Original Article

First-aid knowledge and practices towards patients with epileptic seizures among the dental students in Saudi Arabia – A cross-sectional study

Zainah Al-Qahtani[1], Syed Esam Mahmood[2], Mariam S. Alshahrani[3], Maram N. Alosaimi[4], Khulud Ali A. Bakri[5], Shahd Mohammed Alqarni[6], Ebtihaj Alshehri[7], Amal Merei M. Alqarni[6]

[1]Internal Medicine Department, Neurology Section, College of Medicine King Khalid University, Abha, Saudi Arabia, [2]Department of Family and Community Medicine, College of Medicine, King Khalid University, Abha, Saudi Arabia, [3]Neurology, Security Force Hospital, Riyadh, Saudi Arabia, [4]General Practitioner, King Abdulaziz Hospital, Taif, Saudi Arabia, [5]Internal Medicine, Asir Central Hospital, Abha, Saudi Arabia, [6]General Practitioner, Asir Central Hospital, Abha, Saudi Arabia, [7]Neurology, Asir Central Hospital, Abha, Saudi Arabia

Abstract

Background: Dental care of patients with epilepsy and seizures must be performed by dentists who are familiar with these disorders. Improper training and incapability to manage medical emergencies, including epileptic seizures, may cause thoughtful consequences and legal actions. Therefore, dental students must have a proper knowledge of the disease and its consequences. They should have the ability to provide first-aid measures helping a patient experiencing an epileptic seizure in their clinics. This study aims to evaluate the first-aid knowledge and practices towards patients with epileptic seizures among the dental students in Saudi Arabia. **Methods:** A cross-sectional study was conducted targeting dental students in Saudi Arabia from 15 September 2022 to 15 December 2022 using convenience sampling. An online questionnaire was sent to the students via social media platforms for data collection. The data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 16.0. **Results:** Of the 499 dental students included, 154 (30.86%) students had ever seen an epileptic patient in the clinics. About 16% of students did not know about performing cardiopulmonary resuscitation (CPR) on patients. The majority (66.5%) would call the ambulance after the patient's seizure stops. About 82% of students prefer to call an ambulance if the patients face difficulty breathing or waking up after the seizure. More than 60% of students were taking precautions before treating an epilepsy patient. About 58.5% of the students were using local anaesthesia for an epilepsy patient. Nearly 41.9% do not have the confidence to treat an epilepsy patient. About 28.0% would swipe the vagus nerve stimulation (VNS) magnet over the left side of the chest. Of 154 students, who had ever seen epileptic patients, the majority (68.8%) refused to treat patients if they observe noncompliance with medication and follow-up among the patients who had any recent illness or seizures (16.2%). **Conclusion:** The undergraduate dental students had an intermediate knowledge regarding epilepsy and epileptic seizure first aid. However, some students lacked the confidence to deal with the epileptic cases in their clinics. Educational campaigns on epilepsy and first-aid courses targeting dental students are highly recommended.

Keywords: Dental students, epilepsy, first aid, knowledge, Saudi Arabia

Address for correspondence: Dr. Syed Esam Mahmood, Department of Family and Community Medicine, College of Medicine, King Khalid University, Abha, Saudi Arabia.
E-mail: smahmood@kku.edu.sa

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Introduction

Epilepsy is a neurological illness characterized by recurrent seizures, which are brief episodes of involuntary movements that may involve a part of the body or the entire body, sometimes accompanied by loss of consciousness and loss of control of bowel or bladder function.[1] This condition is one of the most frequent neurological disorders affecting humans.[2] In Saudi Arabia, the prevalence rate of epilepsy has been reported to be 6.54 per 1000 persons.[3] Studies have shown that epileptic patients have a more significant number of missing or decayed teeth, so they may require frequent dental treatment.[4,5]

Additionally, gingival hyperplasia develops in around half of the individuals receiving antiepileptic drugs, such as dilantin and phenytoin within 12–24 months of treatment. Surgical reduction is required in severe situations.[6] Anxiety or a flickering light may cause a seizure in a patient at the dentist's office.[7] Due to the use of local anaesthetics/antibiotics, people with epilepsy are more likely to experience seizures, which need a proper first-aid measure from the dentist.[8] Local anaesthetics and antibiotics provoke seizures by decreasing inhibitory transmission in the brain, thus lowering the seizure threshold. Understanding epilepsy and associated seizures improves the alertness of the disorder's effect on a patient's medical and psychological health. Dental care of patients with epilepsy and seizures must be performed by dentists who are familiar with these disorders.[9] It is necessary for dentists to be familiar with specific needs of these patients, as well as prevent the possible related risks that could affect patients during an epileptic seizure. Improper training and incapability to manage medical emergencies, including epileptic seizures, may cause thoughtful consequences and legal actions.[10] Therefore, it is vital that the dental students must have a proper knowledge of the disease and its consequences because they represent the future workforce in the field of dentistry. They should have the ability to provide first-aid measures helping a patient experiencing an epileptic seizure in their clinics. Knowing how to help someone during a seizure can make a difference and save a life. To the best of our knowledge, studies in Saudi Arabia are limited on this topic and no similar studies have been conducted among dental students. Studies conducted in other groups, such as teachers, have reported moderate to poor knowledge of epilepsy, and approximately one-tenth had taken first-aid training.[11,12] The awareness of seizure first-aid measures is also inadequate (57.3%) among the public in Saudi Arabia.[13] This study will help in identifying deficiencies in knowledge about epilepsy among dental students and to outline the concerns they will take into account when providing dental care to epilepsy patients. This study also serves as a baseline for the Ministry of Education to educate dental students and improve their knowledge of first-aid provision skills of patients with epilepsy and seizures. With this background, this study was undertaken to evaluate the first-aid knowledge and practices towards patients with epileptic seizures among the dental students in Saudi Arabia.

Materials and Methods

Study overview: A descriptive cross-sectional study was conducted targeting dental students in Saudi Arabia from 15 September 2022 to 15 December 2022 using sampling. Convenience sampling eased the access to the study population.

Ethical Considerations: This study was approved by the Research Ethics Committee of King Khalid University in September 2022 (ECM#2022-2402). The confidentiality of the participants was ensured, and all the collected information in this study was used for scientific purposes only.

Study procedure and assessment: The investigators used an online pre-structured questionnaire to collect the data after obtaining informed consent from the participants.

For questionnaire validation, group of subject experts provided valuable feedback during an initial expert review, leading to refinements in question wording for clarity and relevance. Pilot testing with a representative sample allowed us to identify any ambiguities in question. Content validity was ensured through consultations with field experts. In conjunction with the expert review and pilot testing, we also conducted reliability analysis using Cronbach's alpha to assess the internal consistency of our scales. The results indicated a high level of reliability, with Cronbach's alpha coefficient of 0.8. This value signifies strong equivalence of items within single-construct scales.

The questionnaire consisted of multiple items and covered students: demographic data, academic data, history of first-aid training and exposure to epilepsy cases. The second section covered dental students' knowledge regarding epilepsy and epileptic seizure first aid. The last section included students: perceptions and self-confidence regarding dealing with epileptic cases in the clinic. The study questionnaire was sent to the students via social media platforms till no more answers were obtained.

Statistical analysis: The analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 16.0 (SPSS Inc., Chicago, Illinois, USA). The results are presented in frequency and percentage graphs, such as pie and bar diagrams. Baseline characteristic cases were compared using the Chi-square test for categorical variables. $P < 0.05$ was considered statistically significant.

Knowledge and acceptance scores, respectively, were calculated by awarding '1' points for each positive/correct response and '0' points for each negative/wrong response. The final scores were presented in the form of percentage by adding all the points of the respondents followed by calculating the percentage. Thus, we classified final knowledge and awareness scores into three distinct classes based on percentage breakdowns: poor knowledge (0–40%), intermediate knowledge (41–69%) and good knowledge (70% and above). This scoring system was

adopted in accordance with the methodology outlined in the study conducted by Arora *et al*.[14]

Results

There are 499 dental students included in this study, of which 298 study subjects are males and 201 are females. Table 1 presents the demographic characteristics of dental students who had ever witnessed an epileptic patient in dental clinics. The number of respondents who had ever witnessed an epileptic patient in dental clinics was 154 (30.86%). Statistically significant associations were found between ever witnessing an epileptic patient and the student's age groups, marital status and academic year. Table 2 shows that only 41 (8.2%) students were diagnosed with epilepsy in their early childhood. Nearly 21.3% of students have seen epileptic patients in clinics; however, they have never attended a course or workshop about seizure first aid. A higher proportion (56.9%) of students did not have a basic life support (BLS) certificate. Table 3 describes first-aid knowledge and practices towards patients with epileptic seizures among the dental students. Only 16% of the students do not know about performing cardiopulmonary resuscitation (CPR) on patients. Overall, a higher proportion of students have an intermediate knowledge about seizure first-aid measures. Table 4 illustrates the reaction of students after the patient's epileptic seizures stop. Of 499 students, the majority of students (332, 66.5%) would call the ambulance and about 179 (53.9%) students have poor knowledge about calling the ambulance after the patient's seizure stops. About 40% of the students warned patients what could happen to them during the seizure. Table 5 shows the response of students towards the need of calling the ambulance in special circumstances while witnessing a patient with an epileptic seizure. About 392 (82.7%) students prefer to call an ambulance if the patients face difficulty breathing or waking up after the seizure. The majority of students (202, 62.0%) do not have any knowledge about calling an ambulance, if the person is a known patient with epilepsy and the seizure will last less than 5 minutes. About 40% of students have an intermediate knowledge about calling the ambulance if the person got injured during the seizure, such as falling on the head or bleeding. Figure 1 shows that a significant positive correlation was found between the number of students attending dental clinics per week and students examining seizure patients per month. Table 6 depicts the frequency distribution of queries related to the dental management of the epileptic patient. More than 60% of students were taking precautions before treating an epileptic patient. About 292 (58.5%) students used local anaesthesia for an epileptic patient. Nearly 41.9% of students do not have the confidence to treat an epileptic patient. Figure 2 shows the dental student's reaction towards witnessing a patient with vagus nerve stimulation (VNS). A higher proportion of students (139, 28.0%) would swipe the VNS magnet over the left side of the chest. Figure 3 shows the student responses about when they refuse to treat epilepsy patients. Among the total 154 students, who have ever seen epileptic patients in clinics, the majority of students (106, 68.8%) refused to treat patients if they observe noncompliance with medication and follow-up among the patients who had any recent illness or seizures, that is 25 (16.2%).

Table 1: Distribution of demographic characteristics of dental students who have ever seen an epileptic patient in clinics

Demographic characteristics	Category	Ever seen epileptic patient(s) in clinics		Total
		No (*n*=345)	Yes (*n*=154)	
Sex	Female	144	57	201
		71.6%	28.4%	100.0%
	Male	201	97	298
		67.4%	32.6%	100.0%
Age group	≤ 24 years	276	88	364
		75.8%	24.2%	100.0%
	> 24 years	69	66	135
		51.1%	48.9%	100.0%
Marital status	Married	40	55	95
		42.1%	57.9%	100.0%
Academic year	Single	305	99	404
		75.5%	24.5%	100.0%
	First	12	5	17
		70.6%	29.4%	100.0%
	Second	40	3	43
		93.0%	7.0%	100.0%
	Third	65	11	76
		85.5%	14.5%	100.0%
	Fourth	65	16	81
		80.2%	19.8%	100.0%
	Fifth	54	29	83
		65.1%	34.9%	100.0%
	Sixth	39	29	68
		57.4%	42.6%	100.0%
	Intern	70	61	131
		53.4%	46.6%	100.0%

Discussion

In this study, we investigated the first-aid knowledge and practices towards patients with epileptic seizures among the dental students in Saudi Arabia. This study revealed that a substantial proportion of dental students demonstrated an intermediate level of understanding regarding seizure first-aid measures. Literature is scarce discussing this issue but some articles have discussed dentists' awareness regarding emergencies, including epilepsy. In general, many research studies have discussed undergraduate students' awareness of epilepsy and their first-aid skills. About 16% of the students do not know about performing CPR on patients in our study. Marks LA *et al*.[15] reported that almost 50% of the dentists never had any BLS training during their study years. Also, Čuković-Bagić I *et al*.[16] found that 81.3% of the general dentists had no training for BLS for dentists during their undergraduate studies. However, a study in Brazil showed that 87% of dentists were trained in BLS, but only half of them think that they are skilled to provide first aid and perform the essential manoeuvres.[17] In a UAE study, the highest awareness score for first aid was found among the dentistry students.[18]

Table 2: Familiarity of study subjects with epilepsy according to those who have ever seen an epileptic patient in clinics

Query	Ever seen epileptic patient(s) in clinics		Total	*P*
	No (*n*= 345)	Yes (*n*=154)		
Do you have epilepsy				
No	332	126	458	0.00
	72.5%	27.5%	100.0%	
Yes	13	28	41	
	31.7%	68.3%	100.0%	
Do you know someone with epilepsy?				
No	237	53	290	0.00
	81.7%	18.3%	100.0%	
Yes	108	101	209	
	51.7%	48.3%	100.0%	
Do you know someone with epilepsy? If yes, specify the relation.				
No	224	43	267	0.00
	83.9%	16.1%	100.0%	
Relative	53	48	101	
	52.5%	47.5%	100.0%	
Colleague	17	15	32	
	53.3%	46.7%	100.0%	
Friend	40	39	79	
	50.6%	49.4%	100.0%	
Other	11	9	20	
	55.0%	45.0%	100.0%	
Did you ever attend a course or workshop about seizure first aid?				
No	259	70	329	0.00
	78.7%	21.3%	100.0%	
Yes	86	84	170	
	50.6%	49.4%	100.0%	
Did you ever see a video on seizure first aid?				
No	204	41	245	0.00
	83.3%	16.7%	100.0%	
Yes	141	113	254	
	55.5%	44.5%	100.0%	
Do you have a BLS certificate?				
No	239	44	283	0.00
	84.5%	15.5%	100.0%	
Yes	106	110	216	
	49.1%	50.9%	100.0%	

Tiamkao S *et al*.[19] reported that 50.9% of medical students recommended that placing a piece of wood between the teeth during a seizure and performing chest compressions (20.0%) is the appropriate management method. However, it is an obsolete practice now and no longer recommended as could potentially harm the patient by causing additive damage to teeth and oral cavity. Asadi-Pooya AA *et al*.[20] in Iran found that, on two questions, more caregivers provided appropriate responses than nurses and physicians (i.e. not putting fluid or medications into the mouth; not always calling for emergency medical services). The assessed low awareness level among students in this study is consistent with literature findings and may be due to the fact that 21.3% of the students did not attend a course or workshop about seizure first aid and 56.9% of the students had BLS certificates. Most of the students (about 37.3%) know that they should roll the epileptic patient carefully on his side after the seizure stops. In this study, the majority (82.7%) of students prefer to call an ambulance if the patients face difficulty breathing or waking up after the seizure. Regarding students' self-perception and esteem in dealing with an epileptic patient, less than 41.9% of them think they have the confidence to treat a patient with epilepsy. As for their practice in dealing with the epileptic case, the vast majority reported that there are many precautions to be taken before treating a patient with epilepsy, but a lesser proportion knew that they should use local anaesthesia for a patient with epilepsy. The use of benzodiazepine awareness was not satisfactory among the students in case of prolonged seizures. Most of the students reported their refusal to treat epileptic cases who are non-compliant with treatment. These findings are consistent with the following studies. Hassona YM *et al*.[21] reported that 45% of dentists were able to recognize convulsion as a sign of epilepsy, and more than one-third did not know how to behave

Table 3: First-aid knowledge and practices of the dental students towards patients with epileptic seizures

Query	Poor knowledge	Intermediate knowledge	Good knowledge	Total
If the patient experiences an aura during treatment, immediately remove the dental instruments from the patient's mouth.	240	146	15	400
	60.0%	36.5%	3.75%	100.0%
Clear all instruments away from the patient.	243	154	13	410
	59.3%	37.6%	3.2%	100.0%
Place the dental chair in a supported, supine position as near to the floor as possible.	205	143	14	362
	56.6%	39.5%	3.9%	100.0%
Place the patient on his or her side to decrease the chance of aspiration of secretions or dental materials in the patient's mouth.	209	143	14	366
	57.1%	39.1%	3.8%	100.0%
Prevent him from falling?	231	166	15	412
	56.1%	40.3%	3.6%	100.0%
Clear the area from dangerous objects?	250	170	15	435
	57.5%	39.1%	3.4%	100.0%
Time period of the seizure.	180	122	16	318
	56.6%	38.4%	5.0%	100.0%
Loosen clothing around the person's neck.	112	144	16	272
	41.2%	52.9%	5.9%	100.0%
Attempting to open the mouth to put something to avoid tongue.	66	135	16	217
	30.4%	62.2%	7.4%	100.0%
Can the patient swallow their tongue when they have a seizure?	165	120	15	300
	55.0%	40.0%	5.0%	100.0%
Putting a pillow or anything soft under their neck?	103	130	16	249
	41.4%	52.2%	6.4%	100.0%
Observe the patient's breathing and his chest movement.	160	156	16	332
	48.2%	47.0%	4.8%	100.0%
Perform CPR?	18	82	13	113
	15.9%	72.6%	11.5%	100.0%
Do a brief oral examination for sustained injuries?	107	143	14	264
	40.5%	54.2%	5.3%	100.0%

Poor knowledge (0–40%), intermediate knowledge (41–69%) and good knowledge (70% and above)

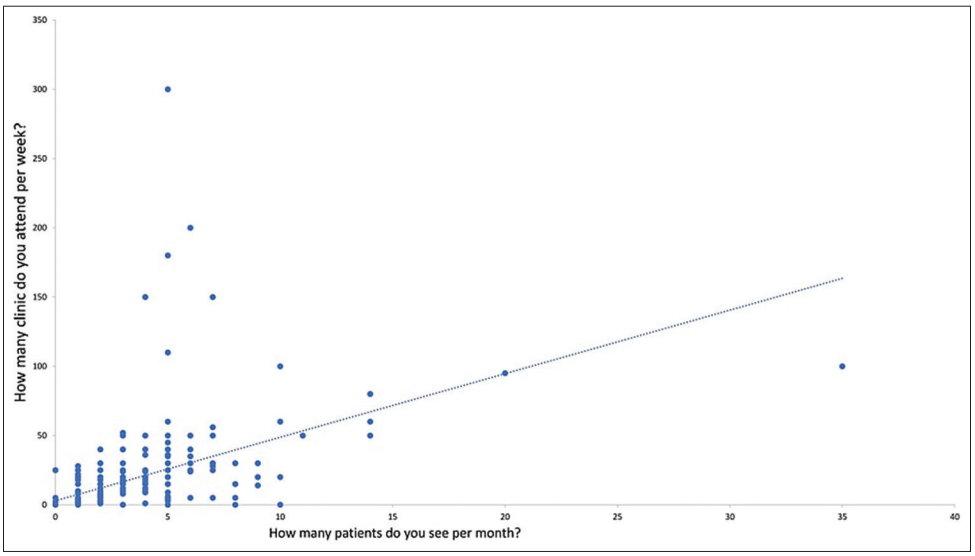

Figure 1: Scatter plot shows the clinics attended and seizure patients examined per month by dental students

in case of an epileptic seizure witnessed in the dental clinic. Also, Albelaihi HF *et al*.[22] found that about 37.8% of dentists were confident to handle any medical emergency in the dental office. In a cross-sectional study conducted among 300 undergraduate medical, dental and nursing students in India, it was found that 65.1% of the medical students, 45.5% of dental and 62.7% of nursing students were aware of first-aid skills, the difference being statistically significant.[23] In another study among university students, good knowledge was generally observed in both medical (61.2%) and nonmedical (53.2%) students. Medical

students' overall knowledge regarding first aid was better than nonmedical students, the results being statistically insignificant.[24] Another recent study was conducted among school teachers in Saudi Arabia and reported that 38.5% had a good overall knowledge level, while 61.5% had poor knowledge regarding epilepsy.[12] Insufficient knowledge about epilepsy, which is a very common disorder, has a great and negative impact on people with epilepsy, their families and communities, and the healthcare systems.[25] Many incorrect and injurious seizure-control practices are adopted especially in developing countries, such as infliction of burns, rubbing irritants in the eyes and fixing the patient over the fire.[26-28] Seizures in epilepsy have an unpredictable nature as it can occur anytime and anywhere; therefore, standardized seizure first-aid training programmes should be developed for the general public and healthcare professionals.[29] Dentists may witness seizures while managing patients. A seizure episode in a dental clinic is a medical emergency, and it is imperative for an oral healthcare provider to have adequate knowledge about this condition in order to render safer dental care to epileptic patients. These considerations suggest that it is important for all dentists to enhance their first-aid knowledge about seizures.[30,31] A recent study helps to relate age, knowledge, experience and clinical skill go hand in hand for better handling of medical emergencies in a dental clinic.[32] The following factors may have led to certain limitations in this study. The cross-sectional nature of this study cannot confirm the causality association between the compared variables. The self-reported responses could over- or underestimate the results. This study targeted only dental students in Saudi Arabia, and our findings did not include the knowledge and evaluation of students belonging to other disciplines across Saudi Arabia. We hope in the future to have all the required resources to conduct studies targeting students from different disciplines. However, the data that included dental students from the entire Kingdom of Saudi Arabia and an extensive analysis that has been made are the strengths of our study.

Table 4: Reactions of dental students after the patient's epileptic seizures stop

Query	Poor knowledge	Intermediate knowledge	Good knowledge	Total
Leave the person alone.	66	14	4	84
	78.6%	16.7%	4.8%	100.0%
Tell him what happened during the seizure.	116	75	11	202
	57.4%	37.1%	5.4%	100.0%
Rolling them carefully on their side.	191	120	11	322
	59.3%	37.3%	3.4%	100.0%
Call an ambulance.	179	139	14	332
	53.9%	41.9%	4.2%	100.0%

Poor knowledge (0–40%), intermediate knowledge (41–69%) and good knowledge (70% and above)

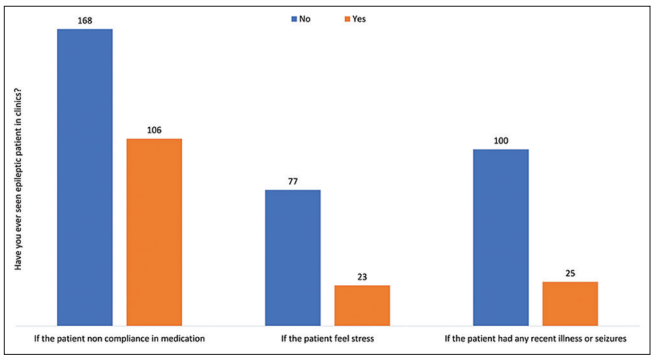

Figure 2: Distribution of student responses about when they refuse to treat patients with epilepsy

Table 5: Decision-making and preference to call the ambulance after an epileptic seizure

Query	Poor knowledge	Intermediate knowledge	Good knowledge	Total
If the person has never had a seizure before	192	147	16	355
	54.1%	41.4%	4.5%	100.0%
If the person has difficulty breathing or waking after the seizure	235	163	15	413
	56.9%	39.5%	3.6%	100.0%
If the person has another seizure soon after the first one	208	147	15	370
	56.2%	39.7%	4.1%	100.0%
If the person has a health condition, such as diabetes, heart disease or is Pregnant	221	155	15	391
	56.5%	39.6%	3.8%	100.0%
If the person is a known patient with epilepsy the seizure will last less than 5 minutes	202	112	12	326
	62.0%	34.4%	3.7%	100.0%
If you are not sure what to do you will call the ambulance.	217	159	16	392
	55.4%	40.6%	4.1%	100.0%
If the seizure lasts more than 5 minutes	215	141	14	370
	58.1%	38.1%	3.8%	100.0%
If the person got injured during the seizure, such as falling on the head or Bleeding	222	154	14	390
	56.9%	39.5%	3.6%	100.0%
You will stay with the person having seizure until the ambulance arrives	234	159	16	409
	57.2%	38.9%	3.9%	100.0%

Poor knowledge (0–40%), intermediate knowledge (41–69%) and good knowledge (70% and above)

Table 6: Responses of students towards dental management of an epileptic patient

Query	I do not know	No	Yes	Total
Do you attend a dental clinic?	Not applicable	224	275	499
	-	44.9%	55.1%	100.0%
Do you have the confidence to treat a patient with epilepsy?	0	290	209	499
	0.0	58.1%	41.9%	100.0%
Is there any precaution taken before treating a patient with epilepsy?	134	50	314	499
	26.8%	10.0%	62.9%	100.0%
Revise the patient's medication before treatment to be sure the seizure is under control.	0	94	405	499
	0.0	18.8%	81.2%	100.0%
Are there special instruments for treating a patient with epilepsy?	191	123	185	499
	38.3%	24.6%	37.1%	100.0%
Can you use local anaesthesia for a patient with epilepsy?	145	62	292	499
	29.1%	12.4%	58.5%	100.0%
Do you have benzodiazepine in the clinic?	165	65	269	499
	33.1%	13.0%	53.9%	100.0%
Do you know how to use benzodiazepine?	157	71	271	499
	31.5%	14.2%	54.3%	100.0%
If the seizure lasts longer than 5 minutes or for repeated seizures, administer a 10 mg dose of diazepam (IM) or (IV) or 2 mg of IV or IM, or 5 mg of midazolam, IM, or IV.	172	111	216	499
	34.5%	22.2%	43.3%	100.0%
Rectal benzodiazepine is an option to be given for prolonged or recurrent seizures.	233	50	216	499
	46.7%	10.0%	43.3%	100.0%
Buccal benzodiazepine is an option to be given for prolonged or recurrent seizures?	302	104	93	499
	60.5%	20.8%	18.6%	100.0%
Nasal benzodiazepine is an option to be given for prolonged or recurrent seizures?	306	78	115	499
	61.4%	15.6%	23.0%	100.0%
Do you know the triggers of seizures in the clinic?	282	82	135	499
	56.5%	16.4%	27.1%	100.0%

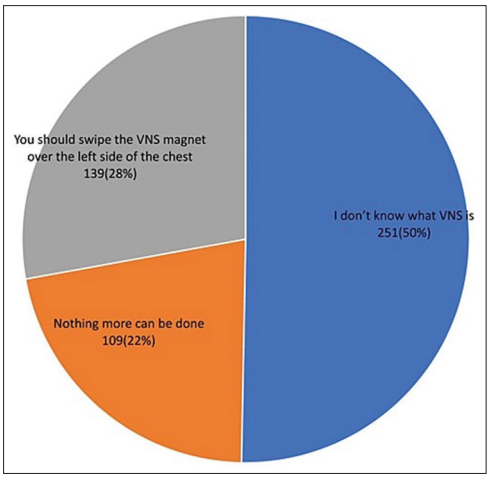

Figure 3: Frequency distribution of the dental student's reaction towards witnessing a patient with vagus nerve stimulation (VNS) If the patient has vagus nerve stimulation (VNS) what should be done?

Conclusions

This study showed that undergraduate dental students had intermediate awareness regarding epilepsy and epileptic seizure first aid. They also lack the confidence to deal with epileptic cases in their clinics irrespective of having BLS certificates. The only satisfactory findings were students' awareness of how to deal with epileptic cases after the seizure ends and when to call for an ambulance was good. Improving dental students' knowledge about epilepsy is, therefore, urgently needed. In view of these findings, adding a first-aid course to the dental college curriculum is recommended with periodic health education for students and mandating training programmes for working dentists. This shall help the students to be confident during duty hours while attending the epilepsy patients or any life-threatening situation and allow these future dentists to develop competencies for improving and implementing good quality care protocols for such patients in practice.

Additional Information

Human subjects

Consent was obtained or waived by all participants in this study. Research Ethics Committee, King Khalid University, Abha, issued approval ECM#2022-2402. This study was approved by the Research Ethics Committee at the King Khalid University, Abha, Saudi Arabia in September 2022 (ECM#2022-2402).

Animal subjects

All authors have confirmed that this study did not involve animal subjects or tissue.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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