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Awareness and Knowledge of Medical Students about Epilepsy in Makkah, Saudi Arabia: A Cross-Sectional Study

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Abstract **Background:** Epilepsy is a common neurological disorder that affects millions globally and remains surrounded by stigma and misconceptions, particularly in some regions. Understanding medical students' awareness and knowledge is vital, as they play a critical role in shaping future healthcare attitudes and practices. This study aimed to assess the awareness, knowledge, and perceptions of epilepsy among medical students in Makkah, Saudi Arabia. **Methods:** A descriptive cross-sectional study was conducted from March to May 2024 involving 400 medical students from Umm Al-Qura University in Makkah. Data were collected using a validated, self-administered online questionnaire distributed via social media platforms. The questionnaire covered demographic data, general knowledge, perceived causes, attitudes, and compliance with physician recommendations regarding epilepsy. Statistical analysis was performed using R software version 4.3.1, employing chi-squared and Fisher's exact tests to assess associations between variables. A p-value of <0.05 was considered statistically significant. **Results:** The overall awareness of epilepsy was high, with 90.2% of participants reporting familiarity with the condition. Awareness was significantly associated with marital status ($p = 0.014$) and academic year ($p = 0.001$). Clinical year students showed significantly greater understanding of symptom variability (85.7% vs. 73.6%, $p = 0.004$) and the treatability of epilepsy (52.0% vs. 25.6%, $p<0.001$) compared to preclinical students. Despite high awareness, some stigma-related responses were noted, including hesitation about social interactions and misconceptions about the autonomy of individuals with epilepsy. **Conclusion:** Medical students in Makkah demonstrate a generally good level of awareness and knowledge about epilepsy, particularly those in clinical years. However, persistent stigma and gaps in understanding suggest the need for targeted educational interventions. Enhancing epilepsy-related content in the medical curriculum and promoting awareness through workshops and campaigns can further improve attitudes and preparedness in future healthcare professionals.

Key Words Epilepsy, Awareness, Knowledge, Medical Students, Stigma, Saudi Arabia, Makkah

INTRODUCTION

Epilepsy is a chronic, noncommunicable neurological disorder that affects approximately 50 million people globally and is clinically defined by the occurrence of two or more unprovoked seizures [1]. These seizures are characterized by brief episodes of involuntary movement, which may sometimes involve a loss of consciousness or control over bladder and bowel functions [2].

Despite its high prevalence and treatability, epilepsy remains widely misunderstood and is often surrounded by stigma and misconceptions. Public perceptions of epilepsy are frequently shaped by cultural beliefs rather than scientific knowledge. For instance, a study conducted in Al Majmaah city, Saudi Arabia, revealed that 10% of residents believed epilepsy was caused by jinn or "fairy spirits," while 23% attributed it to evil forces [3-4]. Such beliefs contribute significantly to the social stigma and discrimination faced by individuals with epilepsy.

Discrimination against people living with epilepsy is commonly rooted in a lack of awareness and understanding of the condition [5]. This misunderstanding persists across various segments of society, regardless of age, gender, socioeconomic status, education level, or race [6]. As a result, epilepsy continues to be a source of social exclusion and negative attitudes, even among those in healthcare-related fields.

Understanding epilepsy is essential for shaping public attitudes and improving interactions with affected individuals. In particular, medical students represent the next generation of healthcare providers and play a critical role in promoting informed and empathetic care. However, there is a noticeable gap in the literature regarding medical students' awareness, knowledge, and attitudes towards epilepsy, especially within the Saudi context.

This study aims to assess the knowledge, perceptions, and attitudes of medical students at Umm Al-Qura University in Makkah, Saudi Arabia, toward epilepsy. By exploring their understanding and beliefs, this research seeks to identify areas for educational improvement and contribute to reducing stigma within the healthcare system.

METHODS

This study employed a web-based, descriptive cross-sectional design to evaluate the awareness and knowledge of epilepsy among medical students. The data were collected through an online questionnaire adapted from a previously validated study instrument [7].

The study population included medical students enrolled in the second through sixth academic years at Umm Al-Qura University in Makkah, Saudi Arabia. Participation was voluntary, and written informed consent was obtained electronically from all respondents prior to their inclusion in the study. Ethical approval was granted by the Biomedical Research Ethics Committee at Umm Al-Qura University (Approval Number: HAPO-02-K-012-2023-10-1811).

Data collection was carried out between March and May 2024 through the dissemination of the questionnaire via social media platforms, including WhatsApp and Twitter. The survey was administered using Google Forms (Google LLC, Mountain View, California, United States), and was conducted in English. The questionnaire was developed based on a comprehensive literature review and included 23 items divided into five sections:

- Demographic information
- General knowledge of epilepsy
- Awareness of epilepsy causes, with comparison between preclinical and clinical years
- Attitudes toward individuals with epilepsy
- Compliance with physician recommendations regarding epilepsy

The minimum sample size required for statistical analysis was calculated using OpenEpi version 3.0. With an estimated total student population of 1,500, a confidence level of 95%, and an expected frequency of 50%, the required sample size was determined to be 306 participants. Ultimately, 400 valid responses were collected and included in the analysis.

Data were analyzed using R software version 4.3.1. Descriptive statistics (frequencies and percentages) were used to summarize the participants' characteristics. Inferential statistics, including Pearson's Chi-squared test and Fisher's exact test, were applied to explore associations between sociodemographic variables (e.g., academic year, marital status) and levels of epilepsy awareness. Differences in knowledge and attitudes between clinical and preclinical students were also assessed using Chi-squared tests. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The responses of 400 students were analyzed in the current study. The majority of participants fell within the age range of 20 to 23 years, constituting 65.8% of the sample. Regarding marital status, the vast majority were single, comprising 98.0% of respondents. In terms of academic year,

Table 1: Sociodemographic Characteristics of the Participants (N = 400)

Characteristic	Category	Frequency (n)	(%)
Age (years)	18 – 20	64	16.0
	20 – 23	263	65.8
	23 – 25	66	16.5
	25 – 30	7	1.8
Marital Status	Single	392	98.0
	Married	7	1.8
	Divorced	1	0.3
Academic Year	First Year	7	1.8
	Second Year	46	11.5
	Third Year	68	17.0
	Fourth Year	90	22.5
	Fifth Year	127	31.8
	Sixth Year	44	11.0
	Intern/Resident	18	4.5
Year of Study	Preclinical	121	30.3
	Clinical	279	69.8

Table 2: Differences In Awareness Levels About Epilepsy in Terms of Sociodemographic Characteristics Aware About Epilepsy or Convulsive Seizures

Characteristic	No N=20	Yes N=361	Maybe N=19	p-value
Your age	-	-	-	0.307
18 to 20	5 (7.8%)	54 (84.4%)	5 (7.8%)	-
20 to 23	13 (4.9%)	238 (90.5%)	12 (4.6%)	-
23 to 25	2 (3.0%)	63 (95.5%)	1 (1.5%)	-
25 to 30	0 (0.0%)	6 (85.7%)	1 (14.3%)	-
Marital status	-	-	-	0.014
Single	17 (4.3%)	356 (90.8%)	19 (4.8%)	-
Married	3 (42.9%)	4 (57.1%)	0 (0.0%)	-
Divorced	0 (0.0%)	1 (100.0%)	0 (0.0%)	-
Academic year	-	-	-	0.001
First year	0 (0.0%)	6 (85.7%)	1 (14.3%)	-
Second year	6 (13.0%)	33 (71.7%)	7 (15.2%)	-
Third year	3 (4.4%)	64 (94.1%)	1 (1.5%)	-
Fourth year	4 (4.4%)	80 (88.9%)	6 (6.7%)	-
Fifth year	6 (4.7%)	120 (94.5%)	1 (0.8%)	-
Sixth year	0 (0.0%)	43 (97.7%)	1 (2.3%)	-
Intern/Resident	1 (5.6%)	15 (83.3%)	2 (11.1%)	-
Year of study	-	-	-	0.074
Preclinical	9 (7.4%)	103 (85.1%)	9 (7.4%)	-
Clinical	11 (3.9%)	258 (92.5%)	10 (3.6%)	-

Note: n (%) Fisher's exact test

Table 3: Participants' Responses Regarding General Knowledge about Epilepsy

Characteristic	Overall (N = 400)	Preclinical (N = 121)	Clinical (N = 279)	p-value
Do you know anyone who has epilepsy?	-	-	-	0.907
No	276 (69.0%)	83 (68.6%)	193 (69.2%)	-
Yes	124 (31.0%)	38 (31.4%)	86 (30.8%)	-
Do not know	0 (0.0%)	0 (0.0%)	0 (0.0%)	-
Would you object to any of your children playing with persons who sometimes have seizures?	-	-	-	0.149
No	208 (52.0%)	59 (48.8%)	149 (53.4%)	-
Yes	113 (28.3%)	31 (25.6%)	82 (29.4%)	-
Do not know	79 (19.8%)	31 (25.6%)	48 (17.2%)	-
Would you object to your son or daughter marrying a person who has seizures?	-	-	-	0.756
No	173 (43.3%)	50 (41.3%)	123 (44.1%)	-
Yes	89 (22.3%)	26 (21.5%)	63 (22.6%)	-
Do not know	138 (34.5%)	45 (37.2%)	93 (33.3%)	-
Do you think people with epilepsy can be employed like others?	-	-	-	0.372
No	50 (12.5%)	14 (11.6%)	36 (12.9%)	-
Yes	304 (76.0%)	89 (73.6%)	215 (77.1%)	-
Do not know	46 (11.5%)	18 (14.9%)	28 (10.0%)	-
Do all patients with epilepsy have the same symptoms?	-	-	-	0.004
No	328 (82.0%)	89 (73.6%)	239 (85.7%)	-
Yes	32 (8.0%)	11 (9.1%)	21 (7.5%)	-
Do not know	40 (10.0%)	21 (17.4%)	19 (6.8%)	-
Does epilepsy strike at any particular age?	-	-	-	0.623
No	148 (37.0%)	43 (35.5%)	105 (37.6%)	-
Yes	146 (36.5%)	42 (34.7%)	104 (37.3%)	-
Do not know	106 (26.5%)	36 (29.8%)	70 (25.1%)	-
Is epilepsy a treatable disease?	-	-	-	<0.001
No	130 (32.5%)	48 (39.7%)	82 (29.4%)	-
Yes	176 (44.0%)	31 (25.6%)	145 (52.0%)	-
Do not know	94 (23.5%)	42 (34.7%)	52 (18.6%)	-

Note: Statistical tests used: Fisher's exact test and Pearson's Chi-squared test. Values are presented as n (%)

the fifth year had the highest representation, accounting for 31.8% of participants. Moreover, most participants were in the clinical years of study, making up 69.8% of the sample (Table 1).

Awareness Levels About Epilepsy in Terms of Sociodemographic Characteristics

Of note, 361 students were aware about epilepsy or convulsive seizures (90.2%, Figure 1). Regarding the associated factors, marital status ($p = 0.014$) and academic year ($p = 0.001$) showed significant associations. Among the married participants, only 57.1% were aware of epilepsy, contrasting sharply with the 90.8% awareness rate among singles. Regarding academic year, second-year students exhibited the lowest awareness rate at 71.7%, while awareness levels were notably higher among students in other academic years, ranging from 83.3% to 97.7% (Table 2).

Participants' Responses Regarding the General Knowledge About Epilepsy

A significant majority, comprising 76.0% of respondents, expressed that individuals with epilepsy can be employed in jobs like others. Moreover, 82.0% of participants acknowledged that not all patients with epilepsy exhibit the same symptoms. Overall, 36.5% recognized that epilepsy can strike at any particular age, while 44.0% of respondents believed that epilepsy is a treatable disease. Only 31.0% of students knew anyone with epilepsy, with 28.3% indicating that they would object to having any of their children play with individuals who sometimes had seizures and 22.3% would object to having a son or daughter marry a person who sometimes has seizures (Table 3). The comparison between clinical and preclinical years revealed that significantly more clinical year students believed that not all patients with epilepsy have the same symptoms (85.7% vs. 73.6%, $p = 0.004$) and that epilepsy is a treatable disease (52.0% vs. 25.6%, $p<0.001$) compared to their preclinical counterparts (Table 3). Participant perceptions regarding the causes of epilepsy indicated that the majority attribute it to brain disease (83.2%), followed by hereditary factors (65.2%) and mental or emotional stress disorders (57.8%, Figure 2).

Among the participants, 90.3% believed that a person with epilepsy can have a child, while 90.0% found it acceptable to work with a person with epilepsy as a colleague. Furthermore,59.3% disagreed with the idea that students with epilepsy should be prevented from participating

Table 4: Participants' Responses Regarding Attitudes About Epilepsy

Characteristic	Overall (N = 400)	Preclinical (N = 121)	Clinical (N = 279)	p-value
A person with epilepsy can have a child				
No	11 (2.8%)	5 (4.1%)	6 (2.2%)	0.082
Yes	361 (90.3%)	103 (85.1%)	258 (92.5%)	
Do not know	28 (7.0%)	13 (10.7%)	15 (5.4%)	
Can a person with epilepsy live alone?				
No	195 (48.8%)	69 (57.0%)	126 (45.2%)	0.016
Yes	103 (25.8%)	20 (16.5%)	83 (29.7%)	
Do not know	102 (25.5%)	32 (26.4%)	70 (25.1%)	
Acceptable to work with a person with epilepsy (as colleague)?				
No	12 (3.0%)	7 (5.8%)	5 (1.8%)	0.102
Yes	360 (90.0%)	105 (86.8%)	255 (91.4%)	
Do not know	28 (7.0%)	9 (7.4%)	19 (6.8%)	
Should students with epilepsy be prevented from participating in sports?				
No	237 (59.3%)	72 (59.5%)	165 (59.1%)	0.532
Yes	57 (14.3%)	14 (11.6%)	43 (15.4%)	
Do not know	106 (26.5%)	35 (28.9%)	71 (25.4%)	
In developing countries like Saudi Arabia, does epilepsy affect a small number of people?				
No	219 (54.8%)	47 (38.8%)	172 (61.6%)	<0.001
Yes	181 (45.3%)	74 (61.2%)	107 (38.4%)	
Do not know	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Must every person with epilepsy use an antiepileptic drug?	-	-	-	
No	113 (28.3%)	16 (13.2%)	97 (34.8%)	<0.001
Yes	185 (46.3%)	60 (49.6%)	125 (44.8%)	
Do not know	102 (25.5%)	45 (37.2%)	57 (20.4%)	
Is there a role for surgical intervention in advanced epilepsy cases?				
No	47 (11.8%)	20 (16.5%)	27 (9.7%)	<0.001
Yes	167 (41.8%)	29 (24.0%)	138 (49.5%)	
Do not know	186 (46.5%)	72 (59.5%)	114 (40.9%)	
During your professional training, did you receive information on how to manage epilepsy?				
No	81 (20.3%)	40 (33.1%)	41 (14.7%)	<0.001
Yes	263 (65.8%)	53 (43.8%)	210 (75.3%)	
Do not know	56 (14.0%)	28 (23.1%)	28 (10.0%)	
Would you follow a physician's advice not to drive if you had epilepsy?				
No	43 (10.8%)	15 (12.4%)	28 (10.0%)	0.582
Yes	298 (74.5%)	86 (71.1%)	212 (76.0%)	
Do not know	59 (14.8%)	20 (16.5%)	39 (14.0%)	
If no, what are the reasons for not following physicians' driving restrictions?*				
Financial reasons	1 (2.4%)	1 (6.7%)	0 (0.0%)	0.390
No reason to prevent patients from driving	10 (23.8%)	2 (13.3%)	8 (29.6%)	
Public awareness	19 (45.2%)	7 (46.7%)	12 (44.4%)	
Social reasons	12 (28.6%)	5 (33.3%)	7 (25.9%)	

Note: Fisher's exact test and Pearson's Chi-squared test used where appropriate

in sport activities. Overall, 65.8% reported having access to information on how to deal with epilepsy during their professional training. Of the participants, 25.8% believed that a person with epilepsy can live alone and 45.3% acknowledged that epilepsy affects a significant number of people in developing countries like Saudi Arabia. Additionally, 46.3% agreed that every person with epileptic seizures must use an antiepileptic drug, while 41.8% recognized a role for surgical intervention in advanced epileptic cases. Importantly, 74.5% indicated they would comply with a physician's instruction not to drive if they had epilepsy while 10.8% would not. Among the latter group, the most common causes of not following physician's instructions were public awareness (45.2%) and social reasons (28.6%, Table 4). When comparing clinical and preclinical years, more clinical year students agreed that a person with epilepsy can live alone (29.7% vs. 16.5%, p = 0.016) and that there is a role for surgical intervention in advanced epileptic cases (49.5% vs. 24.0%, p<0.001).

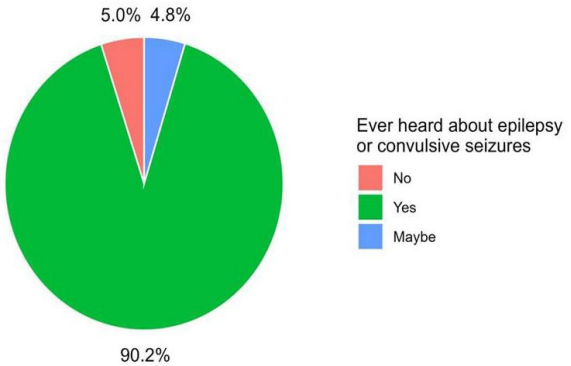

Figure 1: A Pie Chart Depicting the Proportions of Awareness Levels Regarding Epilepsy or Convulsive Seizures

Additionally, more clinical year students reported having access to information on how to deal with epilepsy during their professional training (75.3% vs. 43.8%, p<0.001).

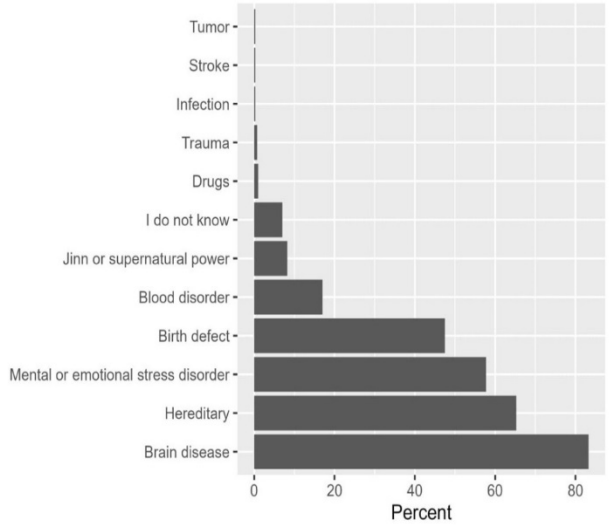

Figure 2: The Proportions of Participants' Perceptions Regarding the Causes of Epilepsy

Conversely, a significantly lower proportions of clinical year students agreed that epilepsy affects a significant number of people in developing countries like Saudi Arabia (38.4% vs. 61.2%, p<0.001) and that every person with epileptic seizures must use an antiepileptic drug (44.8% vs. 49.6%, p<0.001, Table 4).

DISCUSSION

This study aimed to assess the knowledge and attitudes of medical students regarding epilepsy at Umm Al-Qura University in Makkah, Saudi Arabia. A total of 400 students participated, and findings indicated a high level of general awareness, with 97.7% reporting that they had heard of epilepsy or convulsive seizures. Notably, clinical students demonstrated significantly higher levels of awareness compared to preclinical students, a trend consistent with previous research conducted in Riyadh, where 95% of students had heard of epilepsy and clinical students exhibited greater awareness than preclinical counterparts [7]. Similar findings were reported in studies conducted in Jeddah and King Abdulaziz University, where awareness among clinical students was significantly higher than among preclinical students [8-9]. Additionally, a study in Malaysia reported that 86% of students were aware of epilepsy, supporting the idea that awareness is generally high among university students [10].

In our study, 8% of participants believed that all epilepsy patients exhibit the same symptoms. While this figure is relatively low, it remains higher than that reported in several local studies among both students and healthcare professionals [7, 8, 11]. Furthermore, 36.5% of respondents recognized that epilepsy could occur at any age, and 44% believed it is a treatable disease. These findings are in line with Abdulrahman et al. [7], and a study in Riyadh where 82.3% of healthcare professionals considered epilepsy treatable [11].

When exploring beliefs about the causes of epilepsy, brain disease was most frequently cited (83.2%), followed by hereditary factors (65.2%) and mental/emotional stress (57.8%). These results align with earlier local findings [7], although they contrast with other reports highlighting causes such as brain infections [9], stroke [8], and tumors [12].

A generally positive attitude toward individuals with epilepsy was observed. For example, 90% of participants stated they were willing to work with people affected by epilepsy, which closely mirrors the 89.6% reported in previous research [7]. Similarly, 99% of healthcare professionals in another study indicated no objection to working alongside colleagues with epilepsy [11].

However, negative attitudes persist in certain areas. In this study, 59.3% of participants believed that students with epilepsy should not participate in sports—higher than the 51.3% reported by Abdulrahman et al. [7], but lower than the 76.5% found by Alaqeel et al. [11]. Social stigma was also reflected in personal scenarios: only 52% of students said they would allow their children to play with someone who experiences seizures, echoing similar hesitations noted in other studies [8]. In contrast, this acceptance was significantly higher (92.6%) among healthcare professionals [11].

Regarding treatment awareness, 41% of participants believed surgery could be a treatment option for epilepsy—comparable to findings in other regional studies [7-9,11], though lower than the 49.5% observed in our clinical group. An earlier Turkish study reported a lower rate of awareness about surgical treatment (25.2%) [12].

Participants also expressed mixed attitudes regarding marriage and independence for people with epilepsy. While 90.3% agreed that a person with epilepsy can have children, only 43.3% stated they would not object to their son or daughter marrying someone with epilepsy. These attitudes align with trends reported in other student populations [8-9,12-13]. In contrast, a more accepting view was found in a Turkish study by Akça & Kurt, where only 7.6% expressed such objection [14]. Moreover, only 25.8% of our respondents believed that individuals with epilepsy can live independently, a perception consistent with earlier local studies [7-8].

Regarding medication, 46.4% of participants believed all people with epilepsy must use antiepileptic drugs, a rate higher than the 30.4% reported in a Riyadh-based study [7]. This suggests some improvement in understanding but also highlights ongoing misconceptions.

Our findings indicate that clinical-year students consistently demonstrated more favorable knowledge and attitudes toward epilepsy compared to preclinical students. This difference is likely due to increased exposure to patients and relevant clinical experiences, suggesting that curriculum progression positively impacts students' understanding and reduces stigmatizing beliefs. Preclinical students, having limited exposure to real cases, may still rely on preconceived notions or societal myths. Thus, structured academic and clinical exposure appears to be essential for cultivating empathy and accurate knowledge.

This study is not without limitations. The use of self-administered questionnaires may introduce response bias, and the online distribution method may have limited participation to students more active on social media, introducing selection bias. Nevertheless, this study represents, to our knowledge, one of the first attempts to assess epilepsy-related knowledge and attitudes among medical students in Makkah, providing important baseline data for future educational interventions.

CONCLUSIONS

This study demonstrates that medical students in Makkah, particularly those in clinical years, possess a generally good level of awareness and understanding of epilepsy. However, notable gaps remain in knowledge, attitudes, and perceptions—especially among preclinical students. Continued efforts are needed to enhance epilepsy education through structured curriculum improvements, targeted awareness campaigns, and early clinical exposure. These steps are essential to reduce stigma, correct misconceptions, and better prepare future healthcare providers to support individuals living with epilepsy.

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Conflicts of Interest

The authors declare no conflicts of interest related to this study.

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