Evaluation of the attitude and knowledge level of dentistry undergraduate and specialist students towards epilepsy patients

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ABSTRACT

Objective: The objective of this research, which was carried out at a faculty of Dentistry situated in Turkey, was to assess the differences in awareness, knowledge, and attitudes about epilepsy among preclinical and clinical undergraduate students as well as speciality students. Moreover, this study seeks to ascertain the adequacy of the curriculum and clinical training provided to dental students in the context of managing patients with epilepsy. The aim is to ensure a full grasp of the subject matter and the development of practical skills.
Material-method: At order to facilitate the research done at the Faculty of Dentistry at Afyonkarahisar Health Sciences University, Turkey, a comprehensive questionnaire including eight sections and a total of 60 questions was distributed to students at various stages of their dental education, including preclinical, clinical, and speciality students.
Result: The present study used a descriptive, cross-sectional methodology, including a total of 477 participants from various sections (preclinical, clinical, and speciality) within the Faculty of Dentistry at Afyonkarahisar Health Sciences University. When examining the overall understanding of epilepsy, a statistically significant difference was discovered across the various groups. It is noteworthy that a substantial proportion (68.4 %) of students specializing in a particular field displayed a high level of knowledge, which is in stark contrast to the percentages of clinical (40.5 %) and preclinical (29.4 %) students who exhibited similar levels of understanding.
Conclusion: This study conducted at a dental college in Turkey revealed a discernible gradient of knowledge, with speciality students exhibiting the greatest degree of knowledge, followed by clinical students, and subsequently preclinical students. In clinical settings, it was observed that students generally had a favorable disposition while interacting with individuals afflicted with epilepsy. Nevertheless, there was a prevailing sentiment of insufficient preparation and instruction. Hence, it is feasible to augment instructional lectures via the use of problem-based or simulation-based learning frameworks.

1. Introduction

Epilepsy is a common condition in oral and maxillofacial surgery [1]. According to Chapman et al, epileptic seizures are the second most common medical event occurring during dental procedures. Statistical data show that dentists are affected by generalized tonic-clonic seizures an average of 1.5 times during their career [1]. Currently, it is estimated that more than 50 million people worldwide have epilepsy, and an additional 2.4 million individuals are identified each year [2]. Based on data from the World Health Organization, it is estimated that epilepsy accounts for approximately 1 % of the total global medical burden [3].

Epidemiological studies suggest that the prevalence of epilepsy is not significantly influenced by gender and cultural factors. However, there

are notable differences between developed and underdeveloped countries [4]. In industrialized nations, the prevalence rate is about 45 persons per 1,000, but in poor countries it is comparatively higher, exceeding 43 per 1,000 [5,6]. In 2010, Velioğlu et al. conducted a study in Turkey that revealed a prevalence rate of epilepsy in the population that affected 6 per 1,000 [7].

Throughout history, individuals diagnosed with epilepsy have often been publicly condemned, as many societies attributed the occurrence of this disease to malevolent forces [8]. Although medical research recognizes epilepsy as a transient neurological condition, prejudice and discrimination against affected individuals still exist due to societal misunderstandings and fears [9–13].

Medications administered to treat epileptic seizures may lead to an

increase in gingival tissue and changes in the oral mucosa, thus indirectly affecting dental health. In addition, it has been observed that epileptic seizures can lead to dental complications, including tooth fractures and soft tissue injuries [14–16].

Dentists frequently express concern about the possible occurrence of seizures during the administration of anesthetics in individuals diagnosed with epilepsy. To reduce the occurrence of seizures in the clinical setting, it is imperative that dentists have a thorough understanding of three basic principles. First, dentists must acquire knowledge of the patient's seizure history and medication. Second, they should be able to identify and avoid triggers that can precipitate seizures. Finally, dentists should be able to recognize warning signs that a seizure is imminent and then take preventive measures to prevent it. They should also be able to provide appropriate treatment in the event of a seizure [17–19]. Careful selection of an anesthetic procedure is critical for safe and effective treatment of people with epilepsy. According to research, people who regularly take anti-seizure medications do not experience complications during dental procedures performed under general anesthesia [18]. However, local anesthesia is often preferred to general anesthesia when treating people with epilepsy. The reason for this decision is the potential risk of transient anoxia, a condition that can occur after administration of general anesthesia, and its potential to trigger epileptic seizures [20].

Regarding the safety of local anesthetics in people with epilepsy, the available evidence is inconclusive [21]. Several studies suggest that there is little conclusive evidence of the convulsive effects of low-dose anesthetics during dental procedures [18]. According to Gallagher et al [22], typical dosages of local anesthetics used in dental procedures are believed to have no significant interactions with conventional antiepileptic drugs. However, excessive amounts of local anesthetics have the potential to cause sequelae such as generalized tonic-clonic seizures [22].

Management of seizures occurring during dental procedures can be achieved by the use of sedative treatments, including inhalation of nitrous oxide or intravenous benzodiazepines. However, if seizures occur despite administration of an intravenous sedative, it is advisable to postpone treatment [18,22,23].

Several studies (Hassona, 2014; Campos, 2017; Guillen, 2020; Cordova et al., 2023) [24–27] have provided evidence indicating that undergraduate dentistry students have a restricted understanding of patients diagnosed with epilepsy. It is worth mentioning that there is a scarcity of comparison research in the existing literature about the level of knowledge among preclinical, clinical, and speciality dentistry students.

This research aims to evaluate the awareness and viewpoints of preclinical, clinical, and speciality dental students enrolled in the Faculty of Dentistry at Afyonkarahisar Health Sciences University, located in Turkey.

2. Material-method

2.1. Ethical aspects of the study

The study project was formally authorized by the Clinical study Ethics Committee of the Faculty of Dentistry at Afyonkarahisar University of Health Sciences, situated in the inner western Aegean area of Turkey, on May 5, 2023. The approval was granted under protocol registration 2023-245. A web-based survey with information on the objectives and methodologies of the research was sent to all participants. The questions of the questionnaire included in the study developed by Aragon et al.[28] and Lurita Cordova et al.[27], were translated into Turkish and slightly adjusted for use in our study.

In order to establish the reliability of the questionnaire, an assessment was conducted, yielding a Cronbach's alpha coefficient of 0.894.

Once the questions underwent revision, the questionnaire was then finished and submitted into the Google Forms platform. Afterwards, the

hyperlinks were sent to the participants using WhatsApp groups in order for them to complete the forms. The data collection period was from May to June 2023.

2.2. Population and selection of respondents

The sample population of this research consisted of 510 students enrolled in the Faculty of Dentistry at Afyonkarahisar Health Sciences University. This included 300 students in the preclinical stage, 160 students in the clinical stage, and 50 students specializing in a specific area. The study's participants were chosen for inclusion based on their voluntary agreement to participate and their successful completion of the whole questionnaire. The ultimate research cohort consisted of 477 participants, with 286 belonging to the preclinical group, 153 to the clinical group, and 38 to the specialized group.

2.3. Data collection tools

The major method used for data collection was a structured questionnaire, which consisted of eight distinct parts. The preceding sections included an analysis of the "level of knowledge," followed by subsequent parts that assessed "experience," "tolerance," and "willingness to provide treatment." The preceding section examined the participants' "information sources regarding epilepsy".

This study included many demographic factors, including gender, age, academic level, and location of residence.

2.3.1. Section measuring the level of knowledge about epilepsy

This section, which contains 43 queries, is split into four topics. The questions encompass 17 (q1–17) that measure "the general epilepsy knowledge" of dental and specialty students, 9 (q18–26) zeroing in on "pharmacological information", 10 (q27–36) that gauge "dentistry practices", and 7 (q37–43) assessing cognizance of "seizures in the dental chair".

The responses to the knowledge inquiries were categorized as either "accurate," "inaccurate," or "unknown." A single point was assigned to each correct answer. The combined scores of these four categories comprise the overall quantitative component of our survey.

Following the analysis of the four variables among the groups, a collective study entitled "Epilepsy in 43 Questions" was executed. The establishment of cut-off points for the quantitative variables was accomplished using the Youden index derived from the Receiver Operating Characteristic (ROC) curve. Subsequently, the resulting values were segregated into two distinct subgroups.

Those that above the predetermined threshold criteria were classified as " good knowledge," whereas those falling below the threshold were deemed as "poor knowledge " and thereafter analyzed. The preclinical cohort was stratified into three distinct categories based on their academic progression: first-year, second-year, and third-year students. The clinical cohort was divided into two distinct cohorts based on their academic progression: the 4th-year and 5th-year students. Conversely, the speciality students' cohort was categorized based on their level of professional experience.

2.3.2. Epilepsy experience section

This section is composed of five queries (q44–48), with answers restricted to "yes" or "no."

2.3.3. Epilepsy tolerance section

The "Social Tolerance" segment holds six inquiries (Q49–Q54), with the option of providing "yes," "no," or "undecided" as replies.

2.3.4. Willingness to provide treatment and clinical experience

The "Willingness to Provide Treatment: Clinical Experience" section was comprised of five inquiries (Q55–59), with the possibility to respond by either "strongly agree," "strongly disagree," or "undecided"

at the center.

2.3.5. Source of information

A single query (q60) scrutinized the principal roots of information regarding epilepsy. Participants were shown seven possibilities and instructed to arrange them from 1 to 7. These options encompassed university education, the internet, TV/radio, books, magazines, newspapers, friends, and other sources.

2.4. Data analysis

Statistical studies were conducted using IBM SPSS 25.0. In order to provide a concise overview of the data, descriptive statistics were used, including measures such as the mean, standard deviation, frequent, minimum, and maximum values. The normality of continuous data was assessed using the Shapiro-Wilk test, whilst the independence of two categorical variables was evaluated using the Pearson Chi-square test. The Mann-Whitney U test was used to compare and contrast two distinct groups, whereas the Kruskal-Wallis test was utilised to distinguish between three populations characterized by non-normal data.

The chi-square independence tests were used to examine the associations between categorical variables via the utilization of 2×2 and 2×3 cross-tables. Statistical significance was determined by a p-value of less than 0.05.

3. Results

3.1. Demographic characteristics

In the school year of 2022–2023, a total of 477 students pursuing dentistry and specialized fields participated in a comprehensive questionnaire. The mean age of the preclinical, clinical, and speciality students was 20.53, 22.92, and 28.16 years, respectively. The group consisted of 296 females and 181 men. Additional details on the demographics may be seen in Table 1.

3.2. Section measuring the level of knowledge about epilepsy

The knowledge questions are listed in Tables 2–3 (general knowledge of epilepsy, pharmaceutical knowledge, dental practice, and seizures in the dental chair). The first three questions that were most frequently answered incorrectly are marked in the Tables 2–3.

The analysis of the four quantitative factors revealed that speciality students exhibited significantly greater levels of knowledge compared to clinical students, who, in turn, demonstrated notably higher levels of knowledge compared to preclinical students. (Table 1 p < 0.001).

The predetermined thresholds for the variables were established as follows: 11 for the variable "general knowledge of epilepsy," 4 for "pharmacological information," 4 for "seizure in the dental chair," 6 for "dentistry practices," and 24 for the variable "43 epilepsy questions."

A comprehensive assessment of 43 queries, focusing on the level of knowledge shown, revealed that 84.2 % of specialized students achieved satisfactory outcomes. In comparison, the rate of clinical students was found to be sufficient at 51.6 %, but preclinical students achieved a lower rate of 23.4 % (refer to Table 4, p < 0.001).

A significant disparity was seen across the groups in relation to all four quantitative assessments of the subchapter, with specialized students outperforming the other groups (Table 5, p < 0.001).

3.3. Subgroup analysis of preclinical, clinical, and specialty student groups

The preclinical students in their first, second, and third years, the clinical students in their fourth and fifth years, and the speciality students were categorized into subgroups based on their years of study: below three years, above three years, and including three years. Each category was then evaluated independently.

Among the cohort of 286 preclinical students, it was observed that 102 individuals were enrolled in the first year, 100 individuals were enrolled in the second year, and 84 individuals were enrolled in the third year. Following the statistical analysis, significant differences were observed across the cohorts in relation to all criteria, except for the variable pertaining to experiencing seizures during dental procedures. A comprehensive evaluation was undertaken to determine the origin of the discrepancy. The first and second years exhibited similarities, however the third year shown a notable disparity in terms of knowledge when compared to the preceding cohorts. According to (Table 5),

Out of the total population of 153 clinical students, 79 individuals were enrolled in their fourth year, while the remaining 74 students were in their fifth year. Upon doing statistical analysis, significant discrepancies were observed across many factors, with the exception of the variable pertaining to "seizure in the dentist chair." Subsequent analyses of subgroups revealed a notable discrepancy in knowledge between students in their fifth year of study and those in their fourth year. According to (Table 5),

Out of the total of 38 specialty students, they were categorized into two distinct categories based on their level of experience. Specifically, there were 16 students who had "3 years or less" of experience, while the remaining 22 students had "more than 3 years" of experience. There were no statistically significant differences seen across any factors

Table 1
Comparison of demographic data and knowledge questions between groups.

		preclinical[c]			clinic[b]			speciality students[a]				p value	
Gender	female	184			89			23				0,438	X2
	male	102			64			15					
Place of residence	center	275			147			35				0,494	X2
	rural	11			6			3					
Age	mean ± std	20,53	±	1,34	22,92	±	0,88	28,16	±	3,33		<0,001	K
Time of education	mean ± std	1,94	±	0,81	4,48	±	0,50	9,05	±	2,93		<0,001	K
Epilepsy general information	min–max	0	–	17	0	–	17	c	0	–	17	bc	<0,001	K
	mean ± std	8,90	±	4,11	10,58	±	3,71		12,05	±	3,75			
Pharmacological information	min–max	0	–	9	0	–	8	c	0	–	9	bc	<0,001	K
	mean ± std	2,16	±	1,99	3,82	±	2,08		5,24	±	1,94			
Seizure in the dental chair	min–max	0	–	7	1	–	7	c	0	–	7	bc	<0,001	K
	mean ± std	3,58	±	1,50	4,31	±	1,15		4,79	±	1,14			
Dentistry practices	min–max	0	–	9	0	–	10	c	3	–	9	bc	<0,001	K
	mean ± std	3,73	±	2,43	6,23	±	1,70		7,13	±	1,42			
Epilepsy 43 questions	min–max	0	–	37	1	–	37	c	4	–	41	bc	<0,001	K
	mean ± std	18,38	±	8,22	24,93	±	6,29		29,21	±	6,53			

X^2 Pearson Chi-square/**K** Kruskal Wallis Test.
b Difference with clinical < 0.05/**c** Difference with preclinical < 0.05.

Table 2
Epilepsy general (q1-17) and pharmacological (q18-26) information questions.

		preclinical[a]		clinic[b]		specialty students[c]	
		N	%	N	%	N	%
q1. Flashing lights or noises may be trigger factors for epilepsy	incorrect[f]	0	0,0%	1	0,7%	0	0,0%
	correct[t]	242	84,6%	145	94,8%	37	97,4%
	I don't know	44	15,4%	7	4,6%	1	2,6%
q2. A person having a seizure may be a real epilepsy patient. **abc**	correct[f]	58	20,3%	32	20,9%	13	34,2%
	incorrect[t]	104	36,4%	89	58,2%	19	50,0%
	I don't know	124	43,4%	32	20,9%	6	15,8%
q3. The people with epilepsy may lose sphincter control (urine and stool) during a seizure.	incorrect[f]	4	1,4%	11	7,2%	1	2,6%
	correct[t]	189	66,1%	121	79,1%	33	86,8%
	I don't know	93	32,5%	21	13,7%	4	10,5%
q4. Tobacco and alcohol use may increase the possibility of an epileptic seizure	incorrect[f]	8	2,8%	9	5,9%	2	5,3%
	correct[t]	189	66,1%	106	69,3%	29	76,3%
	I don't know	89	31,1%	38	24,8%	7	18,4%
q5. Muscle contractions/tremors can occur in an epileptic seizures.	incorrect[f]	16	5,6%	9	5,9%	3	7,9%
	correct[t]	247	86,4%	134	87,6%	34	89,5%
	I don't know	23	8,0%	10	6,5%	1	2,6%
q6. Behavioral changes can occur during epileptic seizures. **abc**	incorrect[f]	53	18,5%	39	25,5%	12	31,6%
	correct[t]	124	43,4%	77	50,3%	21	55,3%
	I don't know	109	38,1%	37	24,2%	5	13,2%
q7.During an epilepsy seizure, a patient may experience a loss of consciousness.	incorrect[f]	21	7,3%	13	8,5%	2	5,3%
	correct[t]	216	75,5%	130	85,0%	33	86,8%
	I don't know	49	17,1%	10	6,5%	3	7,9%
q8. Memory impairment may occur during an epilepsy seizure. **ab**	incorrect[f]	46	16,1%	35	22,9%	4	10,5%
	correct[t]	101	35,3%	84	54,9%	27	71,1%
	I don't know	139	48,6%	34	22,2%	7	18,4%
q9. Hereditary diseases can cause epilepsy.	incorrect[f]	27	9,4%	27	17,6%	6	15,8%
	correct[t]	110	38,5%	58	37,9%	21	55,3%
	I don't know	149	52,1%	68	44,4%	11	28,9%
q10. Accidents or head trauma can cause epilepsy.	incorrect[f]	22	7,7%	14	9,2%	3	7,9%
	correct[t]	152	53,1%	96	62,7%	30	78,9%
	I don't know	112	39,2%	43	28,1%	5	13,2%
q11. Brain tumors can cause epilepsy.	incorrect[f]	12	4,2%	11	7,2%	1	2,6%
	correct[t]	133	46,5%	93	60,8%	33	86,8%
	I don't know	141	49,3%	49	32,0%	4	10,5%
q12. Birth defects can cause epilepsy.	incorrect[f]	11	3,8%	8	5,2%	4	10,5%
	correct[t]	136	47,6%	90	58,8%	24	63,2%
	I don't know	139	48,6%	55	35,9%	10	26,3%
q13. Psychiatric disorders can cause epilepsy.**c**	incorrect[f]	22	7,7%	17	11,1%	7	18,4%
	correct[t]	142	49,7%	79	51,6%	21	55,3%
	I don't know	122	42,7%	57	37,3%	10	26,3%
q14. Stroke can cause epilepsy. **c**	incorrect[f]	28	9,8%	25	16,3%	7	18,4%
	correct[t]	73	25,5%	53	34,6%	16	42,1%
	I don't know	185	64,7%	75	49,0%	15	39,5%
q15. Genetic factors can cause epilepsy.	incorrect[f]	9	3,1%	7	4,6%	1	2,6%
	correct[t]	159	55,6%	102	66,7%	34	89,5%
	I don't know	118	41,3%	44	28,8%	3	7,9%
q16. High fever can cause epilepsy.	incorrect[f]	23	8,0%	15	9,8%	4	10,5%
	correct[t]	110	38,5%	76	49,7%	22	57,9%
	I don't know	153	53,5%	62	40,5%	12	31,6%
q17. Certain drugs can cause epilepsy.	incorrect[f]	12	4,2%	12	7,8%	5	13,2%
	correct[t]	118	41,3%	85	55,6%	24	63,2%
	I don't know	156	54,5%	56	36,6%	9	23,7%
q18. Medication is rarely effective in controlling seizures. **abc**	correct[f]	125	43,7%	63	41,2%	11	28,9%
	incorrect[t]	48	16,8%	54	35,3%	24	63,2%
	I don't know	113	39,5%	36	23,5%	3	7,9%
q19. Epilepsy drugs can cause malformations in babies of epileptic mothers.	incorrect[f]	3	1,0%	12	7,8%	1	2,6%
	correct[t]	118	41,3%	86	56,2%	29	76,3%
	I don't know	165	57,7%	55	35,9%	8	21,1%
q20. The best results are obtained when the two drugs are given together.	correct[f]	20	7,0%	18	11,8%	5	13,2%
	incorrect[t]	45	15,7%	21	13,7%	6	15,8%
	I don't know	221	77,3%	114	74,5%	27	71,1%
q21. Epilepsy drugs have advanced significantly in the last 10 years.	incorrect[f]	1	0,3%	4	2,6%	0	0,0%
	correct[t]	123	43,0%	78	51,0%	28	73,7%
	I don't know	162	56,6%	71	46,4%	10	26,3%
q22. Medications can be discontinued if seizures can be controlled for a year. **a**	correct[f]	39	13,6%	24	15,7%	7	18,4%
	incorrect[t]	49	17,1%	53	34,6%	11	28,9%
	I don't know	198	69,2%	76	49,7%	20	52,6%
q23. Carbamazepine and phenobarbital are antiepileptic drugs.	incorrect[f]	4	1,4%	8	5,2%	1	2,6%
	correct[t]	25	8,7%	85	55,6%	32	84,2%
	I don't know	257	89,9%	60	39,2%	5	13,2%
q24. There are epilepsies that cannot be controlled with drugs.	incorrect[f]	3	1,0%	2	1,3%	1	2,6%
	correct[t]	109	38,1%	82	53,6%	27	71,1%
	I don't know	174	60,8%	69	45,1%	10	26,3%
q25. Valproic acid can increase bleeding during surgery and delay healing.	incorrect[f]	4	1,4%	10	6,5%	0	0,0%

(*continued on next page*)

Table 2 (*continued*)

		preclinical[a]		clinic[b]		specialty students[c]	
		N	%	N	%	N	%
q26. Some anticonvulsant drugs may cause gingival recession. **abc**	correct[t]	27	9,4%	49	32,0%	22	57,9%
	I don't know	255	89,2%	94	61,4%	16	42,1%
	incorrect[t]	8	2,8%	62	40,5%	13	34,2%
	correct[f]	75	26,2%	76	49,7%	20	52,6%
	I don't know	203	71,0%	15	9,8%	5	13,2%

a Top 3 wrong questions for a preclinical/**b** Top 3 wrong questions for a clinical.
c Top 3 wrong questions for speciality students/**t** true answer/**f** false answer.

between these cohorts (Table 5).

3.4. Experience with epilepsy

Regarding inquiries Q47 ("Have you seen someone having an epileptic seizure?") and Q48 ("Have you encountered someone with epilepsy or met someone who has?"), notable disparities of a statistical nature were observed among students specializing in different fields, as well as those in clinical and preclinical programs. In contrast, the replies to the three prior enquiries were consistent across all groups, as seen in (Table 6).

3.5. Social tolerance towards people with epilepsy

The responses to the inquiries within the domain of social tolerance show a notable disparity across the various groups, except for question 53 (Would you be prepared to see an epilepsy patient during an epileptic seizure?) (Table 6).

3.6. Clinical experience and attitudes toward providing dental treatment to patients with epilepsy

The answers to question 55 (Physical examination does not identify all patients with epilepsy) were mostly given as "undecided" and "agree". The response indicating "strongly disagree" to question 56 was chosen by a majority of over 60 % of participants in the preclinic group. However, this percentage reduced to 33 % among the clinic students. Notably, the speciality students exhibited a response rate comparable to that of the clinic students. Regarding Question 57, it was found that a significant majority of participants across all categories expressed agreement that their families would not have any discomfort in providing care for individuals with epilepsy. Regarding Q58, it was often believed that providing therapy for those with epilepsy would not hinder the ability of other patients to get treatment. Moreover, the responses to Question 59 demonstrated a wide-ranging awareness of the ethical responsibility involved in providing care for individuals with epilepsy (Table 6).

3.7. Information source where they learned about epilepsy

In this section, participants were asked about the sources they use to obtain information about epilepsy (Q60).

Participants were asked to list 7 sources (university education, Internet, TV or radio, book or magazine, newspaper, friends, other sources) from first to last.

The first three sources marked as first choice were the same in each group. These were university education, the Internet, and TV or radio.

4. Discussion

This research was conducted at the Faculty of Dentistry at Afyonkarahisar Health Sciences University in Turkey to evaluate the understanding and viewpoints of undergraduate and specialist dental students about individuals with epilepsy. Furthermore, our objective was to evaluate the adequacy of clinical and academic training provided to dental students in relation to their ability to effectively interact with individuals diagnosed with epilepsy. To guarantee comprehensive coverage of the course content, a questionnaire is sent to students at the conclusion of the academic year.

In contrast to the study undertaken by Hossana et al. [24], our analysis included a broader range of participants, including clinical students, preclinical students, speciality students, and undergraduate students. The objective of our study was to assess the impact of the educational intervention on knowledge and attitudes along individuals' career trajectories [19].

The findings of the study indicated that students with specialized training exhibited the highest level of knowledge, followed by those in clinical training, and finally, those in preclinical training. Upon examination of the academic performance throughout the preclinical phase, namely in the first, second, and third years, a distinct disparity in knowledge was discovered among third-year students. Notably, this discrepancy was detected in all areas except for the variable pertaining to the occurrence of seizures when seated. It is suggested that the observed disparity might be attributed to the incorporation of theoretical information pertaining to epilepsy into the curriculum of the third-year dentistry program. It is postulated that the absence of variation in the "seizure in the chair" segment may be ascribed to students' delayed initiation of their clinical-practical training during that time period. When evaluating the clinical performance of fourth- and fifth-year students, it was observed that the fifth-year students demonstrated a higher level of scholarly knowledge and expertise. Upon conducting an evaluation of specialist students, it was seen that there were no significant disparities in knowledge between those with more than three years of experience and those with fewer. According to Alomar et al. [29], it was hypothesized that clinical students exhibit improved understanding and a more compassionate perspective towards epilepsy as compared to preclinical students. Furthermore, it has been said that an increase in knowledge is associated with a reduction in stigma and a more positive perspective. Our results are consistent with the conclusions made by Alomar et al.

Based on the research conducted by Cordova et al., it was observed that a majority of dental students in the 3rd, 4th, and 5th academic years, namely 65 %, had levels of understanding that varied from below satisfactory to average. The study put out the proposition that some characteristics, including gender, year of study, and origin, had an influence on the level of knowledge regarding dental care for individuals with epilepsy [27]. According to Guillen, it has been observed that students in their fourth and fifth years of dentistry education have a significant understanding of the dental therapy of patients with epilepsy [26]. Our investigation included students from all levels of specialization, including those in speciality, preclinical, and clinical programs, in contrast to the investigations conducted by Guillen and Cordova. The determination of information demarcation was achieved by using the cut-off value in the Youden index of the receiver operating characteristic (ROC) curve. Based on this evaluation, the participants were categorized into two distinct groups: those with a high degree of knowledge and individuals with a low level of knowledge. In contrast to specific study results, our categorization did not include a distinct classification for a

Table 3

Dentistry practices (q27-36) and seizure in the dental chair(q37-43).

		preclinical[a]		clinic[b]		specialty students[c]	
		N	%	N	%	N	%
q27. It is necessary to learn the recent seizure history and frequency of people with epilepsy during dental care.	Incorrect[f]	2	0,7%	1	0,7%	1	2,6%
	Correct[t]	203	71,0%	151	98,7%	37	97,4%
	I don't know	81	28,3%	1	0,7%	0	0,0%
q28. Mouth openers or rubber wedges should not be used in dental care of people with epilepsy. [abc]	Correct[f]	88	30,8%	114	74,5%	23	60,5%
	Incorrect[t]	22	7,7%	19	12,4%	12	31,6%
	I don't know	176	61,5%	20	13,1%	3	7,9%
q29. People with epilepsy should discontinue their medications before dental treatment.	Correct[f]	21	7,3%	5	3,3%	3	7,9%
	Incorrect[t]	70	24,5%	127	83,0%	33	86,8%
	I don't know	195	68,2%	21	13,7%	2	5,3%
q30. A person experiencing an epilepsy seizure may experience dentoalveolar avulsions and/or maxillary fractures.	Incorrect[f]	5	1,7%	16	10,5%	2	5,3%
	Correct[t]	136	47,6%	109	71,2%	32	84,2%
	I don't know	145	50,7%	28	18,3%	4	10,5%
q31. If people with epilepsy is medicated with valproic acid we should order a CBC(Complete Blood Count Test) test prior to dental care.	Incorrect[f]	2	0,7%	9	5,9%	4	10,5%
	Correct[t]	93	32,5%	68	44,4%	21	55,3%
	I don't know	191	66,8%	76	49,7%	13	34,2%
q32. Local anesthetics generally do not cause complications in people with epilepsy. [abc]	Incorrect[f]	48	16,8%	38	24,8%	11	28,9%
	Correct[t]	30	10,5%	73	47,7%	19	50,0%
	I don't know	208	72,7%	42	27,5%	8	21,1%
q33. If during dental care the epileptic seizure is repeated several times, the emergency department should be called.	Incorrect[f]	5	1,7%	5	3,3%	2	5,3%
	Correct[t]	211	73,8%	140	91,5%	36	94,7%
	I don't know	70	24,5%	8	5,2%	0	0,0%
q34. If the patient has an epileptic seizure during dental treatment, the dental chair should be placed in the supine position. [abc]	Correct[f]	89	31,1%	72	47,1%	14	36,8%
	Incorrect[t]	22	7,7%	56	36,6%	14	36,8%
	I don't know	175	61,2%	25	16,3%	10	26,3%
q35. After treatment ıt may be recommended to continue follow-up treatment with the same dentist for people with epilepsy.	Incorrect[f]	20	7,0%	34	22,2%	5	13,2%
	Correct[t]	149	52,1%	86	56,2%	31	81,6%
	I don't know	117	40,9%	33	21,6%	2	5,3%
q36. Status epilepticus (a neurological emergency that involves a single seizure lasting more than 5 min or a person not returning to normal within 5 min of multiple seizures) requires urgent intervention.	Incorrect[f]	3	1,0%	3	2,0%	0	0,0%
	Correct[t]	131	45,8%	124	81,0%	36	94,7%
	I don't know	152	53,1%	26	17,0%	2	5,3%
q37. Inserting an airway may be necessary to prevent the tongue from falling backward.	incorrect[f]	8	2,8%	44	28,8%	1	2,6%
	correct[t]	178	62,2%	86	56,2%	32	84,2%
	I don't know	100	35,0%	23	15,0%	5	13,2%
q38. Concussions should be stopped by holding the patient firmly. [abc]	correct[f]	94	32,9%	52	34,0%	9	23,7%
	incorrect[t]	88	30,8%	91	59,5%	24	63,2%
	I don't know	104	36,4%	10	6,5%	5	13,2%
q39. You can put the patient in the Trendelenburg (Head down, feet up) position. [a]	correct[f]	78	27,3%	29	19,0%	5	13,2%
	incorrect[t]	42	14,7%	94	61,4%	21	55,3%
	I don't know	166	58,0%	30	19,6%	12	31,6%
q40. Oxygen administration may be necessary.[bc]	incorrect[f]	31	10,8%	64	41,8%	13	34,2%
	correct[t]	87	30,4%	45	29,4%	15	39,5%
	I don't know	168	58,7%	44	28,8%	10	26,3%
q41. Calling the emergency team quickly may be necessary.[abc]	incorrect[f]	59	20,6%	63	41,2%	13	34,2%
	correct[t]	175	61,2%	71	46,4%	20	52,6%
	I don't know	52	18,2%	19	12,4%	5	13,2%
q42. In seizures lasting more than three minutes, the emergency team should be called.	incorrect[f]	5	1,7%	4	2,6%	2	5,3%
	correct[t]	229	80,1%	136	88,9%	35	92,1%
	I don't know	52	18,2%	13	8,5%	1	2,6%
q43. While having a seizure, move the person to a place where they cannot harm themselves.	incorrect[f]	13	4,5%	11	7,2%	1	2,6%
	correct[t]	226	79,0%	136	88,9%	35	92,1%
	I don't know	47	16,4%	6	3,9%	2	5,3%

a Top 3 wrong questions for a preclinical/b Top 3 wrong questions for a clinical.

c Top 3 wrong questions for speciality students/t true answer/f false answer.

Table 4

Comparison of the groups formed with the cut off values obtained using the youden index.

		preclinical		clinic		specialty students			
		N	%	N	%	N	%	p value	
Epilepsy general information cut off 11	poor	202	70,6%	91	59,5%	12	31,6%	**<0,001**	X^2
	good	84	29,4%	62	40,5%	26	68,4%		
Pharmacological information cut off 4	poor	241	84,3%	95	62,1%	9	23,7%	**<0,001**	X^2
	good	45	15,7%	58	37,9%	29	76,3%		
Seizure in the dental chair cut off 4	poor	201	70,3%	88	57,5%	14	36,8%	**<0,001**	X^2
	good	85	29,7%	65	42,5%	24	63,2%		
Dental practice cut off 6	poor	241	84,3%	84	54,9%	9	23,7%	**<0,001**	X^2
	good	45	15,7%	69	45,1%	29	76,3%		
Epilepsy 43 questions cut off 24	poor	219	76,6%	74	48,4%	6	15,8%	**<0,001**	X^2
	good	67	23,4%	79	51,6%	32	84,2%		

X^2 Pearson Chi-square test.

Table 5

Subgroup analysis, preclinical, clinical and speciality students group.

		Epilepsy general information			Pharmacological information			Seizure in the dental chair			Dental practice			Epilepsy 43 questions		
1st class[c] (n = 102)	min–max	0	–	17	0	–	8	0	–	6	0	–	8	0	–	37
	mean ± std	8,70	±	4,46	2,03	±	2,09	3,47	±	1,58	3,14	±	2,39	17,33	±	8,95
2nd class[b] (n = 100)	min–max	2	–	17	0	–	8	0	–	6	0	–	7	3	–	34
	mean ± std	8,21	±	3,93	1,76	±	1,73	3,44	±	1,43	3,36	±	2,14	16,77	±	7,31
3rd class[a] (n = 84)	min–max	0	–	17	0	–	9	0	–	7	0	–	9	2	–	35
	mean ± std	9,96	±	3,70	2,81	±	2,03	3,89	±	1,46	4,89	±	2,43	21,56	±	7,50
	p value/**K**	**0,009**[bc]			**0,001**[bc]			0,098			**<0,001**[bc]			**<0,001**[bc]		
4th class (n = 79)	min–max	0	–	17	0	–	8	1	–	7	0	–	10	1	–	37
	mean ± std	10,68	±	3,84	4,05	±	2,07	4,47	±	1,16	6,24	±	1,69	25,44	±	6,54
5th class (n = 74)	min–max	4		17	0		8	1		7	2		10	8		37
	mean ± std	10,46	±	3,59	3,57	±	2,07	4,14	±	1,13	6,22	±	1,72	24,38	±	6,01
	p value/**m**	0,599			0,137			**0,041**			0,985			0,286		
Specialty students ≤ 3 years (n = 16)	min–max	6	–	17	3	–	8	4	–	6	3	–	9	16	–	36
	mean ± std	11,75	±	3,19	5,19	±	1,28	4,94	±	0,77	7,25	±	1,48	29,13	±	5,03
Specialty students > 3 years (n = 22)	min–max	0	–	17	0	–	9	0	–	7	4	–	9	4	–	41
	mean ± std	12,27	±	4,17	5,27	±	2,33	4,68	±	1,36	7,05	±	1,40	29,27	±	7,55
	p value/**m**	0,297			0,649			0,616			0,614			0,744		

K Kruskal wallis test/**m** Mann whitney u test.

b Difference with 2nd class < 0.05/**c** Difference with 1st class < 0.05.

"moderate knowledge" category. The results of our investigation revealed that a significant proportion of preclinical students (76.6 %), clinical students (48.4 %), and speciality students (15.8 %) had insufficient levels of knowledge. In alignment with the research conducted by Guillen et al. [26], the academic year had a significant influence on our study. The knowledge levels of students in their third, fourth, and fifth years of study were found to align with the findings reported by Guillen [26] and Cordova [27]. Moreover, the proficiency levels of students specializing in a certain field were found to be consistent with the results obtained from a survey on epilepsy [29].

A majority of the participants (59.4 %) indicated a lack of personal acquaintance with individuals who had experienced seizures. The occurrence of epileptic seizures was reported in less than 50 % of all the groups under study. However, there was a substantial difference between specialist students and the other two categories. This may be attributed to the fact that students specializing in a certain field possess a greater amount of practical experience.

Overall, there was a positive societal attitude towards individuals with epilepsy. Nevertheless, it was shown that clinical students had a higher level of tolerance compared to students specializing in a particular field. The precise explanation of this phenomenon remains uncertain, however it is posited that it might stem from biases formed via personal experiences, cultural and societal standards ingrained throughout upbringing, or an inherent capacity for empathy and compassion. A mere 20.5 % of respondents said that they would decline to enter into marriage with an individual diagnosed with epilepsy. In contrast to the present research, a study done among medical students in Nigeria shown that a significant majority of the participants, namely 70 %, expressed a lack of desire towards entering into a marriage with an individual diagnosed with epilepsy [30]. According to a research done in Turkey, a significant proportion of medical students, namely 71.8 %, exhibited reluctance against entering into a marital union with an individual diagnosed with epilepsy. On the other hand, a smaller percentage, specifically 10.8 %, avoided from expressing a definitive opinion on the subject [31]. In contrast to previous research done in Yemen [24], India [29], and Jordan [32], our study revealed a notable prevalence of favorable social attitudes regarding epilepsy, which aligns with findings from studies conducted among Canadian dentists [28] and Zambian health professionals [33]. The underlying cause for the disparity shown in the research done in Yemen, Jordan, and India remains unknown. However, it is posited that attitudes, cultural factors, societal evolution, and educational interventions may have had a significant role in mitigating this disparity.

Moreover, a significant majority of the participants (75.9 %)

Table 6
Social experience, tolerance and willingness to provide treatment.

		preclinical		clinic		specialty students			
		N	%	N	%	N	%	p value	
q44. Have you ever heard of epilepsy or did you know about this disease?	No	20	7,0%	5	3,3%	2	5,3%	0,272	X²
	Yes	266	93,0%	148	96,7%	36	94,7%		
q45. Have you had an epileptic seizure before?	No	280	97,9%	149	97,4%	36	94,7%	0,502	X²
	Yes	6	2,1%	4	2,6%	2	5,3%		
q46. Do you know someone who has had a seizure?	No	171	59,8%	92	60,1%	20	52,6%	0,680	X²
	Yes	115	40,2%	61	39,9%	18	47,4%		
q47. Have you witnessed someone having an epileptic seizure?	No	219	76,6%	110	71,9%	20	52,6%	**0,007**	X²
	Yes	67	23,4%	43	28,1%	18	47,4%		
q48. Have you met someone who has or has encountered epilepsy?	No	134	46,9%	48	31,4%	8	21,1%	**<0,001**	X²
	Yes	152	53,1%	105	68,6%	30	78,9%		
q49. Would you object to your children having a relationship with people with epilepsy?	No	215	75,2%	132	86,3%	23	60,5%	**0,010**	X2
	Yes	19	6,6%	7	4,6%	7	18,4%		
	undecided	52	18,2%	14	9,2%	8	21,1%		
q50. Do you oppose your relatives marrying someone with epilepsy?	No	201	70,3%	123	80,4%	23	60,5%	**<0,001**	X²
	Yes	17	5,9%	10	6,5%	9	23,7%		
	undecided	68	23,8%	20	13,1%	6	15,8%		
q51. Do you think people with epilepsy should have children?	No	39	13,6%	7	4,6%	6	15,8%	**<0,001**	X²
	Yes	120	42,0%	108	70,6%	21	55,3%		
	undecided	127	44,4%	38	24,8%	11	28,9%		
q52. Do you think people with epilepsy can be employed anywhere?	No	170	59,4%	102	66,7%	29	76,3%	**0,048**	X²
	Yes	36	12,6%	33	21,6%	6	15,8%		
	undecided	80	28,0%	18	11,8%	3	7,9%		
q53. Are you ready to see a people with epilepsy during their epileptic seizure?	No	62	21,7%	27	17,6%	9	23,7%	0,055	X²
	Yes	147	51,4%	97	63,4%	21	55,3%		
	undecided	77	26,9%	29	19,0%	8	21,1%		
q54. Would you agree to marry a people with epilepsy?	No	30	10,5%	10	6,5%	10	26,3%	**<0,001**	X²
	Yes	101	35,3%	83	54,2%	14	36,8%		
	undecided	155	54,2%	60	39,2%	14	36,8%		
q55. Medical history and physical examinations cannot identify all patients with epilepsy.	strongly disagree	14	4,9%	3	2,0%	2	5,3%		
	disagree	27	9,4%	13	8,5%	2	5,3%		
	undecided	99	34,6%	40	26,1%	4	10,5%		
	agree	125	43,7%	79	51,6%	17	44,7%		
	strongly agree	21	7,3%	18	11,8%	13	34,2%		
q56. I consider that I have sufficient knowledge and training to provide dental treatments people with epilepsy in my future practice.	strongly disagree	58	20,3%	9	5,9%	4	10,5%		
	disagree	116	40,6%	42	27,5%	11	28,9%		
	undecided	82	28,7%	65	42,5%	10	26,3%		
	agree	24	8,4%	33	21,6%	10	26,3%		
	strongly agree	6	2,1%	4	2,6%	3	7,9%		
q57. My family would be concerned if I treated patients with epilepsy.	strongly disagree	101	35,3%	60	39,2%	15	39,5%		
	disagree	111	38,8%	58	37,9%	13	34,2%		
	undecided	44	15,4%	20	13,1%	6	15,8%		
	agree	23	8,0%	13	8,5%	3	7,9%		
	strongly agree	6	2,1%	2	1,3%	0	0,0%		
q58. If I treat people with epilepsy, other patients may be reluctant to continue in my care.	strongly disagree	109	38,1%	90	58,8%	23	60,5%		
	disagree	127	44,4%	52	34,0%	9	23,7%		
	undecided	40	14,0%	10	6,5%	4	10,5%		
	agree	7	2,4%	0	0,0%	1	2,6%		
	strongly agree	3	1,0%	1	0,7%	1	2,6%		
q59. As a dentist I have an ethical responsibility to treat people with epilepsy.	strongly disagree	14	4,9%	9	5,9%	5	13,2%		
	disagree	18	6,3%	7	4,6%	3	7,9%		
	undecided	42	14,7%	14	9,2%	3	7,9%		
	agree	111	38,8%	39	25,5%	9	23,7%		
	strongly agree	101	35,3%	84	54,9%	18	47,4%		

X² Pearson Chi-square test.

expressed their belief in possessing an ethical obligation to provide care for those diagnosed with epilepsy. Nevertheless, a significant proportion of the participants (83.2 %) expressed a lack of confidence in their expertise and training to provide dental care to individuals with epilepsy. The existing dental education system relies mostly on theoretical lecture-based instruction, which may not be optimally suited for dental and medical training. According to previous studies, the use of problem-based learning methodology has shown a positive impact on students' capacity to apply clinical scenarios, while not detrimentally effecting their acquisition of factual information [33]. Hence, the use of problem-based learning as an instructional approach for acquiring information on

subjects like systemic illnesses may serve as a potential solution to address the deficiency in students' understanding of this domain. Nevertheless, more research is required to test the validity of this theory.

One of the primary limitations of this research is to the limited size of the sample. Due to the cross-sectional design of the research, it was not possible to assess the temporal dynamics and long-term viability of the information. q5-q8 and q40 are also among the study limitations. It is possible that questions will arise in answering them. This is because the answers to these questions may be specific to certain types of epilepsy patients. However, it is possible that epilepsy occurs in different types. This means that focusing on a specific seizure type limits a general

presentation of epilepsy. In addition, whether oxygen administration is necessary may also depend on the particular type of seizure.

These limitations highlight the need for new, more comprehensive research into the knowledge and treatment of epilepsy.

5. Conclusion

Despite its limitations, this research discovered that speciality students had a greater understanding of epilepsy than clinical students and that clinical students had a greater understanding than preclinical students at a dentistry school in Turkey. Students were enthusiastic to evaluate epileptic patients in their clinics and generally had a good attitude. However, the majority of students think they lack the training and experience required. Models for simulation- or problem-based learning may be developed in this situation in addition to theoretical courses. The research also had certain advantages. There is a high response rate for the sample dimension. In fact, this research project on epilepsy is the first of its kind at our institution.

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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.

References

[1] Chapman PJ. Medical emergencies in dental practice and choice of emergency drugs and equipment: a survey of Australian dentists. Aust Dent J 1997;42:103–8.
[2] World Health Organization In: Epilepsy; 2019.
[3] Epilepsy: Global Issues for the Practıcıng Neurologıs. In.
[4] Shakirullah AN, Khan A, Nabi M. The prevalence, incidence and etiology of epilepsy. Int J Clin Exp Neurol 2014;2:29–39.
[5] Burneo JG, Tellez-Zenteno J, Wiebe S. Understanding the burden of epilepsy in Latin America: a systematic review of its prevalence and incidence. Epilepsy Res 2005;66:63–74.
[6] Tellez-Zenteno JF, Pondal-Sordo M, Matijevic S, Wiebe S. National and regional prevalence of self-reported epilepsy in Canada. Epilepsia 2004;45:1623–9.
[7] Velioglu SK, Bakirdemir M, Can G, Topbas M. Prevalence of epilepsy in northeast Turkey. Epileptic Disorders 2010;12:22–37.
[8] Burneo JG. Sonko-Nanay and epilepsy among the Incas. Epilepsy Behav 2003;4: 181–4.
[9] Amoroso C, Zwi A, Somerville E, Grove N. Epilepsy and stigma. Lancet 2006;367: 1143–4.
[10] Baker GA, Brooks J, Buck D, Jacoby A. The stigma of epilepsy: a European perspective. Epilepsia 2000;41:98–104.
[11] Baskind R, Birbeck GL. Epilepsy-associated stigma in sub-Saharan Africa: the social landscape of a disease. Epilepsy Behav 2005;7:68–73.
[12] Jacoby A, Snape D, Baker GA. Epilepsy and social identity: the stigma of a chronic neurological disorder. Lancet Neurol 2005;4:171–8.
[13] Paschal AM, Ablah E, Wetta-Hall R, Molgaard CA, Liow K. Stigma and safe havens: a medical sociological perspective on African-American female epilepsy patients. Epilepsy Behav 2005;7:106–15.
[14] Ataol E, Erbaş Ünverdi G, Güngör HC. Management of cervical root fracture injury in a patient with epilepsy: Case report with 5-year follow-up. Special Care Dent 2018;38:319–23.
[15] Djais AI, Adam AM, Thahir H, Oktawati S, Gani A, Yunus M, et al. Management of gingival enlargement caused by phenytoin used in epilepsy patients: A case report. J Int Dental Med Res 2019;12:705–8.
[16] Wang M, Ding D, Zhang Q, Zhu G, Ge Y, Yang B, et al. Oral health and dental status in people with epilepsy in rural China. Seizure 2019;65:42–7.
[17] Ciarrocca KN, Greenberg M, Garfunkel A. Neuromuscular diseases. In: Burket's oral medicine diagnosis and treatment. India: BC Decker Inc; 2003. p. 597–8.
[18] Fiske J, Boyle C. Epilepsy and oral care. Dental Update 2002;29:180–7.
[19] Sanders BJ, Weddell JA, Dodge NN. Managing patients who have seizure disorders: dental and medical issues. J Am Dental Assoc 1995;126:1641–7.
[20] Malamed S. Handbook of Local Anesthesia. 5 [sup] th ed. St Louis: Mosby. 1997, p. 187–91.
[21] Malamed SF. Handbook of local anesthesia-e-book. Elsevier Health Sciences; 2019.
[22] Gallagher S, Weiss S, Cardy JO, Humphries T, Harman KE, Menascu S. Efficacy of very high dose steroid treatment in a case of Landau-Kleffner syndrome. Dev Med Child Neurol 2006;48:766–9.
[23] Ogunbodede E, Adamolekun B, Akintomide A. Oral health and dental treatment needs in Nigerian patients with epilepsy. Epilepsia 1998;39:590–4.
[24] Hassona YM, Mahmoud AAA-A, Ryalat SM, Sawair FA. Dental students' knowledge and attitudes toward patients with epilepsy. Epilepsy Behav 2014;36:2–5.
[25] F. C. Conocimientos y actitudes de los estudiantes de odontología frente a la atención de pacientes con epilepsia en la clínica odontológica Unheval-Huánuco 2017. In: Huánuco: Universidad nacional, 2017.
[26] Guillen Catasi KY. Nivel de conocimiento del manejo de pacientes con epilepsia entre los alumnos del 4to y 5to año de la Facultad de Odontología de la UCSM-2020. 2020.
[27] Lurita-Córdova P, Ladera-Castañeda M, Santander-Rengifo F, López-Gurreonero C, Cornejo-Pinto A, Cervantes-Ganoza L, et al. Sociodemographic factors associated with the level of knowledge about management of epileptic patients in Peruvian dental students: a cross-sectional study under a multivariable analysis. BMC Oral Health 2023;23:51.
[28] Aragon CE, Hess T, Burneo JG. Knowledge and attitudes about epilepsy: a survey of dentists in London, Ontario. J Can Dental Assoc 2009:75.
[29] Doshi D, Reddy BS, Kulkarni S, Karunakar P, Anup N. Dentists' knowledge, attitudes and practices toward patients with epilepsy in Hyderabad city, India. Epilepsy Behav 2012;23:447–50.
[30] Ekeh BC, Ekrikpo UE. The knowledge, attitude, and perception towards epilepsy amongst medical students in Uyo, Southern Nigeria. Adv Med 2015;2015.
[31] Kartal A. Knowledge of, perceptions of, attitudes and practices regarding epilepsy among medical students in Turkey. Epilepsy Behav 2016;58:115–8.
[32] Daoud A, Al-Safi S, Otoom S, Wahba L, Alkofahi A. Public knowledge and attitudes towards epilepsy in Jordan. Seizure 2007;16:521–6.
[33] Bassir SH, Sadr-Eshkevari P, Amirikhorheh S, Karimbux NY. Problem–based learning in dental education: a systematic review of the literature. J Dental Educ 2014;78:98–109.