

Knowledge of and Attitude Towards Epilepsy Among the General Public in Saudi Arabia

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ABSTRACT

Epilepsy, the most prevalent chronic neurological disorder, impacts individuals across all age groups. The current understanding of epilepsy is constrained by limited knowledge, as indicated by cross-sectional studies. Furthermore, views towards this condition exhibit notable variations across different cultural contexts. To investigate the level of knowledge and attitudes around epilepsy among the general public. A cross-sectional study was conducted in Saudi Arabia between January and February 2022, utilizing an online survey as the primary data collection tool. The study sample comprised individuals currently residing in Saudi Arabia, aged 18 years or older. The researchers employed binary logistic regression as a statistical method to ascertain the factors that serve as predictors for possessing information about epilepsy. The study involved a total of 530 individuals. The participants demonstrated a limited degree of understanding on epilepsy, as evidenced by a median knowledge score of 3.0 (interquartile range: 2.0-5.0) out of a total of 12 points. The study sample exhibited a favorable disposition towards epilepsy, as evidenced by a mean attitude score of 3.6 (SD: 1.3) out of 4. Women between the ages of 24 and 34, married individuals, those with a bachelor's degree, individuals employed in the healthcare sector, those who have reported exposure to information about epilepsy through hearing or reading, personal acquaintance with someone who has or had epilepsy, and those who have witnessed an epileptic seizure were found to possess a higher level of knowledge regarding epilepsy, in comparison to other groups ($p \leq 0.05$). Future research is needed to look into the variables that contribute to a lack of knowledge and to identify educational interventions to raise public awareness.

Keywords: Attitude; Epilepsy; Knowledge; Saudi Arabia

INTRODUCTION

Epilepsy, the most prevalent chronic brain disorder, impacts individuals across all age groups¹. Epilepsy has a global prevalence over 50 million individuals, the majority of whom, around 80%, reside in low- and middle-income nations². If individuals with epilepsy are accurately identified and given appropriate treatment, it is predicted that approximately 70% of them may achieve freedom from seizures². However, in low-income countries, almost three quarters of individuals with epilepsy do not have access to the necessary treatments. In certain countries, this percentage can even reach up to 90%¹. In several countries, a significant number of healthcare professionals lack the requisite expertise to effectively identify, diagnose, and manage epilepsy. The accessibility of anti-seizure medications is limited in a majority of low-resource countries. Individuals diagnosed with epilepsy and their respective families frequently encounter instances of social stigma and discriminatory treatment¹. Seizures exhibit distinct characteristics that are contingent upon the specific location of the cerebral disturbance and the extent to which it propagates within the brain³. Temporary symptoms include loss of awareness or consciousness, as well as impairments in movement, sensation (including vision, hearing, and taste), mood, or other cognitive functions³.

Individuals diagnosed with epilepsy have an increased prevalence of physical ailments, including fractures and bruising resulting from seizures-induced injuries. Additionally, they are more susceptible to psychological issues, such as anxiety and sadness³. In the same way, people with epilepsy face a mortality risk that is up to threefold greater compared to the overall population. Notably, the highest rates of early mortality are observed in low- and middle-income nations as well

as rural regions. Potentially preventable causes of mortality among individuals with epilepsy, particularly in low- and middle-income nations, encompass falls, drowning incidents, burns, and prolonged seizures³.

The public's attitudes towards individuals with epilepsy should align with the overall level of awareness that the general public possesses regarding this medical condition^{4,5}. Historically, epilepsy was erroneously associated with the manifestation of demonic possession. Despite the transient aberration in brain functioning that underlies epilepsy, the persistence of fear and misinformation perpetuates discriminatory attitudes and engenders feelings of guilt among individuals affected by this condition⁶. Moreover, epilepsy has become closely associated with mental illness and cognitive impairments in the public consciousness, and even in the legislative frameworks of certain countries. These sweeping generalizations unjustly stigmatize and adversely impact numerous individuals living with epilepsy⁷⁻⁹. The challenge of combating prevalent social stereotypes is considerable¹⁰⁻¹².

Epilepsy is a well recognized condition within society due to its prevalence across diverse age groups, genders, and racial/ethnic backgrounds. However, despite its societal recognition, epilepsy remains inadequately comprehended. The existing body of research suggests that there is a dearth of comprehensive understanding of epilepsy, as indicated by cross-sectional studies. Moreover, it has been observed that attitudes towards this neurological illness exhibit substantial variations across different cultural contexts¹³⁻¹⁶. Despite advancements in worldwide understanding, attitudes, and perspectives about epilepsy, there persist certain myths around this medical

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condition^{13,14}. Children and older adults exhibit the highest prevalence rates, rendering them particularly susceptible to the physical and psychological consequences associated with this condition¹⁷. Seizures, which are a manifestation of epilepsy, can present in diverse forms and may or may not require medical intervention. Therefore, it is crucial to ascertain the level of public awareness regarding the condition. Limited research has been conducted in Saudi Arabia regarding the general populace's understanding of epilepsy. The aim of this study was to investigate the knowledge and attitudes of the general people towards epilepsy.

METHOD

Study design: Between January and February 2022, an online survey was used to perform a cross-sectional study in Saudi Arabia.

Study population: The study sample encompassed the entire population of individuals currently residing in Saudi Arabia who are aged 18 years or older. The survey was distributed across several social media platforms.

Sampling procedure: The researchers employed the convenience sampling strategy in this investigation. The survey's URL was disseminated over several social media platforms, including WhatsApp and Facebook. The cover letter outlined the objectives and eligibility requirements of the study.

The questionnaire tool: This study's questionnaire tool was adapted from a previous questionnaire tool developed by Young et al.¹⁸. The questionnaire instrument consisted of a set of 15 items designed to assess the extent of knowledge regarding epilepsy. The study comprised of four inquiries that assessed the level of information had by the general population regarding epilepsy, alongside an additional set of four inquiries that delved into the attitudes held towards those affected by epilepsy. An investigation was conducted to assess the level of knowledge and attitudes towards individuals with epilepsy within a sample of students at Fanshawe College in London, Ontario, Canada, utilizing a unique questionnaire instrument.

Statistical analysis: The data analysis for this study was conducted using version 27 of the Statistical Package for Social Science software. The data of a categorical nature was given in the form of frequencies and percentages. The mean (standard deviation (SD)) was used to represent continuous data that followed a normal distribution, while the median interquartile range (IQR) was employed for continuous data that did not exhibit a normal distribution. The study aimed to assess the participants' level of knowledge of epilepsy by the administration of four multiple-choice questions (MCQs), each containing a total of 12 correct options. Each correct choice was assigned a score of 1. As a result, the highest achievable knowledge score would be 12. A higher score indicates a greater level of knowledge on the part of the participant. The study aimed to investigate participants' attitudes regarding epilepsy through the use of a four-item questionnaire consisting of a yes/no response style. Each response reflecting a positive attitude was assigned a score of 1, with a maximum attainable attitude score of 4. The researchers employed binary logistic regression to ascertain the factors that predict an individual's level of knowledge regarding epilepsy. The cut-off point for determining knowledge was set at 3.0, representing the median knowledge score within the study sample. Additionally, the researchers utilized binary logistic regression to identify predictors of a positive attitude towards epilepsy. The cut-off point for a positive attitude was established at 3.6, corresponding to the mean attitude score within the study population. A 95% confidence interval ($p < 0.05$) was utilized to indicate the statistical significance of the findings, with a significance threshold set at 5%.

RESULTS

Participants demographic characteristics

The study encompassed a cohort of 530 people. The majority of the individuals surveyed, specifically 69.6%, identified as female. Approximately one-third (28.9%) of the people involved in the study fell within the age range of 30-34 years. A majority of the survey participants, specifically 60.8%, reported being married, while an equivalent percentage of 60.0% indicated possessing a bachelor's degree. Approximately 46.6% of the study participants were found to be without employment. According to the findings, 40.2% of the study participants indicated that their monthly salary falls below the threshold of 2,500 SAR.

A majority of the study participants (65.8%) indicated awareness of epilepsy through hearing or reading about it. A smaller proportion (13.4%) reported experiencing multiple seizures after the age of 5. Additionally, a significant percentage (36.2%) reported personal knowledge or past acquaintance with individuals affected by epilepsy. Similarly, 36.0% of participants reported witnessing someone having an epileptic seizure. For more comprehensive information regarding the demographic features of the people involved in the study, please consult Table 1.

Table 1. Demographic characteristics of the study participants

Demographic variable	Frequency	Percentage
Gender		
Female	369	69.6%
Age group		
18-23 years	92	17.4%
24-29 years	124	23.4%
30-34 years	153	28.9%
35-39 years	79	14.9%
40-45 years	49	9.2%
46 years and above	33	6.2%
Marital status		
Single	160	30.2%
Married	322	60.8%
Divorced	34	6.4%
Widowed	14	2.6%
Education level		
Secondary school level or lower	151	28.5%
Bachelor degree	318	60.0%
Higher education	61	11.5%
Employment status		
Unemployed	247	46.6%
Working outside the healthcare sector	179	33.8%
Student	62	11.7%
Working in the healthcare sector	24	4.5%
Retired	18	3.4%
Monthly income category		
Less than 2500 SAR	213	40.2%
2500-5000 SAR	149	28.1%
5000-7500 SAR	104	19.6%
7500 SAR and above	64	12.1%

SAR: Saudi Arabian Riyal, 1 SAR equals to 0.25 USD

Knowledge about epilepsy

The study sample had a low degree of familiarity with epilepsy, as evidenced by a median knowledge score of 3.0 (interquartile range: 2.0-5.0) out of a possible 12, corresponding to 25% of the highest achievable score. A just 10.8% of individuals possessed the knowledge that epilepsy manifests with an incidence rate of one occurrence per 100 individuals. The range of participants' ability to identify causes of epilepsy varied from 18.5% (in the case of stroke) to 61.3% (in the case of recognizing it as a hereditary condition). The study revealed that a proportion ranging from 39.1% to 63.0% of the individuals demonstrated the ability to recognize symptoms associated with epilepsy. In relation to the management of epilepsy, around 23.0% of the participants in the survey were able to acknowledge the notable advancements that have occurred in the treatment of this condition within the previous decade. Furthermore, it was shown that there is a 25.1% occurrence rate of fetal abnormalities among infants born to women with epilepsy who undergo therapy. Table 2 presents the percentages of participants who provided accurate responses to questions assessing their knowledge about epilepsy.

Attitude towards epilepsy

The study sample exhibited a positive attitude towards epilepsy, as shown by a mean attitude score of 3.6 (SD: 1.3) out of a possible score of 4, reflecting 90% of the highest attainable score. The range of

participants who had a favorable attitude towards epilepsy, as indicated by the four-item measure, varied from 56.7% to 82.2%. The majority of participants (82.2%) expressed a reluctance to allow their future children to interact with individuals who occasionally experienced epileptic seizures in educational or recreational settings. According to Table 3, the percentage of those who agreed that persons with epilepsy should be employed in the same jobs as other individuals was found to be 56.7%, representing the lowest level of agreement.

Predictors of knowledge and positive attitude towards epilepsy

Binary logistic regression analysis identified that females, those who are aged 24-34 years, married participants, those who have bachelor degree, those who are working in the healthcare sector, those who have reported that have heard or read about epilepsy, know or have you ever known someone who had epilepsy, and those who have ever seen someone having an epileptic seizure were more likely to be knowledgeable about epilepsy compared to other ($p \leq 0.05$). At the same time, females, those who are aged 24-29 years, those who have bachelor degree, those who have monthly income less than 2,500 SAR, those who have reported that have heard or read about epilepsy, know or have you ever known someone who had epilepsy, and those who have ever seen someone having an epileptic seizure were more likely to have positive attitude towards epilepsy compared to other ($p \leq 0.05$), Table 4.

Table 2. Percentage of participants who answered epilepsy knowledge questions correctly

Variable	Frequency	Percentage
“Prevalence of epilepsy is....”		
“One in every 100 people*”	57	10.8%
“One in every 1,000 people”	116	21.9%
“One in every 10,000 people”	122	23.0%
“One in every 50,000 people”	157	29.6%
“One in every 1,000,000 people”	78	14.7%
“Causes epilepsy:”		
Accidents*	180	34.0%
Inherited disease*	325	61.3%
Insanity or other mental illness	176	33.2%
Brain tumors*	133	25.1%
Birth defects*	123	23.2%
Stroke*	98	18.5%
Don't know	60	11.3%
“An epileptic attack is...”		
“A loss of consciousness*”	334	63.0%
“A convulsion or shaking*”	322	60.8%
“An episode of behavioral change*”	231	43.6%
“A period of memory disturbance*”	207	39.1%
Don't know	64	12.1%
“Drug therapy for epilepsy is...”		
“It is seldom effective in controlling seizures”	205	38.7%
“It is best given as two or more drugs that work together”	203	38.3%
“It has advanced significantly over the past 10 years*”	122	23.0%
It occasionally produces malformations in babies of mothers with epilepsy*”	133	25.1%
“It can be stopped abruptly after seizures are controlled for a year	156	29.4%
“Don't know”	70	13.2%

* Indicates right answer

Table 3. Participants attitude towards epilepsy

Variable	Frequency	Percentage
“Would you object to having any of your (eventual) children associate with persons who sometimes had epileptic seizures in school or in a playground?” (no) (n= 529)	435	82.2%
“Would you object to a person with epilepsy marrying a close relative of yours (brothers, sister, or child)?” (no) (n= 524)	375	71.6%
“Do you think persons with epilepsy should have children?”(yes) (n= 524)	305	57.5%
“Do you think that, in general, persons with epilepsy should be employed at the same jobs as other people?” (yes) (n= 526)	298	56.7%

Table 4. Predictors of knowledge and positive attitude towards epilepsy

Demographic variable	Odds ratio of being knowledgeable about epilepsy (95CI)	Odds ratio of having positive attitude towards epilepsy (95CI)
Gender		
Male (Reference group)	1.00	1.00
Female	2.9 (2.0-4.3)***	2.2 (1.5-3.3)***
Age group		
18-23 years (Reference group)	1.00	1.00
24-29 years	1.5 (1.0-2.4)*	2.6 (1.6-3.5)***
30-34 years	1.6 (1.1-2.5)*	1.0 (0.7-1.5)
35-39 years	1.0 (0.6-1.6)	0.8 (0.5-1.3)
40-45 years	0.9 (0.5-1.6)	1.0 (0.5-1.8)
46 years and above	0.9 (0.4-1.9)	0.9 (0.4-1.8)
Marital status		
Single (Reference group)	1.00	1.00
Married	1.7 (1.2-2.5)**	1.3 (0.9-1.9)
Divorced	0.4 (0.2-0.8)**	1.2 (0.6-2.5)
Widowed	1.1 (0.4-3.3)	0.6 (0.2-1.9)
Education level		
Secondary school level or lower (Reference group)	1.00	1.00
Bachelor degree	1.6 (1.1-2.3)*	1.7 (1.2-2.5)**
Higher education	0.8 (0.5-1.5)	0.9 (0.5-1.6)
Employment status		
Retired (Reference group)	1.00	1.00
Unemployed	0.6 (0.5-0.9)*	0.7 (0.5-0.9)*
Working outside the healthcare sector	1.3 (0.9-1.9)	1.3 (0.9-1.9)
University student	1.5 (0.9-2.7)	1.6 (0.9-2.7)
Working in the healthcare sector	3.1 (1.0-9.2)*	1.3 (0.6-3.0)
Monthly income category		
Less than 2500 SAR (Reference group)	1.00	1.00
2500-5000 SAR	1.1 (0.7-1.6)	1.6 (1.1-2.3)*
5000-7500 SAR	0.4 (0.3-0.6)***	0.8 (0.5-1.2)
7500 SAR and above	1.8 (1.0-3.2)	1.0 (0.6-1.8)
“Have you ever heard or read about epilepsy? (yes)”	5.6 (3.8-8.3)***	3.5 (2.3-5.3)***
“Have you ever had more than one seizure after the age of 5 years? (yes)”	0.6 (0.3-0.9)*	1.8 (1.1-3.0)*
“Do you know or have you ever known anyone who had epilepsy? (yes)”	2.0 (1.4-3.0)***	1.4 (0.9-1.9)
“Have you ever seen anyone having an epileptic seizure? (yes)”	2.3 (1.5-3.4)***	1.5 (1.1-2.2)*

*p≤0.05, **p≤0.01, ***p≤0.001

DISCUSSION

In this study it was found that there is a poor level of knowledge about epilepsy among the general public about epilepsy (knowledge about its incidence rate, causes of epilepsy, identifying its symptoms, and treatment). A poor level of knowledge about epilepsy representing 25% out of the maximum obtainable score, with only 10.8% of them were able to know that epilepsy occur with an incident rate of one in every 100 people. This is consistent with a previous study that was conducted in the USA and reported low level of knowledge (40%) about the disease¹⁹. Previous studies showed that the general public demonstrate poor knowledge about chronic diseases and their associated complications²⁰⁻²⁴.

This study also showed that the majority of the study participants (65.8%) have heard or read about epilepsy. Interestingly, these figures are lower than those reported in earlier research performed in Saudi Arabia's various locations, including Riyadh (95.5 %) and al Majmaa (81.4 %). However, it is important to note that these studies only looked at epilepsy knowledge in Saudi Arabia's central region, whereas the study sample in this study included patients from all over Saudi Arabia and used a different sampling method in which participants were recruited from supermarkets, universities, and hospitals, which could be attributed to inclusion bias because people from different sociodemographic areas have different knowledge about epilepsy²⁵.

The percentage of individuals who correctly identified causes of epilepsy ranged from 18.5 % (for stroke) to 61.3 % (for diabetes) (knowing that it could be an inherited disease). These findings are consistent with prior research, which found that epilepsy can be caused by brain illnesses and/or genetic diseases²⁶⁻²⁸. Around one-quarter of the survey participants were able to recognize that epilepsy therapy has evolved greatly over the last ten years (23.0%), and that it occasionally causes abnormalities in babies born to mothers with epilepsy (25.1 %). These findings demonstrate that the study sample has limited understanding about epilepsy drug treatment therapy, which is consistent with earlier research. Only approximately half of the study sample in a study that was conducted at Al kharji city in Saudi Arabia had a good understanding of efficient pharmacological therapy treatment for epilepsy²⁸.

Females, those who are aged 24-34 years, married participants, those who have bachelor degree, those who are working in the healthcare sector, those who have reported that have heard or read about epilepsy, know or have you ever known someone who had epilepsy, and those who have ever seen someone having an epileptic seizure were more likely to be knowledgeable about epilepsy compared to other ($p \leq 0.05$). This contrasted with the findings of a prior study in the United States, which revealed that those who know or have ever known someone with epilepsy, as well as younger and more educated participants, did not have better epilepsy knowledge than others¹⁹. The findings of the USA study could be attributed to the public's overall lack of knowledge about epilepsy, or to the fact that many people with epilepsy have not informed their family, friends, or co-workers about the illness^{19,29,30}.

This study found that the general public had a positive attitude toward epilepsy, with a mean attitude score of 3.6 (SD: 1.3) out of four. The highest percentage stated that they would not object to any of their (potential) children associating with people who occasionally experienced epileptic seizures in school or on a playground (82.2 %). While the lowest percentage agreed that people with epilepsy should work in the same jobs as everyone else (56.7 %). These findings are similar to those of prior research conducted in Riyadh and Al Kharji cities in Saudi Arabia^{27,28}.

Those with a favorable attitude regarding epilepsy were more likely to be female, have a bachelor's degree, and work in the healthcare field. These findings are comparable to those of a previous study conducted in Austria, and they demonstrate the need of increased epilepsy awareness and education in improving people's attitudes toward epileptic patients³¹.

The way people with epilepsy are treated in society is incredibly important²⁹. Such attitudes may be primarily based on knowledge or emotion³². This study showed that those who have reported that have heard or read about epilepsy, know or have you ever known someone who had epilepsy, and those who have ever seen someone having an epileptic seizure have a more positive attitude towards epilepsy. This can be attribute to the fact that emotions and personal relationships could be the reason for this attitude.

The utilization of numerous online platforms as a means of data collection was a strength of this study, which may have helped attract participants from various sociodemographic groups. We were able to compare our findings to another population and investigate the differences between the two research populations by using a previously validated questionnaire method. Interviewer bias was reduced when a self-administered questionnaire was used. However, due to its cross-sectional study methodology, this study has several limitations. For example, the study design does not allow for causal inferences. Furthermore, the online data gathering approach may have excluded some crucial demographic groups, such as the elderly and those without internet access. The sample was obtained through convenience sampling, which may result in some inclusion bias; however, it is important to note that the study's data collection took place during the COVID-19 pandemic, when people were on lockdown for long periods of time and engaged in virtual and online activities.

CONCLUSION

In this study, it was found that the general public in Saudi Arabia has a low level of knowledge of epilepsy, but that individuals have a good attitude toward epilepsy. Future research is needed to look into the variables that contribute to a lack of knowledge and to identify educational interventions to raise public awareness.

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REFERENCE

1. World Health Organization. Epilepsy [Internet]. 2022 [Accessed on April 07, 2022].
2. World Health Organization. Epilepsy signs [Internet]. 2022 [Accessed on April 07, 2022].
3. World Health Organization. Epilepsy: Key Facts [Internet]. 2022 [Accessed on April 07, 2022].
4. Matuja WB, Rwiza, H T. Knowledge, attitude and practice (KAP) towards epilepsy in secondary school students in Tanzania. *Centr Afr jour med* 1994;40(1):13-8.

5. Wright G. Rehabilitation and the problem of epilepsy. *Bos Lit Bro* 1975; 1(1): 1-11.
6. Dam M, Gram L. Epilepsy: prejudice and fact. *Copen Munks* 1975; 1(1): 1-17.
7. Placencia M, Farmer P J, Jumbo L, et al. Levels of stigmatization of patients with previously untreated epilepsy in northern Ecuador. *Neuroepidemiology* 1995;14(3):147-54.
8. Rodriguez-Rivera L. Considerations on the concept of epilepsy. *Rev Neurol* 1999;28(1):1159-61.
9. Villanueva-Gomez F. Epilepsy, society and rights. *Rev Neurol* 1998;26(1):294-7.
10. Dell J. Social dimensions of epilepsy: stigma and response. *Neurol* 1986; 1(1): 1-18.
11. McLin W, de Boer H. Public perceptions about epilepsy. *Epilepsia* 1995;36(1):957-9.
12. Schneider J, Conrad P. Having epilepsy: the experience and control of illness. *Philad: Tem Univ Pre* 1983; 1(1): 1-19.
13. Caveness W, Gallup G. A survey of public attitudes toward epilepsy in 1979 with an indication of trends over the past thirty years. *Epilepsia* 1980;21(1):509-18.
14. Gajjar M, Geva E, Humphries T, et al. A new scale to assess culture-specific beliefs and attitudes about epilepsy. *Epilepsy Behav* 2000;1(1):235-55.
15. Mirnics Z, Czikora G, Závecz T, et al. Changes in public attitudes toward epilepsy in Hungary: results of surveys conducted in 1994 and 2000. *Epilepsia* 2001;42(1):86-93.
16. Fong C, Hung A. Public awareness, attitude, and understanding of epilepsy in Hong Kong: Special Administrative Region, China. *Epilepsia* 2002;43(1):311-6.
17. Devinsky O. Epilepsy patient and family guide. *Philad FA Davis* 2002; 1(1): 1-16.
18. Young GB, Derry P, Hutchinson I, et al. An epilepsy questionnaire study of knowledge and attitudes in Canadian college students. *Epilepsia* 2002;43(6):652-8.
19. Kobau R, & Price P. Knowledge of epilepsy and familiarity with this disorder in the U.S. population: results from the 2002 HealthStyles Survey. *Epilepsia* 2003;44(11):1449-54.
20. Conway T, Hu T C, Bennett S, et al. A pilot study describing local residents' perceptions of asthma and knowledge of asthma care in selected Chicago communities. *Chest* 1999;116(1):229-34.
21. Michielutte R, Disiker R A, Stafford C L, et al. Knowledge of diabetes and glaucoma in a rural North Carolina community. *J Community Health* 1984;9(4):269-84.
22. Naser AY, Alrawashdeh HM, Alwafi H, et al. Knowledge and awareness of the general population and healthcare providers about retinoblastoma: It is time to know the glow. *Int J Clin Pract* 2021;75(8): 1-13.
23. Alsaleh FM, Albassam KS, Alsairafi ZK, et al. Knowledge and practice of foot self-care among patients with diabetes attending primary healthcare centres in Kuwait: A cross-sectional study. *Saudi Pharm J* 2021;29(6):506-15.
24. Alyami HS, Naser AY, Alyami MH, et al. Knowledge and Attitudes toward Autism Spectrum Disorder in Saudi Arabia. *Int J Environ Res Public Health* 2022;19(6): 1-22.
25. Al-Hanawi MK, Keetile M. Socio-Economic and Demographic Correlates of Non-communicable Disease Risk Factors Among Adults in Saudi Arabia. *Front Med* 2021;8(1): 1-16.
26. Daoud A, Al-Safi S, Otoom S, et al. Public knowledge and attitudes towards epilepsy in Jordan. *Seizure* 2007;16(6):521-6.
27. Alaqeel A, Sabbagh AJ. Epilepsy; what do Saudi's living in Riyadh know? *Seizure* 2013;22(3):205-9.
28. Al-Dossari KK, Al-Ghamdi S, Al-Zahrani J, et al. Public knowledge awareness and attitudes toward epilepsy in Al-Kharj Governorate Saudi Arabia. *J Family Med Prim Care* 2018;7(1):184-90.
29. De Boer H. Epilepsy and society. *Epilepsia* 1995;36(1): 8-11.
30. Pedley T. Epilepsy and education. *Epilepsia* 1995;36(1): 18-22.
31. Spatt J, Bauer G, Baumgartner C, et al. Predictors for Negative Attitudes toward Subjects with Epilepsy: A Representative Survey in the General Public in Austria. *Epilepsia* 2005;46(1):736-42.
32. Ajzen I. Nature and operation of attitudes. *Annu Rev Psychol* 2001;52(1):27-58.