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Prevalence of depressive symptom and its associated factors among epilepsy patients in Amhara region, Ethiopia: cross-sectional study

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Abstract

Background Depressive symptom is the most common type of psychiatric co-morbidity among persons with epilepsy. Epilepsy patients are identified as at higher risk of suffering depressive symptom explicitly in low- and middle-income countries due to poor mental health care systems and financial burdens. The co-occurrence of depressive symptom among epilepsy patients deteriorates the prognosis of the disease and diminishes the quality of life of both the patients and their families. However, there is limited evidence on the prevalence of depressive symptom and associated factors in Ethiopia. Therefore, this study is intended to assess the prevalence of depressive symptom and associated factors among epilepsy patients attending in Amhara region, Ethiopia.

Method A multi-center institution-based cross-sectional study was done among epilepsy patients attending at Amhara region, Ethiopia. The Hospital Anxiety Depression tool was used to assess depressive symptom. To determine the factors associated with depressive symptom, a binary logistic regression model was used. Adjusted Odds Ratio (AOR) with the 95% Confidence Interval (CI) was reported in the multivariable binary logistic regression analysis.

Results About 406 participants were registered in the study with a response rate of 97.6%. The prevalence of depressive symptom among epilepsy patients was 53.9% [95%CI: 49.1%, 58.8%]. In the multivariable binary logistic regression analysis, taking polytherapy treatment [AOR = 1.87, 95% CI: 1.04, 3.36], perceived stigma [AOR = 5.73, 95%CI: 3.11, 10.55], poor antiepileptic medication adherence [AOR = 3.33, 95%CI: 1.30, 8.54] and having poor [AOR = 5.83, 95%CI: 2.44, 13.90] and moderate social support [AOR = 3.08, 95%CI: 1.34, 7.09] were significantly associated with depressive symptom.

Conclusions This study revealed that the magnitude of depressive symptom among epilepsy patients in Ethiopia was relatively high and multiple factors determined the likelihood of depressive symptom. Thus, healthcare providers and concerned stakeholders should strengthen comprehensive health education to reduce the magnitude and

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consequences of depressive symptom among this segment of the population. Moreover, strong social support with special attention should be given to epilepsy patients.

Keywords Amhara region, Associated factors, Depressive symptom, Epilepsy

Background

Epilepsy is a neurological disorder characterized by an enduring predisposition to generate epileptic seizures [1] having recurrent seizures with brief episodes of involuntary body movement [2]. Globally, it is a serious public health problem estimated to affect around 50 million people [3]. Epilepsy accounts for 1% of the global burden of disease and about 80% of this is in developing countries [4]. Epilepsy is a foremost public health problem with an estimated prevalence of 5.2/1000 people at risk with an annual incidence of 64 in 100, 000 people in Ethiopia [5].

Persons with epilepsy (PWE) are more exposed to psychiatric disorders, which is 9% higher in persons with epilepsy than in the general population, and depression rates are 22% more advanced than in the general population [6]. Depressive symptom is common among persons with epilepsy due to different reasons, such as involvement of the brain area, perceived stigma and antiepileptic medication nonadherence [7]. This high-magnitude disease is predisposed to other categories of health-related complications of which depressive symptom is the most common. Depressive symptom have been more likely to suffer from epilepsy than those without depression [8]. Although depressive symptom is the most frequent psychiatric comorbidity among persons with epilepsy, they often remain unrecognized and left untreated [9]. The simultaneous occurrence of depressive symptom with epilepsy makes clinical management more complicated so understanding the magnitude and main associated factors of depressive symptom among epilepsy patients plays a key role in identifying and treating health problems as timely much as possible.

Depressive symptom is a disturbance of mood characterized by loss of interest, the unsettling influence of sleep, problems in appetite and psychomotor action, trouble concentrating or making decisions and repeating considerations of death or suicide [10–12]. Among the 50 million patients with epilepsy worldwide, 9.5–85% are also expected to suffer from depressive disorder [13, 14], and more than 80% of them live in low and middle-income countries where psychiatric comorbidity is often under-recognized [15].

Different studies across the world showed that there is a high prevalence of depressive symptom among persons with epilepsy with prevalence rates ranging from 20 to 55% [16–18] and in Ethiopia it ranges from 34.8 to 51.2% [19, 20]. Studies reported that poor anti-epileptic medication adherence, comorbidity, and poor social support were the most frequently reported predictors associated with depression [13, 19, 21–24]. However, information is scarce on the prevalence and associated factors of depressive symptom among epilepsy patients in the study area. Therefore, this study can provide evidence on the prevalence as well as the most important factors associated with depressive symptom. In addition, the results of this study give information to healthcare providers and caregivers, to give attention to persons with epilepsy to optimize and improve their quality of life by improving the quality of the healthcare service mainly on depressive symptom and also serve as baseline information for further study.

Methods

Study design and setting

Study design

A multicenter institution-based cross-sectional study was conducted among epilepsy patients attending follow-up treatment at Amhara region from March 23 to April 23, 2021.

Study setting

Amhara region is one of the twelve regional states and located in the Northern part of Ethiopia with an estimated area of 159,173.66 square kilometers. According to the Amhara National Regional Health Bureau, the Annual Performance Report, the region has 81 Hospitals, of them eight are referral hospitals namely, the University of Gondar Comprehensive Specialized Referral Hospital, Tibebegion Comprehensive Referral Hospital, Felegehiwot Comprehensive Referral Hospital, Debre Markos, and Debre Tabor referral hospital which are found in the Northwestern part of the region whereas Dessie referral hospital and Woldia Referral hospitals are in the eastern part of Amhara region and Debrebirahan referral hospital in southern Amhara. All those Referral Hospitals serve the population found in the region and provide multidimensional aspects including inpatient and outpatient care for clients who need health care services including surgical, medical, and other services. The study was conducted among four randomly selected referral hospitals namely Felegehiwot Referral Hospital, Debre Markos Referral Hospital, Dessie Referral Hospital and Debretabor Comprehensive Specialized Referral Hospital. Each referral hospitals provide follow-up treatment for five working days per week (from Monday to Friday) in the chronic outpatient department for epilepsy patients and the frequency of the patient's follow-up time

is primarily based on the patient's disease progress, how the prescribed anti-epileptic medication controls and/or decreases seizure frequency. There were 376, 372, 338, and 275 patients attending follow-up treatment at Deberemarkos referral hospital, Felegehiwot Specialized referral hospital, Dessie referral hospital, and Debretabor referral hospital respectively.

Study participants

All adult epilepsy patients whose age is greater than or equal to 18 years had follow-up treatment at the outpatient department (OPD) within the study period.

Inclusion and exclusion criteria

Adult epilepsy patients (aged ≥ 18 years) attending follow-up treatment for at least 6 months were included in the study whereas patients who were critically ill during data collection time were excluded.

Sample size determination and sampling technique

The minimum adequate sample size was calculated by using a single population proportion formula (n = (Zα/2)2 p (1-p)/ d2) with the assumption of (Z = 1.96, d = 0.05, and *P* = 43.8%) [22]. By considering a 10% non-response rate, the final estimated sample size was 416. There were a total of 1361 epilepsy patients attending follow-up treatment in the four randomly selected referral hospitals during the data collection period. Then proportional allocation of participants to each selected referral hospital was done and those participants were interviewed using a systematic random sampling technique by considering every three individuals. The sampling interval value was determined by dividing the total number of adult epilepsy patients who have follow-up treatment at referral hospitals in Amhara region (*n* = 1361) by the sample size, (1361/416). The first participant of the study was selected using a lottery method.

$$\mathrm{n} = \left(\mathrm{Z}\frac{\alpha}{2}\right) 2^{*}\mathrm{p}(1-\mathrm{p})/\ (\mathrm{d})\,2$$

n = the initial sample size.

Z *α*/2 = Standardized normal distribution value for the 95% CI, = 1.96.

P = prevalence of depression from a previous study (0.438).

d = margin of error 5%.

n= $\frac{(1.96)2\ \mathbf{x}0.438(1-0.438)}{(0.05)2}$ = 378.25≈378, considering a 10% non-response rate the final sample size was 378+37.8=415.8≈416.

Study variables

Outcome variable

Depression was assessed by the Hospital Anxiety Depression Scale (HADS) tool. The tool was validated in Ethiopia [25]. A score greater than or equal to eight was diagnosed as having depressive symptom [14, 26, 27].

Independent variables

Socio-demographic factors: age, sex, marital status, occupational status, level of income, residency, religion, and educational status, Clinically related factors: duration of treatment, seizure type, frequency of seizure, number of medications taken, and comorbidity, patient-related factors: substance use (alcohol, chat, cigarette, illicit drugs) or other substances), perceived stigma, Medication adherence, and social support.

Data collection tools and procedures

Data were collected by four BSc nurses. The principal investigator of the study and two supervisors were accountable for monitoring the data collection process. The Hospital Anxiety and Depression Scale (HADS) was used to assess depressive symptom. It was used and validated in Ethiopia with an internal consistency of 0.76 and 0.78 for depression and anxiety sub-scale scores respectively and 0.87 for the full hospital anxiety and depression scale with a test-retest intraclass correlation coefficient of 0.944 [25, 28]. It has 14 item questions that are divided into two parts, which is a 7-item sub-scale for each depressive and anxiety symptom. Having a score of greater than or equal to eight were considered depressive and anxiety symptoms respectively [14, 26].

Kilifi Stigma Scale was used to assess perceived stigma [29]. It has fifteen items and a total score was calculated by adding all item scores. The score above the median value of the data showed the presence of perceived/felt stigma [30].

Oslo-3 items social support scale system (Oslo SSS) tool was used to assess the patients' level of Social support. The sum score of this scale ranged from a minimum of 3 to a maximum of 14. (3–8 poor, 9–11 moderate, and 12–14 strong social support) [31]. The patient's level of medication adherence was evaluated by using the Medication Adherence Rating Scale (MARS), ten-item questions and the total score is the sum of these questions [32] with reliability and internal consistency of 0.76 and 0.80 respectively [33]. Patients who scored greater than or equal to six were considered as having good antiepileptic medication adherence [34].

Data management and analysis

Epi data version 4.6 statistical software was used for coding and data entry. Then exported to STATA version 14 statistical software. The chi-square assumption was

checked for categorical variables. For the associated factors, a binary logistic regression model was fitted. Both bi-variable and multi-variable binary logistic regression analyses were done, and variables with a p-value ≤ 0.2 in the bi-variable binary logistic regression analysis were considered for the multivariable analysis. Adjusted Odds Ratio (AOR) with a 95% confidence interval and p-value of less than 0.05 was used to report factors associated with depressive symptom. Model fitness was assessed by the Hosmer-Lemeshow test.

Data quality control

For data collection, the questionnaire was translated into the Amharic version and back-translated to the English version for analysis purposes. Data quality was assured by conducting a pretest taking 10% of the total sample size at University of Gondar Comprehensive Specialized Referral Hospital. Training was given to data collectors. Data was collected through face-to-face interviews and medical chart review for one-month duration. The principal investigator and supervisors were responsible for monitoring the data collection process.

Result

Socio-demographic characteristics of the study participants

A total of 406 participants were enrolled in the study, with a response rate of 97.6%. Among the study participants more than half 241(59.4%) were females, nearly half 190 (46.80%) of participants were married and more than half 216 (53.2%) of the participants were orthodox religion followers and more than half (51.5%) of the respondents were urban residents. The median (± IQR) age of participants was 35 ± 14 years. (Table 1).

Clinical, behavioral, and psychosocial-related factors of participants

Among the study participants, nearly two-thirds 254 (62.6%) of the patients were on polytherapy anti-epileptic medication. Nearly one-third of 118 (29.1%) of the study participants have had a comorbid disease. More than half

Table 1 Socio-demographic characteristics of epilepsy patients in Amhara region, Ethiopia, 2021 (*n* = 406)

Variable	Category	Frequency (*n*)	Percent (%)
Sex	Male	165	40.64
	Female	241	59.36
Age (in years)	18–24	49	12.07
	25–31	94	23.15
	32–38	98	24.14
	39–45	92	22.66
	> 45	73	17.98
Marital status	Married	190	46.80
	Single	142	34.98
	Divorced	45	11.08
	Widowed	29	7.14
Educational status	Unable to read and write	94	23.15
	Primary school	143	35.22
	Secondary school	85	20.94
	College and above	84	20.69
Occupation	Farmer	51	12.56
	Government employee	68	16.75
	House wife	78	19.21
	Merchant	48	11.82
	Self-employee	106	26.11
	Student	55	13.55
Religion	Orthodox	216	53.20
	Muslim	108	26.60
	Protestant	75	18.47
	Others*	7	1.72
Residency	Urban	209	51.48
	Rural	197	48.52
Average monthly income (ETB)	≤ 1000	88	35.77
	1001–2000	69	28.05
	> 2000	89	36.18

*= *Catholic*, *Adventist*

(51.5%) of the participants felt perceived stigma. More than half (51.9%) of the respondents had strong social support (Table 2).

Prevalence of depression

In this study, the prevalence of depressive symptom among epilepsy patients was 53.9% (95%CI; (49.1%, 58.8%).

Factors associated with depression

In the multivariable binary logistic regression analysis, polytherapy, perceived stigma, medication adherence, and social support were significantly associated with depressive symptom. The odds of depressive symptom among epilepsy patients who took more than one antiepileptic drug were nearly two times (AOR = 1.87, 95%CI: (1.04, 3.36)) higher odds of depressive symptom as compared to those who took monotherapy antiepileptic drug. Patients who had felt stigma had more than five times (AOR = 5.73, 95%CI: (3.11, 10.55)) higher odds of depressive symptom compared to their counterparts.

Patients who had poor medication adherence were 3.33 times (AOR = 3.33, 95%CI: (1.30, 8.54)) with higher odds of depressive symptom compared to those who had good medication adherence.

The odds of depression among epilepsy patients who had poor social support were 5.83 times (AOR = 5.83, 95%CI: (2.44, 13.90)) and for those who had moderate social support were 3.08 times (AOR = 3.08, 95%CI: (1.34, 7.09)) higher odds of depressive symptom compared to their counterparts (Table 3).

Discussion

Depressive symptom among epilepsy patients is a serious health problem [35, 36] that makes clinical management difficult. This study found that more than half of epilepsy patients experience depressive symptom. This finding was in line with another study conducted in Jimma,

Table 2 Clinical and modifying characteristics of study participants at Amhara region, Ethiopia, 2021 ($n = 406$)

Variable	Category	Frequency(*n*)	Percent (%)
Therapy	Monotherapy	152	37.44
	Poly therapy	254	62.56
Illness duration/ year	≤ 5	329	81.03
	> 5	77	18.97
Used medication	Carbamazepine		
	Yes	161	39.66
	No	245	60.34
	Phenobarbital		
	Yes	186	45.81
	No	220	54.19
	Phenytoin		
	Yes	244	60.10
	No	162	39.90
	Sodium valproate		
	Yes	92	22.7
	No	314	77.3
Medication adherence	Good	249	61.3
	Poor	157	38.7
Comorbidity	Yes	92	22.7
	No	314	77.34
seizure frequency/ month	None	14	3.45
	1–2	258	63.55
	3–5	134	33.00
Type of seizure	Focal	3	0.74
	Generalized	403	99.26
Use of substance	Yes	87	21.43
	No	319	78.57
Stigma	Yes	209	51.48
	No	197	48.52
Level of social support	Poor	128	31.53
	Moderate	67	16.50
	Strong	211	51.97

Table 3 Bivariable and multivariable analysis of factors associated with depressive symptom among epilepsy patients attending at Amhara region, Ethiopia, 2021

Variable	Category	Depression No	Yes	COR with the 95%CI	AOR with the 95%CI
Sex	Male	95	70 (17.2%)	1	1
	Female	92	149 (36.7%)	2.19(1.47,3.29)	1.23(0.68,2.24)
Age(in years)	18–24	39	10 (2.4%)	1	1
	25–31	56	38 (9.4%)	2.65(1.18,5.94)	1.10(0.41,2.97)
	32–38	42	56 (13.8%)	5.2(2.33,11.59)	1.69(0.55,5.23)
	39–45	35	57 (14%)	6.35(2.82,14.31)	0.94(0.27,3.36)
	> 45	15	58 (14.3%)	15.08(6.15,36.99)	1.70(0.40,7.19)
Marital status	Married	72	118 (29.0%)	1	1
	Single	93	49 (12.1%)	0.32(0.20,0.51)	0.59(0.26,1.34)
	Divorced	18	27 (6.6%)	0.92(0.47,1.78)	0.61(0.22,1.67)
	Widowed	4	25 (6.2%)	3.81(1.28,11.40)	3.63(0.82,16.03)
Therapy	Monotherapy	100	52 (12.8%)	1	1
	Poly therapy	87	167 (41.1%)	3.69(2.42,5.64)	**1.87(1.04,3.36)***
Comorbidity	Yes	9	109 (26.8%)	19.59(9.54,40.27)	1.86(0.69,5.04)
	No	178	110 (27.1%)	1	1
Use of substance	Yes	6	81 (19.9%)	17.71(7.51,41.77)	0.78(0.22,2.71)
	No	181	138 (34%)	1	1
Stigma	No	147	50 (12.3%)	1	1
	Yes	40	169 (41.6%)	12.42(7.76,19.89)	**5.73(3.11,10.55)****
Drug adherence	Poor	14	143 (35.2%)	23.25(12.61,42.86)	**3.33(1.30,8.54)***
	Good	173	76(18.7%)	1	1
Level of social support	Poor	12	116 (28.5%)	26.12(13.39,50.91)	**5.83(2.44,13.90)****
	Moderate	21	46 (11.3%)	5.92(3.25,10.77)	**3.08(1.34,7.09)***
	Strong	154	57 (14.1%)	1	1

**p-value < 0.05*, ***p-value < 0.01*, COR = Crude Odds Ratio, AOR = Adjusted Odds Ratio and CI = confidence interval

Ethiopia (49.3%) [37], and Bench Maji zone, Ethiopia (51.2%) [20].

However, it was lower than studies reported in Nigeria (85.5%) [38] Guinea (66%) [39], and Nepal, Jumla (55%) [17]. Possible reasons for the difference may be due to the use of different screening tools to diagnose depressive symptom. For instance, the Beck Depression Inventory (BDI) and PHQ9 tool were used in a study done in Nigeria Guinea, and Nepal respectively. In addition, the difference might be due to the variation in the use of different cutoff points to diagnose depressive symptom. Besides, the discrepancy may be due to the exclusion and inclusion criteria of the study participants for example epilepsy patients who have comorbid disease were excluded in a study conducted in Nigeria.

The finding of this study was higher than studies conducted in Gondar, Ethiopia (45.2%) [40], Addis Ababa, Ethiopia (43.8%) [22], Ilu Ababore, South West Ethiopia (48.1%) [13], and Ayder and Mekelle hospitals, Ethiopia 34.8% [19], Sub- Saharan Africa (32.7%) [21], A longitudinal study done in Rwanda [41], a systematic review and meta-analysis study conducted in China 27% [42], a cross-sectional study done in China [43] and a case-control study conducted in Turkey 35.4% [44]. The variation may be due to the use of different measurement tools to diagnose depressive symptoms for example Patient Health Questionnaire version 9 (PHQ9) tool was used in studies conducted in Addis Ababa, Ayder and Mekelle, Beck Depression Inventory (BDI) was used in studies done in Gondar and Ilu Ababore, South West Ethiopia).

The odds of developing depressive symptom among patients who took more than one antiepileptic drug were nearly two times more likely to experience depressive symptom as compared to those who took one anti-epileptic drug. This finding is supported by another study conducted in South Africa, Southwest Ethiopia, and Gondar respectively [13, 21, 40, 45–47]. The possible justification might be due to the financial burden of the cost of medications and due to the side effects of antiepileptic drugs. Additionally, taking polytherapy treatment can increase the likelihood of experiencing side effects comprising cognitive impairment, and mood swings which can contribute to the development of depressive symptoms.

The complexity of managing a polytherapy regimen can lead to stress and feelings of decreased control over one's condition, further exacerbating depressive symptom [48]. Each antiepileptic drug can have its own set of side effects, and when combined, these can become more pronounced, leading to depressive symptom [49]. The need to take multiple medications can be a visible reminder of

one's epilepsy, leading to social stigma and potential feelings of isolation which can contribute to depression [50]. Literature suggests potential shared neurochemical pathways between epilepsy and depression, meaning that the underlying brain mechanisms involved in seizure activity might also be related to depressive symptom [51].

Patients who had felt perceived stigma were more than five times more likely to have depressive symptom as compared with their counterparts. This finding is supported by another study done in Addis Ababa, Ethiopia, Jimma, Ethiopia, Ayder and Mekelle [19, 22, 37, 42, 45]. The possible reason might be due to a lack of coping strategies to the multidimensional effect of seizure including perceived negative social attitude as a result of unaccepted seizure signs. Besides the patients may not develop stigma resistance ability throughout their life that helps them to cope with different cultural beliefs, social stigma and the impact of the illness that contributed to the feeling of perceived stigma. Moreover, perceived stigma could forecast poor coping mechanisms among people with epilepsy and the affective symptoms were commonly related to felt sigma among people with epilepsy [52]. Authors suggest that epilepsy is a highly stigmatized disease in many different cultures, predominantly in countries with limited resources [53].

Depressive symptom is positively associated with epilepsy patients who have perceived stigma due to the feeling of being discriminated or socially excluded because of their health condition can lead to low self-esteem, social isolation, and a sense of helplessness, which are major contributing factors to depressive symptom [54]. Perceived stigma can create a significant psychological burden among persons with epilepsy, increasing their vulnerability to depressive symptom [55]. When persons with epilepsy feel stigmatized, they may withdraw from social interactions, leading to isolation and loneliness, which can worsen depressive symptoms. The perception of being "different" or "less than" due to epilepsy can significantly impact self-worth, contributing to depressive symptom [56]. The constant worry about having a seizure, combined with the stress of perceived stigma, can contribute to depressive symptom. Perceived stigma can significantly impact a person's quality of life, including their ability to maintain relationships, and participate in social activities, further increasing the risk of depressive symptom. Hence, for persons with epilepsy who experience perceived stigma, seeking mental health support is crucial to manage depressive symptom and improve overall quality of life.

Epilepsy patients who had poor anti-epileptic medication adherence were more than three times more likely to develop depressive symptom as compared to their counterparts. This finding was supported by study findings conducted in Addis Ababa, Ethiopia, southwest Ethiopia and Gondar, Ethiopia [20, 22, 40, 45]. The possible justification might be due to epilepsy patients with poor medication adherence to their antiepileptic drug could result in increased seizure frequency, hospital admissions, increased healthcare costs, and worsened clinical outcomes that may contribute patients to develop depressive symptom. Depressive symptom is significantly associated with epilepsy patients who have poor medication adherence because the side effects of antiepileptic drugs can contribute to depressive symptom. Poor medication adherence can exacerbate existing depressive symptoms in epilepsy patients. When patients don't take their medication as prescribed, they are more likely to experience seizures, which can be frightening and disruptive to daily life, further contributing to depression.

Not being able to effectively control seizures due to poor medication adherence can lead to feelings of helplessness and lack of control over one's health, which are significant contributors to depression. Literature suggests that the neurotransmitters and brain regions involved in epilepsy are also implicated in depression, meaning there might be a shared biological basis for the two conditions [57].

Compared to patients with strong social support, this study found that depressive symptom among epilepsy patients with poor social support were nearly six times and moderate social support were more than three times. This finding was supported by a study conducted at Ilu Ababore zone hospitals, in South West Ethiopia [13]. The possible reason might be due to that having strong social support diminishes the patient's level of stress. Besides poor social support can have an unwanted effect on the mental and physical well-being of the patients. Literature supports that strong social support neutralizes the patient's level of depressive symptom [58, 59]. Lack of supportive relationships can lead to feelings of depressive symptom. Depressive symptom is significantly associated among persons with epilepsy patients having poor social support because the lack of a strong support network can exacerbate the psychological challenges of living with epilepsy, including feelings of isolation, stigma, and difficulty managing seizures [60], leading to increased stress and a higher likelihood of experiencing depressive symptom. Persons with epilepsy may face social stigma, leading to feelings of isolation and a reluctance to disclose their condition to others, which can further limit their social connections and depressive symptom [55]. Managing seizures and the uncertainty associated with epilepsy can be stressful, and a strong social support system can help individuals cope with this stress, while a lack of support can amplify it.

Seizures can impact daily life and activities, and a supportive network can provide assistance and help manage these challenges, while a lack of support can make

these tasks more difficult and lead to feelings of helplessness [61]. Social support can encourage healthy coping mechanisms, which can be crucial for managing the psychological impact of epilepsy. Clinicians should actively assess social support networks and provide patients with information and resources to build or strengthen their support systems. Educating family and friends about epilepsy can help reduce stigma and foster a more supportive environment.

Conclusions

This study revealed that the magnitude of depressive symptom among epilepsy patients in Ethiopia was relatively high and multiple factors determined the occurrence of depressive symptom. Thus, the enactment of interventional modalities for epilepsy patients having poor antiepileptic medication adherence and poor social support is needed. Raising awareness about epilepsy to reduce stigma and encourage strong social support within communities is essential to decrease the prevalence of depressive symptom and its consequences. Providing mental health services to address emotional challenges associated with epilepsy and educating family members and caregivers on how to best support persons with epilepsy is essential.

Strengths and limitations

The authors try to incorporate the level of social support system as an additional variable from the previously conducted studies which may significantly affect the patient's level of depressive symptom. The cross-sectional nature of the study limits the ability to infer causation or determine directionality between the outcome variable and independent variables. There may be a possibility of social desirability bias and recall bias since we used an interviewer-administered questionnaire.

Abbreviations

AOR	Adjusted Odds Ratio
MARs	Medication Adherence Rating scale
CI	Confidence Interval
HADS	Hospital Anxiety, and Depression Scale
OSS-3	Oslo-3 items social support scale

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Author contributions

SST, YAW, AFZ, MK, SMW, KM, BGY, BDM and YAT participated in the design of the study, involved in the data collection, analysis, and write-up of the manuscript. SST, YAW, BGY, BDM and YAT were involved in the design, data analysis, and drafting of the manuscript. SST, BGY, YAW, AFZ, MK, SMW and YAT were participated in the data analysis and critically reviewed the manuscript. All the authors read and approved the final manuscript.

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Data availability

Data are available upon reasonable request to the corresponding author.

Declarations

Ethical approval

The study was conducted under consideration of the Helsinki Declaration of Medical Research Ethics [62]. The study was approved by the Research Ethical Review Committee of the School of Nursing, College Medicine, and Health Sciences on behalf of the University of Gondar review board. A formal letter indicating the approval was obtained and submitted to Amhara Referral Hospitals' administrative. Oral informed consent was obtained from each participant and personal identification like name and medical registration numbers were not used to maintain confidentiality.

Consent to participate

The study was approved by the Research Ethical Review Committee of the School of Nursing, College Medicine, and Health Sciences on behalf of the University of Gondar review board. A formal letter indicating the approval was obtained and submitted to Amhara Referral Hospitals' administrative. Oral informed consent was obtained from each participant and personal identification like name and medical registration numbers were not used to maintain confidentiality.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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