certain outcomes, such as the high percentages of participants who had previously witnessed a seizure (56.9 %) and those who had previously attended a course or workshop on seizure first aid (31.3 %). Second, the online nature of the study may have excluded subgroups of the population, such as those without internet access. Third, the scoring system for awareness levels was not validated, which could have introduced bias into the results. Finally, the study was conducted in a single region, which limits the generalizability of the findings to other populations in Saudi Arabia.

In conclusion, this study found that people in Jazan, Saudi Arabia, have inadequate awareness of seizure first aid. This is evidenced by the common misconceptions that antiseizure medication can be administered orally to stop a seizure and that an ambulance should always be called. These misconceptions can lead to delays in treatment and can potentially worsen the outcome of a seizure. It is important to educate the public about seizure first aid through a variety of methods, such as videos on social media, field training, and other educational materials. This study will provide valuable insights into public awareness of seizure first aid in Saudi Arabia. The findings could help identify areas where education is needed and improve the quality of care for people with epilepsy in Jazan region and beyond.

Data availability statement

Data will be made available on request.

Funding

None.

Additional information

No additional information is available for this paper.

CRedit authorship contribution statement

Faisal Hakami: Conceptualization, Data curation, Formal analysis, Methodology, Resources, Software, Validation, Writing – original draft. **Khalid M. Hakami:** Data curation, Methodology, Resources, Software. **Shaden A. Zaalah:** Data curation, Methodology, Resources, Software. **Afnan A. Alamer:** Data curation, Methodology, Resources, Software. **Ghaidaa H. Alharbi:** Data curation, Methodology, Resources, Software. **Mohammed Awaf:** Data curation, Methodology, Resources, Software. **Sulaiman Hamdi:** Data curation, Methodology, Resources, Software. **Anas E. Ahmed:** Data curation, Formal analysis, Methodology, Resources. **Amal H. Mohamed:** Conceptualization, Project administration, Supervision, Writing – original draft. **Abdulaziz Alhazmi:** Conceptualization, Project administration, Supervision, Writing – review & editing, Methodology, Validation. **Tahir Hakami:** Conceptualization, Data curation, Formal analysis, Project administration, Supervision, Validation, Writing – original draft, Writing – review & editing, Methodology, Resources, Visualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

The authors would like to thank the study participants for their valuable contributions to this research.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2023.e22197>.

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