

Knowledge and awareness toward surgical treatment of epilepsy among medical students at Umm Al-Qura University

SAGE Open Medicine

Volume 10: 1–6

© The Author(s) 2022

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/20503121221146065

journals.sagepub.com/home/smo



Rami Algahtani, Qamar ALhothaly , Raghd Alabdullah, Omniyh Fatani, Asmaa Alsaeigh, Amal Alamri, Abdullah Tawakul and Jihad Muglan

Abstract

Objective: This study aims to evaluate knowledge and awareness toward surgical treatment of epilepsy among medical students at Umm Al-Qura University.

Methods: A survey composed of 10 questions was distributed to medical students concerning surgical neurological disorders. It was used to collect data from 401 samples. Questions addressed general knowledge of epilepsy surgery and drug-resistant epilepsy, students' attitude toward epilepsy surgery, and techniques. The chi-square test was utilized.

Results: The familiar surgical techniques were lobectomy (11.2%), followed by hemispherotomy (8.2%). The term “drug-resistant epilepsy” was known to 24.4%. More than half of the students 259 (64.6%) would refer patients with drug-resistant epilepsy to a neurosurgeon and neurologist, knowledge and awareness of epilepsy surgery were high for 30.7% of students. Statistically, significant relationship was observed between the level of awareness and academic years ($p = 0.000131$).

Conclusions: Medical students have a positive attitude toward epilepsy surgery. Students are less aware of drug resistance in epilepsy. Knowledge and awareness were better among students at higher levels. We conclude that highlighting the importance of epilepsy surgery should be continued. Moreover, additional educational effort should be invested in expressing the term drug-resistant epilepsy.

Keywords

Seizure, surgery, treatment, medical students, knowledge

Date received: 12 September 2022; accepted: 30 November 2022

Introduction

Epilepsy is a common chronic neurological disorder associated with recurrent seizures that result from the excessive or hypersynchronous activity of cortical neurons.¹ It can cause a wide range of symptoms depending on the site of the brain disturbance.² Epilepsy affects more than 70 million people globally.³ According to the Global Burden of Epilepsy Report, epilepsy causes 13 million disability-adjusted life years (years lost + years lived with impairment) each year.⁴ Every year, 125,000 individuals with epilepsy die, with over 80% of these deaths occurring in low- and middle-income nations. Epilepsy deaths are caused by either direct (e.g. status epilepticus, injuries, and sudden unexpected death in epilepsy) or indirect (e.g. aspiration pneumonia, suicide, and drowning) causes.⁴

Epilepsy is effectively treated with anti-seizure medication in 70% of patients.⁵ However, 30–40% of patients continue to have seizures despite medical treatment.⁶ The

International League Against Epilepsy defined drug-resistant epilepsy as the persistence of seizures despite at least two syndrome-adapted anti-seizure drugs used at efficacious daily dose.⁷ Patients with drug-resistant epilepsy can suffer from a decline in neurocognitive and psychological function, and most of them can never become seizure-free with pharmacological management alone and require further management.⁸

Epilepsy surgery reduces mortality and improves the life of DRE patients, and it is effective in succeeding seizure freedom.^{9,10} However, it remains an underused evidence-based

Department of Medicine, College of Medicine, Umm Al-Qura University, Makkah, Saudi Arabia

Corresponding author:

Qamar ALhothaly, Department of Medicine, College of Medicine, Umm Al-Qura University, Makkah, Saudi Arabia.

Email: qamaralhothaly@gmail.com



Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the Creative Commons

Attribution-NonCommercial 4.0 License (<https://creativecommons.org/licenses/by-nc/4.0/>) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and Open Access pages (<https://us.sagepub.com/en-us/nam/open-access-at-sage>).

option in treating epilepsy, and limited surgeries are performed in potentially eligible patients around the world.¹¹

In a previous study conducted on medical students of the Faculty of Medicine, University of Ljubljana, Slovenia, the result showed a positive attitude of medical students toward epilepsy surgery. Although most students (72.3%) were familiar with the term “drug-resistant epilepsy,” the knowledge of the term “mesial temporal sclerosis” was inadequate in 85.8% of them. Most (74.5%) of the students responded that they were aware of the possibility of surgical treatment for some cases of epilepsy. In addition, 48.9% responded that they generally would have supported an operation.⁸

Surgical management for drug-resistant focal epilepsy is an alternative option to control resistant focal seizures.⁵ In the United States, the analysis of attitudes toward epilepsy surgery reports showed that it takes up an average of 18 years of referral decisions reflecting a huge underutilization of surgical procedures in epilepsy.⁸ Therefore, medical students’ knowledge and attitude toward this alternative management option are important to educating patients with drug-resistant focal epilepsy.⁸

In Saudi Arabia, there is no evidence addressing the general knowledge of medical students on epilepsy surgery. Therefore, the present study aimed to evaluate the knowledge and awareness toward surgical treatment of epilepsy among medical students in Umm Al-Qura University (UQU).

Methods

This cross-sectional study was conducted using a self-administered structured survey at UQU, Makkah, Kingdom of Saudi Arabia. Medical students of the Faculty of Medicine who agreed to participate were included in the study (from the second to the sixth year). Medical students who have epilepsy and who declined to participate in the study were excluded. The questionnaire was then sent from November 2021 to December 2021.

Questionnaire structure

The questionnaire was drafted.^{8,12} It was applied as a Google form and distributed electronically through social media platforms. The language of questionnaire was created in English. The questionnaire contained demographic data as well as questions related to awareness of epilepsy surgery

Concerning knowledge scores. Two points were given for a correct answer, 1 for the *I don’t know choice* and 0 for an *incorrect answer*. The participants were divided into three groups based on their scores. A score of 0–5 points was considered low awareness, 6–12 points moderate awareness, and 13–20 high awareness.

Sample size calculation

The required sample size was calculated, using OpenEpi version 3.0, taking into account the population size of approximately 1362 students. The minimum sample size required for this study to achieve a 5% margin of error, 95% confidence interval, and took the design effect of 1 was 300 participants. However, the final collected data comprised 401 students.

Statistical analysis

Analyses were done using SPSS software version 23. Categorical variables were presented as frequencies and percentages. The relationship between variables was analyzed according to the chi-square test. Statistical significance was determined at $p < 0.05$.

Ethical approval

Ethical approval was obtained from the Medical Ethics Committee of UQU, Saudi Arabia, ethical approval number: HAPO-02-K-012-2021-11-835.

Results

A total of 401 students completed our questionnaire. There were 208 (51.9%) males and 193 (48.1%) females. Of the 401 students, 131 (32.7%) were preclinical year students, and 270 (67.3%) were clinical year students (Table 1).

Figure 1 illustrates the level of knowledge of epilepsy surgery. It shows a considerable level of knowledge among medical students. Six (1.5%) students had low knowledge, 272 (67.8%) had moderate knowledge, and 123 (30.7%) had high knowledge.

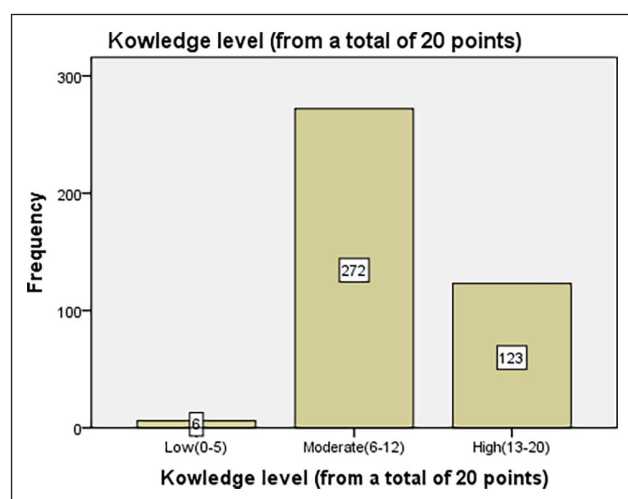
As for the type of epilepsy that can be surgically treated, 79 (19.7%) choose the correct answer which is partial or focal epilepsy. One-hundred ninety-nine (49.6%) respondents witnessed that epilepsy can be managed surgically. Two-hundred two (50.4%) students had not heard that epilepsy could be managed by a surgical method.

Among the respondents who knew about epilepsy surgery medical school educational program does not show a significant difference in comparison to general knowledge, 84 (20.9%) got their knowledge from the medical school curriculum, 56 (14.0%) read about it, 11 (2.7%) have seen a case that has been surgically treated, 7 (1.7%) got their knowledge from their neurologist, and 2 (0.5%) have a family member who experienced surgical management of epilepsy. However, most students (165, 41.1%) had never heard about it. Seventy-six (19.0%) have general knowledge.

One hundred eighty-seven (46.6%) answered that surgical treatment for epilepsy should be considered in selected cases, which was the correct answer, 120 (29.9%) students did not know, 79 (19.7%) answered only as a last resort, 10 (2.5%) always, and 5 (1.2%) never.

Table 1. Participants' demographic data.

Characteristics	Category	Precent
Gender	Female	193 (48.1%)
	Male	208 (51.9%)
Academic year	2nd Year medical school	69 (17.2%)
	3rd Year medical school	62 (15.5%)
	4th Year medical school	94 (23.4%)
	5th Year medical school	110 (27.4%)
	6th Year medical school	66 (16.5%)
	Total	401

**Figure 1.** The participants' level of knowledge.

Most students (265, 66.1%) did not know what type of epilepsy can be surgically treated, 79 (19.7%) answered partial or focal type, 26 (6.5%) answered generalized epilepsy, 25 (6.2%) answered both types (partial and generalized), and 6 (1.5%) answered neither. According to the moderate risk as a correct answer, the risk of head surgery is considered as a high risk. Mood changes and memory loss vary between individuals as low risk. The entire impression of epilepsy surgical risk was as follows: 178 (44.4%) students did not know, 110 (27.4%) answered high risk, 66 (16.5%) moderate, 37 (9.2%) very high, and 9 (2.2%) low.

In contrast, according to very high benefit as a correct answer, being seizure free in subsequent years is considered as an advantage. The impression of the potential benefit of epilepsy surgery was as follows: 181 (45.1%) medical students did not know, 96 (23.9%) answered moderate benefit, 86 (21.4%) high benefit, 27 (6.7%) very high benefit, and 11 (2.7%) low benefit.

A total of 177 (44.1%) medical students were familiar with the term drug-resistant epilepsy, get a score of two, and 224 (55.9%) were not, get a score of zero. Among respondents according of considering management failure after two anti-seizure medications as the correct answer, 234 (58.4%) answered that drug-resistant epilepsy is the failure of seizure

control after three and more anti-seizure medications (monotherapy or polytherapy), 98 (24.4%) answered failure of seizure control is after two anti-seizure medication (monotherapy or polytherapy), and 69 (17.2%) answered failure of seizure control is after one anti-seizure medications (monotherapy or polytherapy).

The students responded that patients with drug-resistant epilepsy should be referred to a neurosurgeon and neurologist (259, 64.6%) get two points in the score as the correct answer, a radiologist (17, 4.2%) or do not know (125, 31.2%) one point in the score. When asked about surgical techniques, lobectomy (45, 11.2%) was the technique the medical students were most familiar with in terms of surgical treatment of epilepsy, followed by hemispherotomy (33, 8.2%), then corpus callosotomy (23, 5.7%), laser ablation (14, 3.5%), lesionectomy (12, 3.0%), vagus nerve stimulation (8, 2.0%), and neupace (4, 1.0%), each of gets two points in the score as a correct answer. With most medical students being unaware (262, 65.3%) one point in the score (Table 2). There was a significant association found between the level of awareness and academic year ($p=0.000131$) (Table 3).

Discussion

This study investigated the knowledge, perception, and attitudes toward epilepsy surgery among medical students at UQU. The respondents present an approximately equal number of males and females, with two-thirds of respondents being clinical year students.

The results vividly present a high level of knowledge of epilepsy surgery as about 67.8% had moderate knowledge, while 30.7% had high knowledge. According to the knowledge result, there was a significant association between the level of knowledge and academic years.

The current study showed that most (20.9%) medical students at UQU get their knowledge about epilepsy surgery from the medical school curriculum, 19.0% had general knowledge, 14.0% had read about it, and 2.7% had seen a case that has been surgically treated. Most respondents (259, 64.6%) correctly answered that the appropriate referral of patients with drug-resistant epilepsy should be referred to neurosurgeons and neurologists. Regarding the technique of surgical management, lobectomy was the most familiar technique for students (11.2%), followed by hemispherotomy (8.2%).

Despite a high level of knowledge about epilepsy surgery, misconceptions were largely reported as most students (265, 66.1%) did not know what type of epilepsy could be surgically treated. At the same time, 234 (58.4%) answered that drug-resistant epilepsy is the failure of seizure control after three and more anti-seizure medications (monotherapy or polytherapy) instead of after two anti-seizure medications (monotherapy or polytherapy) (98, 24.4%).

Most of the published studies addressing knowledge and awareness of epilepsy surgery have been performed among neurologists, general practitioners, or the general population, and the results are not relatable to our study due to the varia-

Table 2. Students' knowledge about epilepsy surgery.

Question	Number (%)
Have you heard that epilepsy can be treated surgically?	
Yes	199 (49.6)
No	202 (50.4)
Where did you get the information about epilepsy surgery?	
I read about it	56 (14.0)
I have seen a case treated surgically	11 (2.7)
From my neurologist	7 (1.7)
In the medical school curriculum	84 (20.9)
Family members who had epilepsy surgery	2 (0.5)
General knowledge	76 (19.0)
Never heard about it	165 (41.15)
When do you think surgical treatment for epilepsy should be considered?	
Always	10 (2.5)
Never	5 (1.2)
In selected cases	187 (46.6)
Only as a last resort	79 (19.7)
I don't know	120 (29.9)
What type of epilepsy can be surgically treated?	
Generalized epilepsy	26 (6.5)
Partial or focal epilepsy	79 (19.7)
Neither	6 (1.5)
Both	25 (6.2)
I don't know	265 (66.1)
What is your impression of the risk of epilepsy surgery?	
Low	9 (2.2)
Moderate	66 (16.5)
High	110 (27.4)
Very high	37 (9.2)
I don't know	178 (44.4)
What is your impression of the potential benefit of epilepsy surgery	
Low	11 (2.7)
Moderate	96 (23.9)
High	86 (21.4)
Very high	27 (6.7)
I don't know	181 (45.1)
Are you familiar with the term "drug-resistant epilepsy"?	
Yes	177 (44.1)
No	224 (55.9)
What constitutes drug-resistant epilepsy?	
Failure of seizure control after two anti-seizure medication(monotherapy or polytherapy)	98 (24.4)
Failure of seizure control after one anti-seizure medication (monotherapy or polytherapy)	69 (17.2)
Failure of seizure control after three and more anti-seizure medication (monotherapy or polytherapy)	234 (58.4)
A patient who has drug-resistant epilepsy should be referred	
To neurosurgeon and neurologist	259 (64.6)
To radiologist	17 (4.2)
I don't know	125 (31.2)
Which of the following techniques are you familiar with in terms of surgical treatment of epilepsy?	
Lesionectomy	12 (3.0)
Lobectomy	45 (11.2)
Hemispherotomy	33 (8.2)
Corpus callosotomy	23 (5.7)
Vagus nerve stimulation	8 (2.0)
Neuropace	4 (1.0)
Laser ablation	14 (3.5)
I don't know	262 (65.3)

Table 3. Association between the level of awareness and demographic data.

Variable	Level on knowledge			p-Value
	Low (0–5) n = 6	Moderate (6–12) n = 272	High (13–20) n = 123	
Academic year				
Preclinical year	4 (66.7%)	103 (37.9%)	24 (19.5%)	0.000131
Clinical year	2 (33.3%)	169 (62.1%)	99 (80.5%)	

tion in knowledge levels between neurologists, general practitioners, and medical students.^{11,13}

We identified only a few similar studies conducted among medical students. One study performed in Ljubljana, Slovenia, showed that 74.5% of the students had heard that epilepsy could be managed surgically in selected cases, compared to our study, where 49.6% of respondents were familiar with a surgical option. This study showed that 44.1% of students were familiar with the term “drug-resistant epilepsy” compared to 72.3% of students in Slovenia. Most (64.6%) of the participants in our study would refer patients with drug-resistant epilepsy to a neurologist and neurosurgeon and 4.2% to a radiologist, which is similar to students in Slovenia (76.6% to a neurologist and only 0.3% to a radiologist).⁸ The findings of this study suggest that adding more educational programs and more awareness for medical student are recommended to increase the student’s awareness. Our study has some limitations. First, the data was collected through a self-reported survey, and therefore, it may have recall bias. Second, we included only medical students studying at UQU which limits the generalizability of the study findings. Third, the questionnaire was not pilot-tested but was constructed based on common knowledge and assessed by neurologists and general practitioner

Conclusion

In conclusion, the most obvious finding to emerge from this study is that the level of knowledge and awareness of epilepsy surgery among medical students at UQU was moderate. The second major finding was that most students did not have the knowledge regarding the type of epilepsy that can be surgically treated and the surgical techniques that may be used. This study strengthens the idea that the importance of surgical options to manage epilepsy should be highlighted in medical school curriculums in the hope that would change the attitude toward drug-resistant epilepsy patients in the future resulting in early recognition, referral, and surgical treatment appropriately. Third, a pilot study was not carried out to test the validity of the questionnaire but was constructed based on common knowledge and assessed by neurologist and general practitioner

Author contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data;

took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethics approval

Ethical approval was obtained from the Medical Ethics Committee of Umm Al-Qura University, Saudi Arabia, approval no. HAPO-02-K-012-2021-11-835.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Informed consent

Written informed consent was obtained from all subjects before the study.

ORCID iD

Qamar ALhothaly  <https://orcid.org/0000-0003-3090-8020>

Supplemental material

Supplemental material for this article is available online.

References

1. Neyaz HA, Aboauf HA, Alhejaili ME, et al. Knowledge and attitudes towards epilepsy in Saudi families. *J Taibah Univ Med Sci* 2017; 12: 89–95.
2. Shihata SS, Abdullah TS, Alfaidi AM, et al. Knowledge, perception and attitudes toward epilepsy among medical students at King Abdulaziz University. *SAGE Open Med* 2021; 9: 205031212199124.
3. Thijs RD, Surges R, O’Brien TJ, et al. Epilepsy in adults. *Lancet* 2019; 393: 689–701.
4. Singh G and Sander JW. The global burden of epilepsy report: implications for low- and middle-income countries. *Epilepsy Behav Rep* 2020; 105: 106949.
5. Lamberink HJ, Otte WM, Blümcke I, et al. Seizure outcome and use of antiepileptic drugs after epilepsy surgery according to histopathological diagnosis: a retrospective multicentre cohort study. *Lancet Neurol* 2020; 19: 748–757.

6. Rugg-Gunn F, Miserocchi A and McEvoy A. Epilepsy surgery. *Pract Neurol* 2020; 20: 4–14.
7. Guery D and Rheims S. Clinical management of drug resistant epilepsy: a review on current strategies. *Neuropsychiatr Dis Treat* 2021; 17: 2229–2242.
8. Zupan G and Lorber B. Knowledge and awareness of epilepsy surgery among medical students. *J Epilepsy Res* 2017; 7: 50–53.
9. Casadei CH, Carson KW, Mendiratta A, et al. All-cause mortality and SUDEP in a surgical epilepsy population. *Epilepsy Behav* 2020; 108: 107093.
10. Sperling MR, Barshow S, Nei M, et al. A reappraisal of mortality after epilepsy surgery. *Neurology* 2016; 86: 1938–1944.
11. Samanta D, Leigh Hoyt M and Scott Perry M. Healthcare professionals' knowledge, attitude, and perception of epilepsy surgery: a systematic review. *Epilepsy Behav* 2021; 122: 108199.
12. Cothros N, Burneo JG and Steven DA. Knowledge and attitudes about epilepsy surgery among family doctors in Ontario. *Can J Neurol Sc* 2016; 43: 672–677.
13. Roberts JI, Hrazdil C, Wiebe S, et al. Neurologists' knowledge of and attitudes toward epilepsy surgery: a national survey. *Neurology* 2015; 84: 159–166.