Pharmacophore

ISSN-2229-5402

Journal home page: http://www.pharmacophorejournal.com

KNOWLEDGE AND ATTITUDE TOWARDS PEDIATRIC EPILEPSY SURGERY AMONG NEUROLOGISTS IN SAUDI ARABIA

Zainah AlQahtani[1*], Abdullah AlAmeer[2], Yazeed AlLebdi[3], Hamzah AlSharif[4], Raseel Noormohammad[3], Abdullah AlEssa[5], Roaa AlJehani[3], Khames AlZahrani[6]

1. ***Neurology Section, Internal Medicine Department, College of Medicine, King Khaled University, Abha 61421, Saudi Arabia.***
2. ***College of Medical, Ibn Sina Medical College, Jeddah, Saudi Arabia.***
3. ***College of Medical, King Abdulaziz University, Jeddah, Saudi Arabia.***
4. ***College of Medical, Najran University, Najran, Saudi Arabia.***
5. ***College of Medical, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia.***
6. ***Saudi Board of Endodontic SR, King Faisal Specialist Hospital & Research Centre, Riyadh, Saudi Arabia.***

ARTICLE INFO

Received:
28 Sep 2023
Accepted:
06 Dec 2023

Keywords: Pediatric, Knowledge, Epilepsy, Surgery

ABSTRACT

Epilepsy surgery is the gold standard for treating childhood epilepsy, which virtually always results in seizure elimination. In addition to preventing future seizures, a primary goal of surgery is to maintain or even advance cognitive growth. Regarding neurological and psychological health, epilepsy surgery may be a game-changer for individuals. This study aims to assess the levels of knowledge and attitudes toward pediatric epilepsy surgery among neuro residents, specialists, and consultants in Saudi Arabia. And evaluate the factors that affect the physicians' knowledge and attitudes. A self-administered online questionnaire was done through the Google Documents platform and distributed among the neurologists. It contains three sections: demographic information, knowledge, and attitudes towards epilepsy surgery. The study included 162 participants, 60% of whom were neuro specialists, 34% were neuro residents, and 6.2% were neuro consultants. 37% of participants had five to ten years of experience in their field while 38.3% had less than five years of experience. Only 4.3% of participants had good knowledge of pediatric epilepsy surgery, 67.3% had moderate knowledge, and 28.4% had poor knowledge. Regarding attitude, 35.2% of participants had a positive attitude toward pediatric epilepsy surgery, 31.5% had a neutral attitude, and 33.3% had a negative attitude. In conclusion, Saudi neurologists have poor knowledge and negative attitudes toward epilepsy surgery for pediatric patients. Continuous physician education is required, with a focus on early diagnosis of drug resistance when patients fail to respond to antiepileptic drugs.

To Cite This Article: AlQahtani Z, AlAmeer A, AlLebdi Y, AlSharif H, Noormohammad R, AlEssa A, et al. Knowledge and Attitude Towards Pediatric Epilepsy Surgery among Neurologists in Saudi Arabia. Pharmacophore. 2023; 14(S1): e-723-8779

Introduction

When seizures in children are not treated well, they can hurt the developing brain, especially when they often happen, last for a long time, and are caused by status epilepticus [1]. Treatment for children with epilepsy aims to manage their seizures, improve or maintain their psychomotor development, and increase their quality of life [2]. Epilepsy surgery is the procedure of choice to attain these goals [3]. Epilepsy is thought to affect 50 million people around the world, with a median prevalence of 1% to 1.5% in affluent nations [4, 5]. Some 30% of epilepsy patients experience seizures that are unresponsive to medication. There are 10 million eligible surgical candidates everywhere. More than 75% of epilepsy sufferers say they need more information on surgical interventions [6]. One of the most common neurological conditions in pediatrics in Saudi Arabia is epilepsy. Nearly half of newly diagnosed patients are expected to have seizures that are resistant to medication. For these patients, epilepsy surgery has been proven to be the best treatment option, and it helps improve the quality of life for these patients. Even though it has been proven functional and effective, the number of epileptic patients referred to surgery is

Corresponding Author: Zainah AlQahtani; Neurology Section, Internal Medicine Department, College of Medicine, King Khaled University, Abha 61421, Saudi Arabia. E-mail: Zahalas@kku.edu.sa.

considered low due to a lack of proper knowledge and a negative attitude towards surgery by neuro residents, specialists, and consultants. There have been many published reports regarding the attitude toward adult epileptic surgery, but this study is aimed at determining the level of knowledge and awareness of pediatric epilepsy surgery among neurologists in Saudi Arabia [7]. A recent Italian study reported that the majority of neurologists had adequate knowledge and awareness level of epilepsy surgery [8]. Also, a cross-sectional study done in 2020 in KSA showed that a larger number of physicians had enough information about epilepsy surgery [7]. Moreover, a study published in Ljubljana, Slovenia, aimed to determine the awareness of epilepsy surgery among medical students and found that most of these students are aware of epilepsy surgery [9]. There are no sufficient studies related to our topic, for this reason, we will conduct this study to assess the knowledge and attitude of neurologists in Saudi Arabia regarding epileptic surgery for children.

Materials and Methods

Study Design

The study is a cross-sectional questionnaire survey conducted in Saudi Arabia.

Study Setting: Participants, Recruitment, and Sampling Procedure

This study was conducted in Saudi Arabia among pediatric neurology residents, specialists, and consultants. All participants were selected randomly.

The Inclusion and Exclusion Criteria

All participants should be neuro residents, or neurologists working in Saudi Arabia, and have managed pediatric patients with epilepsy. We exclude every neurologist who has not managed pediatric patients with epilepsy.

Sample Size

The questionnaire was sent to a sample size of 200 (Z: 1.96 for 95% confidence level; proportion: 0.5; d: 0.1). The questionnaire link was sent electronically to 200 neurologists chosen by convenient sampling. The participants were asked for consent to participate by clicking on “Yes” to the “agree to participate” icon on the first page of the electronic survey.

Method for Data Collection and Instrument (Data Collection Technique and Tools)

The data was collected by an anonymous, self-administered online questionnaire using the Google Documents platform. The questionnaire was developed by the authors based on other studies that have measured knowledge, attitudes, and perceptions toward epilepsy surgery [7-9]. The questionnaire contained 3 sections: demographic information, knowledge, and attitudes. Section one contained demographic characteristics (current position, workplace, years of experience, and a monthly number of patients with epilepsy). The second and third sections included questions about knowledge and attitude, respectively.

Scoring System

The knowledge section included 9 items that evaluated different aspects of pediatric epilepsy surgery knowledge. Each item had one correct answer, one or more incorrect answers, and an “I don’t know” option. A correct response was awarded one point, while any other response was awarded none. Individuals who scored 1 to 3 points, were considered to have a low grade and insufficient knowledge, and those who scored 4 to 6 points, were considered to have a medium grade and slightly insufficient knowledge, whereas who scored 7 to 9 points, weree considered to have a high grade and sufficient knowledge. The attitude section contained 8 items, including both positive and negative attitude statements. These items used a 5-point Likert scale with options of strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, and strongly disagree, except one question, which assessed the frequency of discussing pediatric epilepsy surgery with patients.

The responses were scored from 0 to 4 based on whether the attitude statement was positive or negative. Individuals who scored 19 or less were considered to have a low grade and negative attitude, and those who scored between 20 to 27 were considered to have a medium grade and positive attitude, whereas those who scored 28 or more were considered to have a high grade and positive attitude. The cutoff points for sufficient or insufficient knowledge and a positive or negative attitude were calculated based on the median score in each section. The questionnaire was subsequently sent to 3 consultants and academic staff in neurology for content validation. A pilot study of 10 neurologists was conducted to assess the clarity of the questions.

Table 1. Knowledge and attitudes grades

Grades	Knowledge	Attitudes
Low (insufficient)	1-3	19 or less
Medium (slightly insufficient)	4-6	20-27
High (sufficient)	7-9	28 or more

Analyzes and Entry Method

Data was entered on the computer using the "Microsoft Office Excel Software" program (2022). Then, the data was transferred to the Statistical Package of Social Science Software (SPSS) program, version 20 (IBM SPSS Statistics) to be statistically analyzed.

Results and Discussion

The study included 162 participants, 60% were neuro specialists, 34% were neuro residents, and 6.2% were neuro consultants. 37% of participants had five to ten years of experience in their field while 38.3% had less than five years of experience. A monthly number of patients with epilepsy was reported as 10-50 patients by 42.6% of participants and more than 50 patients by 5.6% of participants **(Table 2)**.

Table 2. Sociodemographic characteristics of participants (n=162)

Parameter		No.	%
Current position	Neuro Consultant	10	6.2
	Neuro Resident	55	34.0
	Neuro Specialist	97	59.9
Experience (years)	< 5	62	38.3
	5–10	60	37.0
	11–15	11	6.8
	16–20	24	14.8
	> 20	5	3.1
Workplace	University Hospital	92	56.8
	Armed Forces Hospitals	19	11.7
	Outpatient services	51	31.5
Monthly number of patients with epilepsy	< 10	84	51.9
	10–50	69	42.6
	> 50	9	5.6
Region	Eastern Region	8	4.9
	Middle region	20	12.3
	Northern region	29	17.9
	Southern region	100	61.7
	Western Region	5	3.1

As illustrated in **Table 3**, aphasia was identified by 40.7% of participants as the most common neurological complication of pediatric epilepsy surgery, followed by 27.8% visual field loss, and 13.6% paralysis. 39.5% of participants never discuss surgical options when indicated with their pediatric epilepsy patients while only 2.5% always do.

Table 3. Participants' knowledge of epilepsy surgery in pediatrics (n=162)

Parameter		No.	%
Patients with focal epilepsy	< 10%	56	34.6
	10–30%	81	50.0
	31–50%	16	9.9
	> 50%	9	5.6
Approximate percentage of pediatric patients who experience clinically significant and permanent adverse effects after anterior temporal lobectomy	<5%	61	37.7
	5-10%	57	35.2
	11-50%	24	14.8
	>50%	8	4.9
What number of AEDs would try before referring a patient who remains drug-resistant for consideration of pediatric epilepsy surgery?	Failure of all approved AEDs	8	4.9
	Failure of seizure control after > 3 AEDs	19	11.7
	Failure of seizure control after 1 AED	71	43.8
	Failure of seizure control after 2 AEDs	53	32.7
	I don't know	11	6.8

For how long does a patient have to be drug resistant before you consider referral for pediatric epilepsy surgery evaluation?	3 months - 1 year	38	23.5
	2 - 5 years	26	16.0
	> 5 years	13	8.0
	As early as possible	77	47.5
	I don't know	8	4.9
Most common neurological complication of pediatric epilepsy surgery?	Aphasia	66	40.7
	Memory loss	16	9.9
	Paralysis	22	13.6
	Visual field loss	45	27.8
	I don't know	13	8.0
How often do you discuss surgical options - when indicated - with your pediatric epilepsy patients?	Always	4	2.5
	Never	64	39.5
	Rarely	42	25.9
	Sometimes	39	24.1
	Very often	13	8.0

Table 4 shows that 85.2% of participants reported that there is a general agreement on the definition of drug-resistant epilepsy. 79% reported that patients with focal epilepsy and a normal MRI may benefit from pediatric epilepsy surgery. 76.5% reported that patients with generalized (non-focal) epilepsies are not candidates for pediatric epilepsy surgery. 74.7% reported that patients with developmental delays are not candidates for pediatric epilepsy surgery. 71.6% reported that patients with psychiatric comorbidities are not candidates for pediatric epilepsy surgery. 74.1% reported that patients with epileptic encephalopathies are not candidates for pediatric epilepsy surgery.

Table 4. Participants' knowledge of epilepsy surgery for pediatric patients (n=162)

Parameter	Yes	No
Is there a general agreement on the definition of drug-resistant epilepsy?	138 85.2%	24 14.8%
Patients with focal epilepsy and a normal MRI may benefit from pediatric epilepsy surgery.	128 79.0%	34 21.0%
Patients with generalized (non-focal) epilepsies are not candidates for pediatric epilepsy surgery.	124 76.5%	38 23.5%
Patients with developmental delays are not candidates for pediatric epilepsy surgery.	121 74.7%	41 25.3%
Patients with psychiatric comorbidities are not candidates for pediatric epilepsy surgery.	116 71.6%	46 28.4%
Patients with epileptic encephalopathies are not candidates for pediatric epilepsy surgery.	120 74.1%	42 25.9%

As illustrated in **Table 5**, 41.4% of participants strongly agree that pediatric epilepsy surgery is a dangerous procedure. 41.4% strongly agree that pediatric epilepsy surgery should be viewed as a last resort for patients with epilepsy. 45.7% strongly agree that if one of their relatives had epilepsy that was amenable to surgical therapy, they would encourage him/her to undergo pediatric epilepsy surgery. 43.2% strongly agree that pediatric epilepsy surgery is an underutilized treatment method for epilepsy. 50% strongly agree that specialized epilepsy centers should be available in all tertiary hospitals. 43.8% strongly agree that epilepsy surgery is a cost-effective treatment option.

Table 5. Participants' attitude towards epilepsy surgery in pediatrics (n=162)

Parameter	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Pediatric epilepsy surgery is a dangerous procedure.	67 41.4%	42 25.9%	32 19.8%	13 8.0%	8 4.9%
Pediatric epilepsy surgery should be viewed as a last resort for patients with epilepsy.	67 41.4%	39 24.1%	42 25.9%	8 4.9%	6 3.7%
If one of my relatives had epilepsy that was amenable to surgical therapy, I would encourage him/her to undergo pediatric epilepsy surgery.	74 45.7%	41 25.3%	28 17.3%	10 6.2%	9 5.6%
Pediatric epilepsy surgery is an underutilized treatment method for epilepsy.	70 43.2%	35 21.6%	37 22.8%	17 10.5%	3 1.9%

Specialized epilepsy centers should be available in all tertiary hospitals.	81 50.0%	30 18.5%	35 21.6%	11 6.8%	5 3.1%
I think epilepsy surgery is a cost-effective treatment option.	71 43.8%	45 27.8%	32 19.8%	8 4.9%	6 3.7%

As illustrated in **Figure 1**, only 4.3% of participants had good knowledge of pediatric epilepsy surgery, 67.3% had moderate knowledge, and 28.4% had poor knowledge.

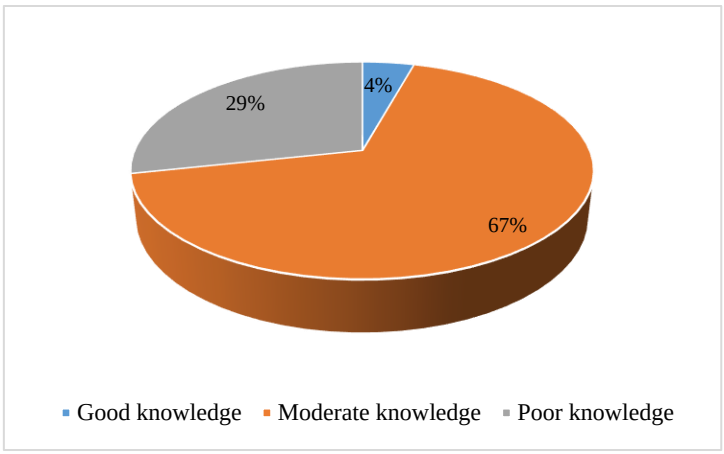

Figure 1. Participants' knowledge scores of epilepsy surgery in pediatrics (n= 162)

Regarding the attitude described in **Figure 2**, 35.2% of participants had a positive attitude towards pediatric epilepsy surgery, 31.5% had a neutral attitude, and 33.3% had a negative attitude.

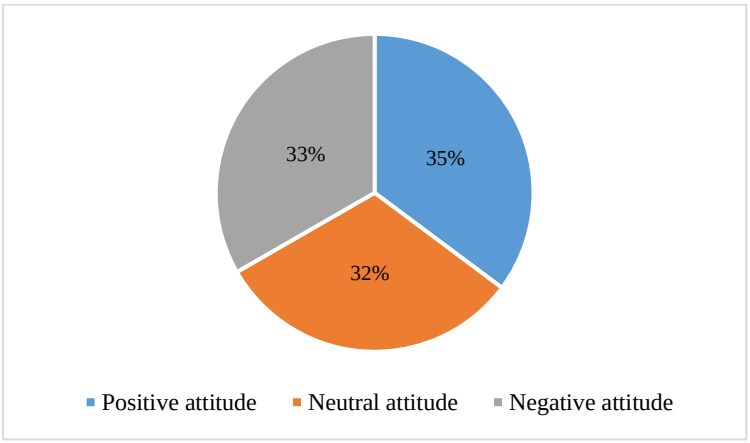

Figure 2. Participants' attitude scores towards epilepsy surgery in pediatrics (n= 162**)**

Tables 6 and 7 shows that knowledge score was significantly associated with participants' current position, years of experience, workplace, and the monthly number of patients with epilepsy while attitude scores were associated with current position, years of experience, workplace, and region (P< 0.05).

Table 6. Knowledge scores of participants in association with their sociodemographic characters

		Knowledge score			Total (N=162)	P value
		Poor knowledge	Moderate knowledge	Good knowledge		
Current position	Neuro Consultant	6	4	0	10	**0.008**
		3.7%	2.5%	0.0%	6.2%	
	Neuro Resident	22	30	3	55	
		13.6%	18.5%	1.9%	34.0%	
	Neuro Specialist	18	75	4	97	
		11.1%	46.3%	2.5%	59.9%	
Years of experience	< 5	25	36	1	62	**0.007**
		15.4%	22.2%	0.6%	38.3%	
	5–10	12	43	5	60	

		7.4%	26.5%	3.1%	37.0%	
	11–15	2	8	1	11	
		1.2%	4.9%	0.6%	6.8%	
	16–20	3	21	0	24	
		1.9%	13.0%	0.0%	14.8%	
	> 20	4	1	0	5	
		2.5%	0.6%	0.0%	3.1%	
Workplace	Armed Forces Hospitals	4	14	1	19	**0.001**
		2.5%	8.6%	0.6%	11.7%	
	Outpatient services	2	48	1	51	
		1.2%	29.6%	0.6%	31.5%	
	University Hospital	40	47	5	92	
		24.7%	29.0%	3.1%	56.8%	
Monthly number of patients with epilepsy	< 10	20	62	2	84	**0.041**
		12.3%	38.3%	1.2%	51.9%	
	10–50	20	44	5	69	
		12.3%	27.2%	3.1%	42.6%	
	> 50	6	3	0	9	
		3.7%	1.9%	0.0%	5.6%	
Region	1rthern region	8	20	1	29	**0.233**
		4.9%	12.3%	0.6%	17.9%	
	Eastern Region	1	6	1	8	
		0.6%	3.7%	0.6%	4.9%	
	Middle region	10	10	0	20	
		6.2%	6.2%	0.0%	12.3%	
	Southern region	26	70	4	100	
		16.0%	43.2%	2.5%	61.7%	
	Western Region	1	3	1	5	
		0.6%	1.9%	0.6%	3.1%	

Table 7. Participants' attitude scores in association with their sociodemographic characters (n=162).

		Attitude score			**Total (N=162)**	**P value**
		Positive score	**Neutral attitude**	**Negative attitude**		
Current position	Neuro Consultant	0	2	8	10	**0.001**
		0.0%	1.2%	4.9%	6.2%	
	Neuro Resident	5	25	25	55	
		3.1%	15.4%	15.4%	34.0%	
	Neuro Specialist	52	24	21	97	
		32.1%	14.8%	13.0%	59.9%	
Years of experience	< 5	13	24	25	62	**0.001**
		8.0%	14.8%	15.4%	38.3%	
	5–10	24	21	15	60	
		14.8%	13.0%	9.3%	37.0%	
	11–15	2	4	5	11	
		1.2%	2.5%	3.1%	6.8%	
	16–20	17	1	6	24	
		10.5%	0.6%	3.7%	14.8%	
	> 20	1	1	3	5	
		0.6%	0.6%	1.9%	3.1%	
workplace	Armed Forces Hospitals	6	13	0	19	**0.001**

		3.7%	8.0%	0.0%	11.7%	
	Outpatient services	51	0	0	51	
		31.5%	0.0%	0.0%	31.5%	
	University Hospital	0	38	54	92	
		0.0%	23.5%	33.3%	56.8%	
Monthly number of patients with epilepsy	< 10	34	26	24	84	**0.060**
		21.0%	16.0%	14.8%	51.9%	
	10–50	23	19	27	69	
		14.2%	11.7%	16.7%	42.6%	
	> 50	0	6	3	9	
		0.0%	3.7%	1.9%	5.6%	
Region	1rthern region	12	3	14	29	**0.001**
		7.4%	1.9%	8.6%	17.9%	
	Eastern Region	1	4	3	8	
		0.6%	2.5%	1.9%	4.9%	
	Middle region	2	6	12	20	
		1.2%	3.7%	7.4%	12.3%	
	Southern region	42	33	25	100	
		25.9%	20.4%	15.4%	61.7%	
	Western Region	0	5	0	5	
		0.0%	3.1%	0.0%	3.1%	

Our study results show very poor knowledge scores of participants of epilepsy surgery in pediatrics as only 4.3% of participants had good knowledge of pediatric epilepsy surgery, 67.3% had moderate knowledge, and 28.4% had poor knowledge. According to a previous Saudi survey, 42.5% of neurologists did not possess the necessary degree of competence in this area. This finding might be explained by Saudi Arabia's dearth of epilepsy surgery facilities. The rapid growth of sub-specialized neurology clinics [10] may also be to blame. According to one study, 65.4% of patients considered their neurosurgeon or neurologist to be their primary source of knowledge about epilepsy surgery [11]. One-fifth of GRs and roughly 6% of PGs in an Indian survey revealed that participants lacked awareness of fundamental DRE and epilepsy surgery concepts, and they were unaware of when an epileptic is classified as medication refractory. A small percentage of GRs were unaware that surgery is another option for treating epilepsy, even though all PGs agreed that some epilepsy can be treated surgically. The training and expertise that PGs have received during their residency time may account for this discrepancy [12]. Similar to this, Zupan G *et al*. (2017) [13] demonstrated how having more education influences one's understanding of epilepsy surgery. The fact that 23% of participants believed epilepsy surgery is not recommended in children and that all children outgrow epilepsy is a further indication that medical students lack fundamental information regarding pediatric epilepsy. Another study showed that there are significant knowledge gaps among neurologists about the justifications for epilepsy surgery. Only 43.4% of neurologists correctly responded that anyone having persistent seizures should be referred, and only 51.4% correctly identified that a patient only needs to experience pharmacological failure with two different medications to be deemed drug-resistant. Furthermore, only 54.1% of physicians acknowledged the necessity of referring a patient as soon as they met the criteria for drug-resistant epilepsy [14]. It has been reported that only a small portion of the world's million prospective candidates have had surgery for epilepsy, making it one of the least used evidence-based therapy alternatives [14]. Additionally, surgical burdens typically get lighter over time [15]. Possible causes include, among others: (i) an increase in the proportion of challenging cases; (ii) an increase in the prevalence of non-lesional epilepsies; and (iii) the backlog of patients who are candidates for novel therapies.

These results are significantly better than those of a previous poll of neurologists working in Michigan, where just 3% of neurologists would recommend a patient with yearly seizures [15]. A high seizure frequency was rated as "very important" by 68.1% of doctors in a different survey of Swedish neurologists when asked about their patients' suitability for epilepsy surgery [16]. Only 18% of Swedish neurologists and 14% of neurologists from Michigan [15] recently properly recognized the fact that epilepsy surgery should be taken into consideration after two medications have failed [17]. Even though our projections are a little bit more optimistic than those of earlier studies, it is obvious that a sizable part of neurologists are unaware of the required standards of practice for epilepsy surgery and drug-resistant epilepsy.

Regarding attitude, 35.2% of our participants had a positive attitude toward pediatric epilepsy surgery, 31.5% had a neutral attitude, and 33.3% had a negative attitude. According to a survey conducted in India, there are misconceptions concerning epilepsy surgery, and GRs and PGs' attitudes must be altered if we are to provide better treatment for people with epilepsy.

Only forty percent of the participants felt confident treating PWE. Inadequate experience and outdated knowledge may have contributed to this response. One-fourth of participants opposed early referral, and forty percent supported further ASM trials before referring a patient with DRE. This could significantly delay the presurgical examination of patients with DRE, which could hurt the surgical result [12]. In studies carried out in other countries, neurologists gave similar responses [16, 18, 19]. Epilepsy surgery was regarded by 60% of survey respondents as a last resort for PWE. Neurologists in Italy have noticed a similar pattern [19]. Such a mindset may overextend pharmacological therapy in DRE, resulting in numerous negative outcomes. Less than 50% of survey respondents consistently advised persons with DRE to have epilepsy surgery, which was much higher than the 5% of neurologists who did so in the survey by Rai V *et al.* [20]. Only 23% of interviewees thought epilepsy surgery was safe and economical. The cost efficacy of epilepsy surgery in the long run needs to be explained to the primary care providers, even though the initial cost at the time of surgery may be substantial. This investigation revealed that physicians who treated more PWE had greater confidence in doing so, which makes sense.

In this study, knowledge score was significantly associated with participants' current position, years of experience, workplace, and monthly number of patients with epilepsy while attitude scores were associated with current position, years of experience, workplace, and region. According to a prior study, there are significantly fewer neurologist-related barriers to epilepsy surgery when one is an epilepsy specialist, has referred more patients for a surgical examination, has superior self-reported knowledge, and graduated from medical school more recently [21]. Although attitudes towards epilepsy surgery and years of practice were not associated in a previous study of neurologist-related barriers to the procedure, [19] recent graduates may be more familiar with the literature and more up-to-date than neurologists with more experience, especially if epilepsy is not their primary area of focus.

Strategies to address various problems, such as spreading awareness of drug-resistance definition and associated risks instead of the potential benefits of surgery, promoting the adoption of epilepsy quality measures, and encouraging the use of structured referral forms that are appropriate for local conditions and address local barriers, are potential solutions to the complex issue of underutilization of epilepsy surgery.

Conclusion

In conclusion, Saudi neurologists have poor knowledge and a negative attitude toward epilepsy surgery for pediatric patients. Knowledge score was significantly associated with participants' current position, years of experience, workplace, and monthly number of patients with epilepsy while attitude scores were associated with current position, years of experience, workplace, and region.

Continuous physician education is required, with a focus on identifying drug-resistant patients, regarding the dire consequences of uncontrolled seizures, the proven efficacy, safety, and indications for epilepsy surgery, and the early diagnosis of drug resistance when patients fail to respond to antiepileptic drugs. Due to driving restrictions, lower quality of life, and maybe being unable to find gainful employment, people who only suffer one seizure a year might still experience severe effects.

Acknowledgments: None

Conflict of interest: None

Financial support: None

Ethics statement: Ethical approval was obtained from the Research Ethical Committee at King Khalid University Saudi Arabia (Ethical approval number: ECM#2023-1801). Participants were informed that their participation is voluntary and filling the questionnaire indicates their consent to participate.

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

References

1. Ko A, Kwon HE, Kim HD. Updates on the ketogenic diet therapy for pediatric epilepsy. Biomed J. 2022;45(1):19-26.
2. Shen A, Quaid KT, Porter BE. Delay in pediatric epilepsy surgery: A caregiver's perspective. Epilepsy Behav. 2018;78:175-8.
3. Sugano H, Arai H. Epilepsy surgery for pediatric epilepsy: optimal timing of surgical intervention. Neurol Med Chir. 2015;55(5):399-406.
4. Armour EA, Yiu AJ, Shrey DW, Reddy SB. Underrepresented Populations in Pediatric Epilepsy Surgery. InSeminars in Pediatric Neurology 2021 Oct 1 (Vol. 39, p. 100916). WB Saunders.
5. Kalkhoran S, Benowitz NL, Rigotti NA. HHS Public Access. Rev del Col Am Cardiol. 2018;72(23):2964-79.
6. Roa JA, Marcuse L, Fields M, Vega-Talbott M, Yoo JY, Wolf SM, et al. Long-term outcomes after responsive neurostimulation for treatment of refractory epilepsy: a single-center experience of 100 cases. J Neurosurg. 2023;139(5):1463-70.

7. Aljafen B, Alomar M, Abohamra N, Alanazy M, Al-Hussain F, Alhumayyd Z, et al. Knowledge of and attitudes toward epilepsy surgery among neurologists in Saudi Arabia. Neurosciences (Riyadh). 2020;25(1):43-9.
8. Casciato S, Morano A, Ricci L, Asioli S, Barba C, Caulo M, et al. Knowledge and attitudes of neurologists toward epilepsy surgery: an Italian survey. Neurol Sci. 2022;43(7):4453-61.
9. Zupan G, Lorber B. Knowledge and awareness of epilepsy surgery among medical students. J Epilepsy Res. 2017;7(1):50-3.
10. Aljafen B, Alomar M, Abohamra N, Alanazy M, Al-Hussain F, Alhumayyd Z, et al. Knowledge of and attitudes toward epilepsy surgery among neurologists in Saudi Arabia. Neurosciences J. 2020;25(1):43-9. doi:10.17712/nsj.2020.1.20190051
11. Hrazdil C, Roberts JI, Wiebe S, Sauro K, Vautour M, Hanson A, et al. Patient perceptions and barriers to epilepsy surgery: evaluation in a large health region. Epilepsy Behav. 2013;28(1):52-65.
12. Chakravarty K, Aleti S, Kharbanda PS, Lal V, Baishya J. Knowledge, attitude, and barriers for epilepsy surgery: A survey among resident doctors in a tertiary care center in India. Epilepsy Behav. 2021;123:108280. doi:10.1016/j.yebeh.2021.108280
13. Zupan G, Lorber B. Knowledge and awareness of epilepsy surgery among medical students. J Epilepsy Res. 2017;7(1):50-3. doi:10.14581/jer.17009
14. Roberts JI, Hrazdil C, Wiebe S, Sauro K, Vautour M, Wiebe N, et al. Neurologists' knowledge of and attitudes toward epilepsy surgery: a national survey. Neurology. 2015;84(2):159-66. doi:10.1212/wnl.0000000000001127
15. Hakimi AS, Spanaki MV, Schuh LA, Smith BJ, Schultz L. A survey of neurologists' views on epilepsy surgery and medically refractory epilepsy. Epilepsy Behav. 2008;13(1):96-101.
16. Kumlien E, Mattsson P. Attitudes towards epilepsy surgery: a nationwide survey among Swedish neurologists. Seizure. 2010;19(4):253-5.
17. Kwan P, Arzimanoglou A, Berg AT, Brodie MJ, Allen Hauser W, Mathern G, et al. Definition of drug-resistant epilepsy: consensus proposal by the ad hoc task force of the ILAE Commission on Therapeutic Strategies. Epilepsia. 2010;51:1069-77.
18. Kumlien E, Mattsson P. Attitudes towards epilepsy surgery: a nationwide survey among Swedish neurologists. Seizure. 2010;19(4):253-5.
19. Erba G, Moja L, Beghi E, Messina P, Pupillo E. Barriers toward epilepsy surgery. A survey among practicing neurologists. Epilepsia. 2011;53(1):35-43. doi:10.1111/j.1528-1167.2011.03282.x
20. Rai V, Shivde P, Rai N, Singh MB. Barriers of Epilepsy Surgery: A Survey Among Indian Neurologists. Indian J Appl Res. 2018;8(12).
21. Roberts JI, Hrazdil C, Wiebe S, Sauro K, Vautour M, Wiebe N, et al. Neurologists' knowledge of and attitudes toward epilepsy surgery: a national survey. Neurology. 2015;84(2):159-66.