Knowledge and attitude toward epilepsy among the final and semi-final years medical students at University of Bahri, Sudan

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Abstract
Objective: To assess the knowledge and attitude toward epilepsy among the final and semi-final years medical students at University of Bahri.

Methods: An observational cross-sectional study was carried out at College of Medicine, University of Bahri. Self-administered questionnaires were applied to 228 medical students in the final and semi-final years.

Results: Sixty-three percent of students showed a high level of knowledge. Despite that 10.1% of the students do not know that atonic seizure is a type of epilepsy, 62.7% attributed the causes of epilepsy to psychological factors only, and 9.6% considered epilepsy is an untreatable disease. The majority of students are not aware that screaming is a manifestation of certain types of epilepsy. More than half of the students considered inserting something into the patient’s mouth during the seizure will prevent tongue biting. Interestingly, a total of 8.3% of students thought that it is a demonic attack, whereas 34.6% of students thought the Holy Quran as an appropriate treatment for epilepsy ($P = .026$). Up to 77% of the students showed a positive attitude toward patients with epilepsy. However, 42.1% of students agreed that there should be some restrictions in sport and leisure activities for people who suffer from epilepsy, and 13.6% of students admitted they will not get married to someone with epilepsy.

Significance: Our study showed an overall relatively high level of knowledge toward epilepsy among medical students with a potentially positive attitude toward patients with the disease. However, there are still misconceptions of epilepsy in different aspects. This study showed some important facts for policymakers and key opinion leaders in curriculum preparation and training programs for medical schools which should be designed to increase knowledge and understanding of epilepsy among the medical students, not just the scientific knowledge but also discuss the social impact of epilepsy on a patient’s life.

Keywords
attitude, epilepsy, knowledge, medical students, sudan
1 | INTRODUCTION

Epilepsy is a neurological disorder characterized by any of the following conditions: (1) At least two unprovoked seizures occurring >24 hours apart; (2) one unprovoked seizure and a probability of further seizures similar to the general recurrence risk at least 60% after two unprovoked seizures, occurring over the next 10 years; and (3) diagnosis of an epilepsy syndrome.1 Epilepsy is a common disorder that affects 61.4 per 100 000 person-years (95% CI 50.7-74.4).2 In the Arab world, there are approximately 724 500 epileptic patients, and in Sudan the prevalence is 0.9/1000.3 Despite this high prevalence, studies in several countries showed that people lack information concerning the disease.4,5 Most of the doctors in their professional life will provide care for people with epilepsy,6 and hence may not feel comfortable in managing them. Some doctors consider their training in epilepsy care to be inadequate.6 There may be other barriers, perceived or not, to providing care to people with epilepsy by general practitioners, and they need to be approached in the medical undergraduate curriculum and medical continuing education.7 Higher levels of education are positively correlated with awareness, knowledge, and attitude concerning epilepsy,8 low knowledge of epilepsy by physicians, mainly on aspects of pathophysiology, classification, and treatment,6 and lack of proper education is likely to be one of the main causes of the stigma involving epilepsy.9,10

Fear and stigma are common among the general population and are shared by 40% of health staff.11 This is considered to be one of the major negative influences on the quality of life of people with epilepsy.12,13 Epilepsy has a socio-cultural, economical, and medical impact which represents an important public health problem.14 Also, it influences the emotional behavior, ability to work, family stability, and self-esteem of people with epilepsy. Sometimes the social discrimination against persons with epilepsy may be more devastating than the disease itself.15 Sigma of epilepsy is a major problem facing people with epilepsy and their relatives in Sudan.16

The gap in knowledge and lack of awareness regarding epilepsy among doctors may lead to misdiagnosis and administration of wrong medication. The knowledge of medical students is crucial for their practice and contact with patients because it affects the knowledge of patients and their close contacts directly and public perception of individuals with the condition indirectly. To the best of our knowledge, there are no published studies conducted among medical students in Sudan. Our aim is to assess the knowledge and attitude toward epilepsy among the final and semi-final years medical students at University of Bahri.

2 | METHODOLOGY

Facility-based observational cross-sectional study conducted at College of Medicine, University of Bahri. The study was conducted during the period from February to March 2020. The study population consisted of final and semi-final years medical students. We used a random sampling method and Slovin’s formula17 to calculate sample size (228), all of them passed neurology exam, and all of them accepted to participate in this study.

Data were collected by self-administered questionnaires that were distributed to fifth- and sixth-year medical students. The questionnaire was adopted and comprised 28 questions developed after reviewing relevant studies.15,18–20 Composed of three sections, section 1 (Q1 to Q7) is about demographic data and experience with epilepsy; section 2 (Q8 to Q16) is about knowledge, we used questions with “TRUE” or “FALSE” options for all knowledge questions the students were to answer all questions accordingly (max = 41), correct responses were scored 1 and incorrect ones as 0, scores were converted to percentages and we categorized the level of knowledge as follow: ≥80% is high, 60%–79% is moderate; and <59% is low. Section 3 (Q17 to Q28) is about the attitude, 3-point Likert scale was used to determine the attitude, we used the mean of each question to interpret it with the difference of 0.66 and divide the responses into three intervals as follow: 1-1.66 treated as a positive attitude; 1.67-2.33 treated as a neutral attitude; and 2.34-3 treated as a negative attitude. In more detail, the attitude section was designed to let disagree option be the ideal response for all questions which interpret positive attitude, and agree option interpreted as negative attitude. To express the general attitude of medical students toward epilepsy at University of Bahri, we calculate the percentage of each option (disagree, neutral, and agree) which equals the total number of responses to the option divided by the total number of responses multiplied by 100.

Data were checked for completeness and consistency. IBM SPSS (Statistical Package for the Social Science),
version 26.0, was used to analyze data, descriptive frequency analysis was made for all variables, the relationship between variables was analyzed according to Chi-square test, and the results have been displayed in tables constructed using Microsoft Excel 2013.

Ethical approval has been taken from community medicine department, College of Medicine, University of Bahri. All students included in this study were informed about the purpose and the objectives of the study and verbal consent was obtained before filling the questionnaire.

3 | RESULTS

A total of 228 questionnaires were distributed to fifth- and sixth-year medical students equally and retrieved on the same day.

The mean age was 23.5 ± 1.36 years. Females were considered the majority (73%) and 27% were males. Regarding marital status, 91.7% were single, only 7.9% were married, and 0.4% were a widow. Considering the experience of epilepsy among the students, 6.6% had an epileptic attack, 37.7% knew someone with epilepsy, and 45.2% had witnessed an epileptic seizure.

Only 0.6% of the students thought epilepsy is a contagious disease. The most common response concerning the definition of epilepsy was an abnormal electrical discharge in the brain (99.6%) and the most commonly reported cause was brain tumors (92.5%). Regarding types of seizures, 10% do not know atonic seizures. Convulsion was the most responded manifestation of epilepsy (98.2%). About half of students (54.4%) thought placing something in the mouth to prevent biting the tongue during the epileptic attack is appropriate. Regarding treatment, 34.6% thought that epilepsy can be treated with the Holy Quran, and 26.3% thought that antiseizure medications could not be taken for life. Almost all students (98.7%) considered drug therapy to be effective (Table 1). Traditional treatment for epilepsy has a statistically significant relation (P-value <.05) to students who thought that epilepsy is a demonic attack (Table 2). The overall level of knowledge among students was high (63%).

The most common negative attitudes were that students thought the person with epilepsy have limited sports and leisure activities (42%) and students refused to marry someone with epilepsy (13.6%). Nearly all of the students (93%) felt people with epilepsy can have children. Stuningly 11% thought children with epilepsy must be prevented from participating in sport exercises in school (Table 3). The overall attitude among students was positive (76.9%).

4 | DISCUSSION

To the best of our knowledge, this is the first study conducted to assess the knowledge, and attitudes toward epilepsy among medical students in Sudan. This study showed an overall high level of knowledge (63%) among medical students.

This study showed that only 0.6% thought epilepsy is a contagious disease in comparison with previous studies,18,21 we assume this difference because of their cultural background and include preclinical and non-medical students in their studies.

Regarding the definition of epilepsy in our study almost all the respondents (99.6%) said it is abnormal electrical discharge in the brain which is higher than the finding of a previous study.20 While 1.8% in our study thought epilepsy as God punishment, in the previous studies18,19,22 the percentages were higher. The idea of the disease as punishment by God in the Islamic culture is a complex matter; these false beliefs even among doctors might explain why some patients request traditional treatment.

Surprisingly 59.6% of participants thought it is an abnormal movement, and this wrong definition of an epileptic seizure has an impact on the diagnosis and treatment, while 10.3% in Nigeria.20 Only 8.3% in our study thought it as a demonic attack and 2.7% in the previous study we assume that because of community culture as Muslims and as an African country, that may lead to the stigma of epilepsy, also some medical students held these beliefs despite clinical experience.

About the causes of epilepsy, 92.5% of students thought it is due to a brain tumor, which is higher than the previous studies.19,21,23 Shockingly 62.7% and 34.5% of students in our study thought it is due to psychological disorder and sleep deprivation, respectively. We assume the students cannot differentiate between epilepsy and psychogenic non-epileptic seizure which is a psychological disorder not neurological, and they cannot differentiate between the causes and the aggravating factors of an epileptic attack.

Unexpectedly 10.6% and 2.6% of students in our study do not know that atonic seizures and absence seizures, respectively, are types of epileptic seizures; this finding is less than Nigerian’s study findings we assume that because in Nigerian’s study some students had no neurological rounds.

Regarding the manifestation of epilepsy, we found that convulsions (98.2%) were the most commonly described manifestations of epilepsy, followed by loss of consciousness (93.9%), and behavioral changes (75%). In similar studies,19,21,22 those findings were lower, probably due to
| Question                                                                 | Correct: N (%) | Incorrect: N (%) |
|------------------------------------------------------------------------|----------------|------------------|
| Do you think epilepsy is a contagious disease?                          |                |                  |
| [T] No                                                                  | 222 (97.4%)    | 6 (0.6%)         |
| What do you think a seizure is?                                         |                |                  |
| [T] An abnormal electrical discharge in the brain                      | 227 (99.6%)    | 1 (0.4%)         |
| [F] A demonic attack                                                    | 209 (91.7%)    | 19 (8.3%)        |
| [F] God punishment                                                      | 224 (98.2%)    | 4 (1.8%)         |
| [F] An abnormal movement                                                | 92 (40.4%)     | 136 (59.6%)      |
| Causes of epilepsy:                                                     |                |                  |
| [T] Accident                                                            | 160 (70.2%)    | 68 (29.8%)       |
| [T] Inherited disease                                                   | 178 (78.1%)    | 50 (21.9%)       |
| [T] Brain tumors                                                        | 211 (92.5%)    | 17 (7.5%)        |
| [F] Psychological                                                       | 85 (37.3%)     | 143 (62.7%)      |
| [F] Sleep deprivation                                                   | 149 (65.4%)    | 79 (34.6%)       |
| Epilepsy manifestation:                                                |                |                  |
| [T] Convulsions or shaking                                              | 224 (98.2%)    | 4 (1.8%)         |
| [T] Loss of consciousness                                               | 214 (93.9%)    | 14 (6.1%)        |
| [T] Episode of behavioral change                                        | 171 (75%)      | 57 (25%)         |
| [T] Period of memory change                                             | 158 (69.3%)    | 70 (30.7%)       |
| [T] Foaming from the mouth                                              | 182 (79.8%)    | 46 (20.2%)       |
| [T] Screaming                                                           | 63 (27.6%)     | 165 (72.4%)      |
| What should be done during a seizure?                                   |                |                  |
| [T] Place the person in a semi-prone position to prevent choking        | 182 (79.8%)    | 46 (20.2%)       |
| [F] Place something in the mouth to prevent biting the tongue           | 104 (45.6%)    | 124 (54.4%)      |
| [T] Give an antiseizure medication during the episode                    | 139 (61%)      | 89 (39%)         |
| [F] Restrain the person and perform cardiopulmonary resuscitation       | 201 (88.2%)    | 27 (11.8%)       |
| [T] Prevent injury during the episode                                   | 210 (92%)      | 18 (8%)          |
| Epilepsy can be treated with:                                           |                |                  |
| [T] Medical                                                             | 227 (99.6%)    | 1 (0.4%)         |
| [T] Surgical                                                            | 152 (66.7%)    | 76 (33.3%)       |
| [F] Herbal                                                              | 206 (90.4%)    | 22 (9.6%)        |
| [F] Cautery                                                             | 216 (94.7%)    | 12 (5.3%)        |
| [F] Holy Quran                                                          | 149 (65.4%)    | 79 (34.6%)       |
| [F] Untreatable                                                         | 206 (90.4%)    | 22 (9.6%)        |
| How long antiseizure medications should be taken?                       |                |                  |
| [T] Maybe for life                                                      | 168 (73.7%)    | 60 (26.3%)       |
| [T] About 2 years at least                                              | 208 (91.2%)    | 20 (8.8%)        |
| [F] Only during an episode                                              | 220 (96.5%)    | 22 (8.5%)        |
| [F] For 3-6 months                                                      | 214 (93.9%)    | 14 (6.1%)        |
Concerning emergency management of seizures, 20.2% did not know that patients should be placed on the left lateral position. Very surprising that 54.4% will place objects in the mouth of patients, in the previous studies range from 22% to 55%. Inserting an object in the mouth of a convulsing person is an ill-advised practice which is very common worldwide, which usually will result in further injuries to the tongue, mouth, and lips.

About the treatment of epilepsy, interestingly there is statistically significant difference between demonic attack and the Holy Quran as a treatment (P = .026). Also, 9.6% and 5.3% of respondents thought epilepsy could be treated by herbs and cautery, respectively; the p-values for both in relation to demonic attack were statistically significant (P = .010) for use of herbs and (P = .032) cautery. Unfortunately, epilepsy is majorly believed to be a spiritual disease in our community.

We also asked about the duration of treatment with antiseizure medications, 91.2% of students knew that epilepsy treatment should be for at least 2 years, while 8.5% thought that the drugs should be given only during an episode of seizure. We assume that students cannot differentiate between epileptic seizures and acute symptomatic seizures. This finding is better than the finding in Nigeria. This difference is due to different populations, some of their participants did not undergo neurology rounds.

Considering drug therapy for epilepsy, unexpectedly 65.4% of students in our study do not know that they should not give two drugs together. Usually, the combination of drugs results in more side effects and could be catastrophic for the patients, and 94.3% knew that drug therapy should be stopped gradually.

Most of the students (76.9%) expressed positive attitudes toward people with epilepsy. Shockingly, a total of 13.6% of our respondents refused to marry someone with epilepsy, this finding is less than the previous studies. Concealed traditional and cultural beliefs particularly regarding marriage could be responsible for the difference between knowledge and attitude in our study.

Ninety-three percent thought that person with epilepsy could have children, the other studies reported close percentages. This reflects that the students were not afraid that epilepsy is an inheritable disease. And 79% of the students would employ a person with epilepsy; this finding is higher than that reported in the previous studies.

In our study, 6.6% thought that children with epilepsy must join schools for persons with disabilities, and 0.9% thought that children with epilepsy must be separated
from other children, in comparison with Jordanian study, the percentages were higher, this might be due to differences in the study population which in Jordan include non-medical colleges.

Interestingly 4% of students in our study thought that children with epilepsy must be prevented from participating in sport exercises in school, and 3% thought that children with epilepsy are less intelligent than other people, this finding is less Jordanian study. This is due to the difference in the study population which in Jordan includes non-medical students.

We assume that the cause of misunderstanding and the gap of knowledge at some point regarding the epilepsy and the bad attitude is because the neurology was taught by an internal medicine specialist not a neurologist.

### 5 LIMITATIONS

The questionnaires were delivered in a classroom environment, which could lead to similar responses because some students may have discussed questions or answers. The attitudes and conceptions about epilepsy could be affected by including non-Sudanese students, and their attitudes probably reflect their own cultures.

Despite these limitations, this study might help to provide a set of findings that could be considered as a baseline for comparison with future studies and a basis to effect needed change in the content of neurology lectures in general and epilepsy in particular, and also this study is important for policymakers and key opinion leaders in curriculum preparation.

| Person with epilepsy can live alone | Disagree N (%) | Neutral N (%) | Agree N (%) | Mean | SD |
|-------------------------------------|----------------|---------------|-------------|------|----|
| A person with epilepsy can drive    | 184 (80.7%)    | 25 (11%)      | 19 (8.3%)   | 1.2763 | ±0.60683 |
| A person with epilepsy has limited sports and leisure activities | 54 (23.7%) | 78 (34.2%) | 98 (42.1%) | 2.1842 | ±0.79165 |

### TABLE 3 Attitude of medical students toward people with epilepsy

| Statement                                                                 | Disagree N (%) | Neutral N (%) | Agree N (%) | Mean   | SD    |
|---------------------------------------------------------------------------|----------------|---------------|-------------|--------|-------|
| Person with epilepsy can live alone                                      | 185 (81%)      | 29 (13%)      | 14 (6%)     | 1.250  | ±0.55828 |
| A person with epilepsy can drive                                        | 184 (80.7%)    | 25 (11%)      | 19 (8.3%)   | 1.2763 | ±0.60683 |
| A person with epilepsy has limited sports and leisure activities        | 54 (23.7%)     | 78 (34.2%)    | 98 (42.1%)  | 2.1842 | ±0.79165 |
| I refuse to marry someone with epilepsy                                  | 147 (64.5%)    | 50 (21.9%)    | 31 (13.6%)  | 1.4912 | ±0.72398 |
| I refuse to employ a person with epilepsy in an office job for me        | 180 (79%)      | 32 (14%)      | 16 (7%)     | 1.2807 | ±0.58632 |
| I refuse to go with someone with epilepsy to a public place              | 204 (89.5%)    | 19 (8.3%)     | 5 (2.2%)    | 1.1272 | ±0.39441 |
| Children with epilepsy must join schools for persons with disabilities   | 187 (82%)      | 26 (11.4%)    | 15 (6.6%)   | 1.2456 | ±0.56415 |
| Children with epilepsy must be separated from other children             | 209 (91.7%)    | 17 (7.4%)     | 2 (0.9%)    | 1.0921 | ±0.31877 |
| Children with epilepsy must be prevented from participating in sport exercises in school | 155 (68%) | 48 (21%) | 25 (11%) | 1.4298 | ±0.68295 |
| People with epilepsy cannot judge on things like the rest of people      | 192 (84.2%)    | 27 (11.8%)    | 9 (4%)      | 1.1974 | ±0.48827 |
| People with epilepsy must not have children.                              | 212 (93%)      | 13 (5.7%)     | 3 (1.3%)    | 1.0833 | ±0.32118 |
| People with epilepsy are less intelligent than other people are          | 196 (86%)      | 25 (11%)      | 7 (3%)      | 1.1711 | ±0.45177 |
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CONFLICTS OF INTEREST
None of the authors has any conflict of interest to disclose.

ETHICAL APPROVAL
We confirm that we have read the Journal’s position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

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