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Epilepsy stigma in Saudi Arabia: The roles of mind–body dualism, supernatural beliefs, and religiosity

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ABSTRACT

Introduction: The stigma of epilepsy continues to negatively impact people with epilepsy (PWE) in many Arab Middle Eastern countries, including Saudi Arabia. Socioreligious, cultural, and philosophical ideas prevalent in the region may contribute to the underpinnings of stigma toward PWE, but this has not been sufficiently studied.
Materials and methods: This study recruited a convenience sample of people without epilepsy from clinic waiting rooms and through social media. Participants completed a questionnaire with questions about demographics, mind–body dualism (MBD), supernatural beliefs (SB), attitudes toward epilepsy (ATE), and religiosity.
Results: A total of 210 participants were recruited. Analysis of variance (ANOVA) showed a significant difference in the mean total ATE scores, indicating better ATE with higher education ($p < 0.001$). Despite the relatively high level of education and a high proportion of participants with medical training, only slightly more than half rejected the possibility that demonic possession may be a cause of epilepsy. Attitudes toward epilepsy were correlated with MDB and SB but not with religiosity. Mind–body dualism and religiosity correlated significantly with negative attitudes toward PWE ($p < 0.05$). A linear regression model using ATE as the dependent variable and MDB, SB, and educational level as independent variables significantly predicted ATE ($F = 15.6$, $p < 0.001$, $R2 = 0.24$), although SB dropped out as a predictor of ATE in that model. Another regression used SB as the dependent variable, and MBD, religiosity, and educational level as independent variables were also significant with all three variables predicting SB ($F = 64.0$, $p < 0.001$).
Conclusions: Mind–body dualism was related to the cognitive process leading to supernatural misconceptions about epilepsy and negative attitudes toward PWE in Saudi Arabia. Although misconceptions that supernatural possession was the cause of epilepsy (justifying treatment by religious healing) and was likely derived from prevalent religious beliefs of the region, religiosity was not associated with negative attitudes toward PWE. The merits and efficacy of an intervention focused on reducing the negative effects of MBD and SB on ATE warrants further investigation.

1. Introduction

The stigma of epilepsy negatively impacts a large swath of the people with epilepsy (PWE) in the Arab Middle Eastern region [1–3]. Research from several countries in the region has shown a relatively high prevalence of negative attitudes toward PWE among the general public, schoolteachers and students, and even healthcare professionals [2,4–7]. Saudi Arabia is one of the Arab Middle Eastern countries where research has shown persistence of negative attitudes and stigma toward epilepsy [4–6,8–13]. Supernatural beliefs (SB) that seizures are caused by demonic possession by mythological and theological creatures called *jinn* are particularly problematic in this country [8,14]. Belief in malevolent jinn as a cause of epilepsy was endorsed by up to 40–50% of studied samples drawn from various Saudi regions [6,8–12]. Similarly, a high proportion of Saudi patients and families (30–50%) resort to various forms of exorcism and religious healing practices [5,6,8,10]. There are also prevalent misconceptions about psychosocial aspects of epilepsy in Saudi Arabia, including deeming PWE insane, unintelligent, evil, or unfit to marry, work, or function effectively as members of society [6,9,10,15].

However, the underpinnings of this stigma toward epilepsy in Arab Middle Eastern countries are not completely understood. It has not been determined whether and how prevailing social, cultural, religious, and philosophical beliefs in the region shape attitudes toward epilepsy (ATE). As most of these countries are generally conservative and religious [3], it makes sense to consider the potential influence of religiosity in shaping ATE. Epilepsy is a disorder that has been associated with religious interpretations and experiences throughout history [16,17]. Islam is the predominant religion in the Middle Eastern region, and the opinions and interpretations of some religious authorities have linked seizures to jinn possession and lack of piety [8,14]. Thus, it is

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important to explore whether there is a relationship between religiosity and negative ATE in this region. Nonetheless, even though some of the misconceptions about epilepsy seem to arise from religious beliefs, these misconceptions have been present in a myriad of cultures throughout history, suggesting there may be other contributing factors. Indeed, it has been suggested that an aversion to seizures may be partly "hard-wired" because the behavioral and motor alterations associated with seizures may be perceived as threatening to the safety of others [16]. This may have partly contributed to the tendency to mischaracterize epilepsy and attribute it to supernatural forces like demonic possession. These SB may in turn relate to beliefs in nonphysical dimensions of the human mind that is vulnerable to supernatural forces. The philosophical viewpoint, first articulated by Rene Descartes, claiming that the mind may be partly or entirely nonphysical, is referred to as mind–body dualism (MBD) [18]. People may be led to believe that epilepsy is caused by possession because of religious teaching, but may also arrive at this belief because of a dualistic view of the human mind and beliefs in supernatural entities that influence it [18]. Of course, it may be that MBD, SB, and religiosity interact to shape people's perceptions of epilepsy.

More than two decades ago, the World Health Organizatoin (WHO) launched the Global Campaign Against Epilepsy: Out of the Shadows [19]. There have been some successes in improving knowledge and attitudes toward PWE throughout the world, including the Middle Eastern region [6,20–22]. However, the success of stigma-reducing interventions has been controversial, and negative attitudes and misconceptions persist in many regions. Relatively few studies have investigated the efficacy of specific interventions designed to reduce stigma in epilepsy [16], and no such interventions have been shown to be successful in the Arab Middle Eastern region. Stigma is a social process where a society discredits individuals with certain characteristics that differ from others, adversely affecting their self-identity [23]. In order to effectively alter this social process, it is important to keep the strategies of stigma-reducing interventions socially and culturally informed, targeting the specific elements that contribute to stigma in the target population [24]. Therefore, in an Arab Middle Eastern country like Saudi Arabia, there is a need to specifically investigate the potential contributions of religiosity, MBD, and SB. This includes how each of these may be associated with measures of stigma and negative ATE, and how they may interact with each other. This knowledge gap provided the rationale for this study. The results may be helpful in focusing educational and awareness interventions on the specific ideas that contribute to the basis for stigma toward epilepsy in Saudi Arabia and may serve as a model for further work in other Arab countries.

2. Materials and methods

2.1. Study participants

Participants were a convenience sample of individuals visiting the outpatient medical departments of King Abdulaziz University Hospital, an academic tertiary care center in Jeddah, Saudi Arabia. In addition, the study recruited individuals by posting a link to a secure platform hosting the study's questionnaire on social media outlets (Twitter and WhatsApp groups). The sample included lay persons and patients without epilepsy in hospital waiting rooms, along with medical students and other medical trainees. People with epilepsy were excluded from the study. Of the 312 individuals approached in the outpatient departments, 109 participated in the study. An additional 101 individuals were recruited through Twitter and WhatsApp groups. The target sample size was estimated to be 200 participants in order to detect significant correlations between variables at a magnitude of $r = 0.20$ ($\alpha = 0.05, \beta = 0.2$).

2.2. Procedures

Researchers administered questionnaires in person and via the social media platforms described above. All individuals consented to completing the anonymous questionnaire. The study was approved by the Ethical Review Board of the Faculty of Medicine at King Abdulaziz University.

2.3. Measures

The questionnaire asked about age, gender, education, and knowledge about and ATE (10 questions, such as whether PWE could drive, swim, marry, have children, work, be intelligent, succeed academically, or stop medication). These were followed by questions about whether epilepsy is a mental disorder and whether it should be treated by religious healing (supplications from the Quran and/or acts of exorcism to expel evil spirits and demons). Response options were "yes", "no", or "I don't know". These 10 questions, chosen because of their face validity, simplicity, and relevance, were derived from questions used to assess ATE previously in Iran [25]. The internal reliability of the ATE scale in the present sample was acceptable (Cronbach's alpha = 0.70).

The next set of questions, the SB scale, inquired about participants' strength of belief in the possibility that epilepsy may be caused by certain supernatural entities that are relevant in Saudi Arabia. These supernatural entities were chosen because of their cultural relevance [4]. They included possession by evil demons (jinn), envy of the evil eye (the idea that malevolent and envious thoughts or staring directed at others can harm them), sorcery (including spells and curses cast to harm others), fate (unchangeable and preordained destiny), divine testing to scrutinize the faith of the tested, and divine punishment of sinners. Participants were asked how strongly they agreed/disagreed with the possibility that each of these supernatural entities may cause epilepsy and provided their answers on a 5-point Likert scale. The internal reliability of the scale in this study was alpha = 0.90.

The MBD scale inquired about participant attitudes (agreement on the same 5-point Likert scale) in response to 3 statements about MBD. These statements in English (translated into Arabic) were as follows: 1) the self and soul are the primary determinants of thoughts, emotions, and behaviors; 2) the self and soul interact with the body to determine thoughts, emotions, behaviors; and 3) nonmaterial factors (spirituality, religiosity, morality) may supersede brain functions and determine thoughts, emotions, and behaviors. The statements were developed after reviewing published MBD scales [18,26] and crafted using simple, culturally relevant language (Cronbach's alpha = 0.60).

Finally, 5 questions from the Belief into Action scale (BIAC) were included to assess religiosity (alpha = 0.70 in the present sample) [27]. The questionnaire was piloted in the first 20 individuals with minor modifications made to the questions to improve clarity.

A secure Google Forms platform was used to store and administer the questionnaire. For the MBD and SB scales, Likert scores for each participant were summed and averaged to calculate the total MBD score and total SB score. With regard to questions about ATE, answers indicating unfavorable attitudes were scored as 0, those indicating favorable ones were scored as 2 whereas ambivalent answers were scored as 1. As such, lower ATE scores indicate negative attitudes toward PWE. The scores of each participant were then summed and averaged to calculate the total ATE score. The BIAC item scores (assessed on a scale from 1 to 10) were summed and divided by 5 to obtain a total average score per item religiosity score [27]. Data were analyzed using IBM SPSS version 20.

3. Results

The demographic characteristics of the sample are presented in Table 1. There were more female than male participants. One-way analysis of variance (ANOVA) showed a significant difference in mean ATE scores based on the level of education ($F(2, 207) = 17.8$, $p < 0.001$). The mean ATE scores for participants with a high school education or lower were 5.7 (standard deviation (SD) = 1.8, 95% confidence interval (CI) = 5.0–6.3), compared with 6.3 (SD = 2.0, 95% CI =

Table 1
Demographic characteristic of study participants.

		n	(%)
Gender	Male	73	(35.7)
	Female	137	(64.3)
Education	High school	29	(20.3)
	College or higher, nonmedical	61	(42.7)
	Medical studies/training	53	(37.1)
Marital status	Not married	69	(48.3)
	Married	74	(51.7)
Occupation	Student	52	(36.4)
	Working	57	(36.9)
	Not working	34	(23.8)

5.8–6.8) for those with a nonmedical bachelor's degree or higher, and 7.5 (SD = 1.6, 95% CI = 7.2–7.8) for those with medical education or training (where higher scores indicate more positive attitudes). The frequency distribution for responses to the MBD questions is presented in Table 2, indicating that most participants positively endorsed dualistic statements. The mean MBD score was 4.1 (SD = 0.7, 95% CI = 4.0–4.3). At least half of the participants indicated belief in each of the supernatural entities inquired about (SB; Table 3). The mean SB score was 2.5 (SD = 1.0, 95% CI = 2.3–2.6). Despite the relatively high level of participants' education and the high proportion with medical training, only slightly more than half rejected the possibility that possession might be a cause for epilepsy. The mean score on the BIAC was 5.2 (SD = 1.6, 95% CI = 5.0–5.4), which indicates moderately high religiosity. The frequency of participants' responses to questions regarding ATE is presented in Table 4. Most participants had favorable attitudes except toward the ability of PWE to drive, swim, and conceive and deliver a child, where responses were mixed. Participants also gave mixed responses to whether PWE should be treated using religious healing practices. The mean ATE score was 6.8 (SD = 1.9, 95% CI = 6.6–7.1).

Pearson correlations between study variables are shown in Table 5. The ATE scores correlated significantly with MBD and SB (including belief in the causal roles for possession and the need for religious healing) but not with religiosity. In addition, MBD correlated significantly with negative attitudes toward PWE with regard to driving ($r = -0.25$, $p < 0.001$), swimming ($r = -0.30$, $p < 0.001$), and intelligence ($r = -0.40$, $p < 0.001$). Supernatural beliefs correlated significantly with negative attitudes toward PWE with regard to marriage ($r = -0.29$, $p < 0.001$), driving ($r = -0.30$, $p < 0.001$), pregnancy ($r = -0.40$, $p < 0.001$), swimming ($r = -0.39$, $p < 0.001$), achieving a college education ($r = -0.15$, $p = 0.03$), and intelligence ($r = -0.40$, $p < 0.001$). Religiosity was significantly correlated with negative attitudes toward PWE with regard to driving ($r = -0.26$, $p < 0.001$), pregnancy ($r = -0.24$, $p < 0.001$), swimming (-0.40, $p < 0.001$), and intelligence ($r = -0.40$, $p < 0.001$).

To further investigate the relationships of MBD, SB, and negative ATE, a linear regression model was run using ATE as the dependent variable and MBD, SB, and educational level as independent variables (Table 6). Religiosity was not included in the model given the absence of significant correlation with overall ATE in bivariate analyses. The R-square for the overall ATE model was significant ($F = 15.6$, $p < 0.001$, $R^2 = 0.24$), with a decrease of 0.5 points in ATE (worsening in attitudes toward PWE) for each point of increase in MBD ($p = 0.025$). Supernatural beliefs were no longer a significant predictor of ATE in the presence of MBD ($p = 0.61$). These findings suggest that once MBD and education were controlled for in the model, SB dropped out as a significant predictor. Another regression model was run using SB as the dependent variable and MBD, religiosity, and educational level as independent variables (Table 6), with all three predictors explaining a significant proportion of the variance in SB (overall model $F = 64$, $p < 0.001$, $R^2 = 0.56$).

4. Discussion

A number of studies have reported negative attitudes toward PWE in Arab Middle Eastern countries [2]. The present study examined whether certain religious and philosophical beliefs contribute to having such attitudes in Saudi Arabia. Epilepsy has long been thought by those in the general population to be caused by demonic possession, evil spirits, and impurities of the soul. Despite modern education and efforts to increase public awareness of the causes of epilepsy, negative perceptions of PWE persist in Saudi Arabia today. They also persist in some surrounding countries in the Middle East that share some socioreligious characteristics with Saudi Arabia [7,20,25,28–30], as well as in some Muslim communities in Western countries [29,31,32]. This underscores the importance of learning more about what causes these beliefs to persist among many in modern society and negatively impact PWE.

The results of the present study suggest that beliefs in demonic possession as a cause of epilepsy are at least in part due to MBD and superstitious SB, but interestingly not to religiosity. Dualistic views of the human mind appear to lead people to believe that certain nonphysical aspects of the human mind are vulnerable to supernatural forces that can alter them in ways that lead to seizures. Supernatural beliefs then provide explanations of this supposed vulnerability of the mind, leading to the association of epilepsy with demonic possession, evil, and lack of piety. These negative perceptions of epilepsy, in turn, lead to negative attitudes toward PWE. Religiosity was correlated with endorsement of

Table 2
Frequencies of participant responses to statements on the MBD scale.

	Strong disagreement	Disagreement	Maybe	Agreement	Strong agreement
The self and soul are the primary determinants of thoughts, emotions, and behaviors.	1% (3)	15% (32)	15% (31)	40% (84)	29% (61)
The self and soul interact with the body to determine thoughts, emotions, behaviors.	1% (3)	3% (6)	10% (21)	42% (88)	44% (92)
Nonmaterial factors (spirituality, religiosity, morality) may supersede brain functions and determine thoughts, emotions, and behaviors.	1% (3)	6% (12)	13% (27)	41% (86)	39% (82)

Table 3
The frequency of endorsement of supernatural beliefs.

	Strong disagreement	Disagreement	Maybe	Agreement	Strong agreement
Belief in possession	34% (71)	22% (46)	30% (63)	11% (23)	3% (7)
Belief in the evil eye	25% (52)	14% (30)	36% (76)	22% (46)	3% (6)
Belief in sorcery	32% (67)	19% (40)	30% (64)	15% (32)	3% (7)
Belief in fate	7% (15)	3% (6)	9% (19)	42% (88)	39% (82)
Belief in divine testing	15% (32)	7% (15)	16% (34)	47% (97)	15% (32)
Belief in divine punishment	41% (86)	34% (71)	18% (38)	6% (13)	1% (2)

Table 4
Frequencies of responses to questions about attitudes toward epilepsy.

	Yes	Maybe	No
PWE can get married	86% (181)	12% (25)	2% (4)
Women with epilepsy can safely conceive and deliver a child	64% (134)	32% (67)	4% (9)
PWE can swim	41% (86)	31% (65)	28% (59)
PWE can drive	26% (55)	26% (55)	48% (100)
PWE can hold a job	94% (197)	5% (11)	1% (2)
PWE can get a college education	96% (201)	3% (7)	1% (2)
PWE are insane	1% (2)	4% (8)	95% (200)
PWE are less smart than others	1% (2)	17% (36)	82% (172)
PWE must be treated indefinitely	22% (46)	36% (76)	42% (88)
PWE should be treated by religious healers	20% (42)	35% (73)	45% (95)

Table 5
Pearson correlations between study variables.

	MBD	R	SB	Possession score	Sorcery score	RH score
ATE	−0.26 (<0.001)*	0.05 (0.5)	−0.16 (<0.018)*	0.42 (<0.001)*	0.19 (0.006)*	0.49 (<0.001)*
MBD	–	0.15 (0.03)*	0.22 (0.001)*	0.5 (<0.001)*	0.18 (0.009)*	0.48 (<0.001)*
R	0.15 (0.03)*	–	0.61 (<0.001)*	0.3 (<0.001)*	0.43 (0.001)*	0.045 (0.52)
SB	0.22 (0.001)*	0.61 (<0.001)*	–	0.7 (<0.001)*	0.85 (<0.001)*	0.36 (<0.001)*
Possession score	0.5 (<0.001)*	0.3 (<0.001)*	0.7 (<0.001)*	–	0.45 (<0.001)*	0.56 (<0.001)*
Sorcery score	0.18 (0.009)*	0.43 (0.001)*	0.85 (<0.001)*	0.45 (<0.001)*	–	0.42 (<0.001)*

ATE: total score of attitudes toward epilepsy; MBD: total dualism score; R: total religiosity score; SB: total score for strength of belief in supernatural entities; possession score: score for strength of belief that possession causes epilepsy; RH score: score for strength of belief that epilepsy is treatable by religious healers.
* p value < 0.05.

SB, but not with negative attitudes toward PWE. Fig. 1 illustrates the relationship between these variables, demonstrating the role played by MBD. Not only were individuals who scored higher on MBD more likely to endorse supernatural causation and treatment by religious healers, they were also more likely to harbor negative attitudes toward the ability of PWE to function normally in society, suggesting a broader effect than just fueling misconceptions about the nature of the disease and its treatments.

The relationship of MBD with stigma has been studied in the context of mental illness, demonstrating the MBD's association with negative attitudes toward mental illness but not specifically in epilepsy [33–35]. A similar role for MBD in the epilepsy stigma process fits with the framework of stigma in chronic illnesses. Dualism leads to a tendency to misattribute the responsibility for having epilepsy to PWE themselves. Misattribution of responsibility is one of the pillars of stigma associated with chronic illnesses [36]. Dualists are more likely to think that the chain of causality leading to epilepsy starts in the vulnerability of nonphysical parts of the self to supernatural forces. Dualists attribute this vulnerability to less adherence to religious or spiritual practices and to a fundamental deficiency in the soul/morality, which otherwise would protect from negative supernatural influences. This may lead to the assignment of undue blame to PWE, opening the door for other negative attitudes as well [37]. Furthermore, MBD and SB may lead to the belief that epilepsy is a mysterious disease with an ambiguous origin and dangerous consequences. Individuals witnessing a seizure have been described as the "terrified watchers" because the danger or peril they imagine may be inflicted on them as a result of the seizures [16]. Both "origin" and "peril" are among previously proposed dimensions of stigma [16].

The potential implications of this study relate to how stigma-reduction strategies might be designed in Saudi Arabia and countries with similar contexts. In addition to programs focused on increasing awareness about the medical aspects of epilepsy, MBD and SB may need to be specifically targeted to address the root of beliefs in supernatural causes of epilepsy. Educating people about the central role that the brain plays in human behavior and the biological nature of seizures may help to weaken misconceptions that epilepsy is of supernatural origin. This approach has shown success in reducing stigma associated with mental illnesses, which share similarities with epilepsy [38,39]. The potential pitfall to avoid while adopting such an approach is

Table 6
Regression analyses of predictors of attitudes toward epilepsy (ATE) and supernatural beliefs (SB) regarding epilepsy.

Independent variable	B	Standard error	Beta	t	p value	95% CI
Regression model with ATE score as dependent variable						
Constant	8.4	0.97		8.7	<0.001	6.5–10.3
MBD	−0.76	0.17	−0.29	−4.5	<0.001	−1.1 to −0.4
SB	0.08	0.15	0.05	0.5	0.61	−0.2–0.4
Nonmedical college education	0.8	0.37	0.2	2.2	0.03	0.08–1.5
Medical training or education	2.1	0.4	0.55	5.18	<0.001	1.3–2.9
Regression model with SB as the dependent variable						
Constant	2.9	0.35		8.14	<0.001	2.2–3.5
MBD	0.18	0.07	0.12	2.6	0.009	0.04–0.3
R	0.2	0.03	0.41	7.9	<0.001	0.17–0.28
Nonmedical university education	−0.38	0.37	0.2	2.2	0.011	0.08–1.5
Medical training or education	−1.1	0.15	−0.55	5.18	<0.001	1.3–2.9

MBD: total dualism score; R: total religiosity score; SB: total score for strength of belief in supernatural entities.

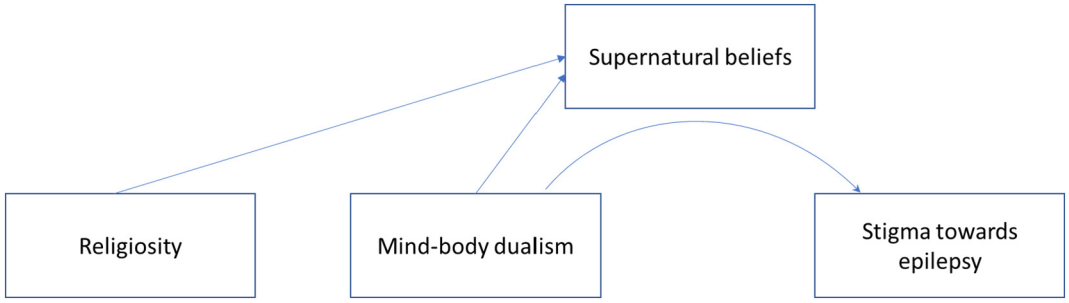

Fig. 1. Model for how belief in mind–body dualism, belief in supernatural entities, and religiosity interact in the cognitive process leading to negative attitudes toward epilepsy.

the portrayal of epilepsy as a hopeless brain disease that alters behavior permanently, disables and disempowers people who suffer from it. A balanced strategy should educate the public about the organic nature of epilepsy, the wide spectrum of its behavioral manifestations, and the variety of treatments that can stop behavioral manifestations of seizures and improve potential psychiatric comorbidities, rendering a perception of epilepsy as an organic and treatable disorder.

5. Study limitations

Several aspects of this study limit the generalizability of these findings, including the relatively small sample size, the nonrandom selection of participants, the location with its unique cultural context (Saudi Arabia), and the cross-sectional nature of the design (thus preventing determination of causal inference in these relationships). The study sample was heterogeneous, including medical outpatients, healthy individuals, medical students, and personnel. The sample was drawn from a single town in Saudi Arabia, which may not be representative of the general public in Saudi Arabia or other countries in the Arab Middle East. However, participants did have a relatively high level of education and many had medical training, suggesting that the influence of MBD and SB may be even greater in the general population.

6. Study strengths

This study also has a number of strengths, including the use of several psychometrically valid measures, multivariate analyses controlling for factors such as education, and the fact that it is one of the few studies (if not only study) examining the relationship between factors such as MBD, SB, and religiosity, and their effects on ATE, especially in a country from the Arab Middle Eastern region.

7. Conclusion

Misperceptions that epilepsy is caused by possession and lack of piety persist today in Saudi Arabia. Even though these are religious ideas, religiosity was not associated with endorsement of such beliefs in this study. Endorsement of these misconceptions was associated with the dualistic view that the mind and body are separate entities, and with a tendency to believe in supernatural malicious entities. This study has limitations but raises important questions about designing educational programs to combat the stigma of epilepsy in Saudi Arabia and countries with similar contexts. Effectively altering perceptions of epilepsy may require combating MBD through educational programs that focus on the biological nature of human behavior and epilepsy.

Conflict of interest

I declare no conflicts of interest in relation to this work.

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