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ORIGINAL ARTICLE

Frequency of depression and its correlation with sociodemographic and clinical characteristics among adult epilepsy patients in neurology clinics at a tertiary care hospital in Sri Lanka

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Abstract

Background: Depression is a common concern among epilepsy patients and affects individuals globally. This presents substantial clinical, social, and economic ramifications, impacting healthcare requirements, quality of life, and productivity. Despite this, comprehensive data on depression in epilepsy remain scarce for Asia, with no published studies from Sri Lanka.

Objective: This study aimed to determine the frequency of depression, and its associated sociodemographic and clinical characteristics, among adult epilepsy patients in a tertiary care hospital in Sri Lanka.

Method: A descriptive cross-sectional study was performed at teaching hospital Karapitiya, involving 413 epilepsy patients. Exclusion criteria included individuals under 18 years, presence of other neurological conditions, chronic severe medical ailments, additional psychiatric comorbidities, history of active cancer within the last five years, and current illicit drug use. Consecutive sampling was employed. Data collection utilized an interviewer-administered sociodemographic and clinical characteristics questionnaire, alongside the 9-item Patient Health Questionnaire (PHQ-9). Statistical analysis was performed using SPSS software.

Results: The observed frequency of depression among epilepsy patients attending the clinic was 29.8%. Among those affected, 21.3% exhibited mild depression, 5.6% moderate depression, 2.2% moderately severe depression, and 0.7% reported severe depression. The statistically significant associations with depression among epilepsy patients included recent seizure occurrence (p=0.001), marital status (p=0.009), and parenthood status (p=0.011).

Conclusions: The observed frequency of depression among the study population surpassed that in the general Sri Lankan populace (4.1%). Timely identification and management of psychiatric comorbidities linked to epilepsy hold promise for optimising healthcare resource allocation in Sri Lanka.

KEYWORDS
Epilepsy, depression, prevalence, Sri Lanka

INTRODUCTION

Throughout history, dating as far back as 400 BC, an intriguing association between epilepsy and depression has been observed. Hippocrates notably remarked, 'melancholics ordinarily become epileptics, and epileptics, melancholics: what determines the preference is the direction the malady takes; if it bears upon the body, epilepsy, if upon the intelligence, melancholy'.[1] This historical insight underscores the enduring fascination with this relationship.

Globally, epilepsy affects approximately 50 million individuals, with a reported prevalence in Sri Lanka of 0.3%, encompassing around 63,000 people.[2] Notably, studies have consistently indicated a prevalence of depression among epileptic patients exceeding 20%,[3] with a recent systematic review and meta-analysis reporting a 23.1% prevalence.[4] Strikingly, the incidence of depression appears to correlate with the frequency of seizures,[5] highlighting the intricate interplay between these conditions. Interestingly, depression was more prevalent in patients with epilepsy than in patients with other chronic medical illnesses[6] and chronic neurological disorders like multiple sclerosis.[7]

Recent evidence has revealed a bidirectional relationship between epilepsy and mood disorders,[8] highlighting their intricate connections. This relationship is shaped by several factors: psychosocial impacts, where the chronic nature of epilepsy leads to stigmatization, low self-esteem, and social isolation,[9] precipitating depressive symptoms; and temporal dynamics, with depression often preceding seizures, suggesting shared underlying mechanisms.[8] Other factors include neurobiological overlaps,[10] such as aberrant neurotransmitter activity, structural brain alterations, and dysfunctions in the hypothalamic-pituitary-adrenal axis[11] and neurocircuitry, particularly in the hippocampus[12] and frontal lobes.[13] Additionally, pharmacological considerations are crucial, as some psychotropic drugs lower the seizure threshold,[14] and antiepileptic drugs can either alleviate or exacerbate depressive symptoms,[15,16] requiring careful treatment selection and monitoring. A systematic review and meta-analysis indicated an increased risk of depression with polytherapy compared to monotherapy[17] though this must be balanced against the greater risks of inadequate seizure treatment.

Depression emerges as a pivotal determinant of the quality of life in individuals with epilepsy,[18] exerting significant impacts on treatment outcomes[19,20] and overall well-being. Despite its profound implications, depression in epilepsy often goes unrecognized and untreated,[10] posing substantial risks including heightened suicide risk and increased healthcare burden.[21]

In response to this challenge, a plethora of validated screening tools, including the Neurological Disorders Depression Inventory for Epilepsy (NDDI-E)[22] and the Patient Health Questionnaire-9 (PHQ-9), have been developed to facilitate timely detection and intervention. However, there is a scarcity of data on depression among patients with epilepsy in many Asian countries.[23] Notably, the prevalence of depression among Sri Lankan patients with epilepsy remains poorly understood, underscoring the need for local research to elucidate sociodemographic and clinical determinants.

This clinic-based study was preformed to determine the frequency of depression and associated sociodemographic factors and clinical characteristics among adults with epilepsy attending the neurology clinics at Teaching Hospital Karapitiya, Sri Lanka.

METHODS

A descriptive cross-sectional hospital-based study was performed at Teaching Hospital Karapitiya; a tertiary care hospital serving around 500 adult patients with epilepsy in the southern province of Sri Lanka.

All patients who fulfilled the operational definition of epilepsy from the International League Against Epilepsy (ILAE), currently receiving treatment and followed up at neurology clinics, were included.

Patients of age less than 18 years, with other neurological conditions (e.g. Parkinson disease, brain tumour, multiple sclerosis, Alzheimer disease), chronic severe medical illnesses (e.g. severe heart failure (EF <35%), end stage renal failure (eGFR < 15 or on dialysis), chronic liver disease, severe chronic obstructive pulmonary disease/ bronchial asthma (with frequent exacerbations), schizophrenia, a history of active cancer in the last five years and current illicit drug use, were excluded from the study. Ethical clearance was obtained from the Faculty of Medicine, University of Ruhuna.

Data collection and analysis

The patients were interviewed using a pre-tested interviewer administered questionnaire. Data on (a) sociodemographic characteristics, (b) epilepsy, (c) anti-seizure medications (ASM) and (d) comorbidities, were recorded. Patients' clinical records were also used for data gathering. In addition, the 9-item Patient Health Questionnaire (PHQ-9), a self-administered screening tool for depression, validated in Sri Lanka, was completed to screen for those with depression.[24]

Data analysis was completed using SPSS statistical software version 23. Means, proportions, frequency analysis and multinominal logistic regression were used in data analysis. The presence of depression was assessed based on the PHQ-9 questionnaire. A patient was considered to have depression if he/she scored ≥5 on the PHQ-9 questionnaire or was currently on treatment for depression by a psychiatrist.

RESULTS

A total of 413 patients were eligible for the study. Table 1 and 2 summarize the sociodemographic and clinical characteristics of the study cohort, according to the severity of depression.

The study population comprised 57% (n=236) males, and the mean age was 38.3 years (SD=15.4; range 18-78 years). Employment status indicated that 54.7% (n=226) were unemployed. The marital status showed 51.3% (n=212) were unmarried, 48% (n=198) married, and 0.7% (n=3) were divorced. Fifty nine percent were (n=244) not parents, while 40.9% (n=169) had one or more children.

Education levels varied, from 8% (n=33) having had no formal education, to only 3.6% (n=15) attaining tertiary education. Social support was reported as good in 89.3% of patients (n=369) and poor in 10.7% (n=44). Financial support was deemed adequate by 57.9% (n=239).

Epilepsy characteristics showed that a majority had its onset after three years (84.5%). Generalized epilepsies were predominant, accounting for 87.9% (n=363), whereas 12.1% (n=50) experienced focal epilepsies. Preictal aura was present in 9.9% of cases (n=41). An epilepsy syndrome was diagnosed in only 4.4% (n=18) (i.e. Juvenile Absence Epilepsy, Juvenile Myoclonic Epilepsy, Epilepsy with generalised tonic clonic seizures alone). Three percent had experienced status epilepticus. A family history of epilepsy was noted in 17.7% (n=73). Additionally, 56.9% (n=235) did not experience seizures within the last month of interview. Electroencephalogram (EEG) abnormalities were observed in 40.9% (n=169) of cases. Computed tomography (CT) or magnetic resonance imaging (MRI) abnormalities were found in 21.3% (n=88) of participants.

Regarding treatment, all were on ASM therapy; 39.7% on monotherapy, and 60.3% (n=249) on polytherapy. Additionally, 14.3% (n=59) had comorbidities, while 85.7% (n=354) did not.

The overall frequency of depression in our study population was 29.8% (n=123). Twenty one percent exhibited mild depression, as indicated by a PHQ9 score ranging from 5 to 9. Additionally, 5.6% (n=23) displayed moderate depression (PHQ9 scores between 10 and 14), 2.2% (n=9) had moderately severe depression, (PHQ9 scores of 15 to 19) and 0.7% (n=3) were classified as having severe depression (PHQ9 scores of 20 to 27).

TABLE 1 Sociodemographic characteristics of the study cohort categorised according to the severity of depression

Sociodemographic characteristic	Total frequency (%)	Frequency (%)				
		Depression (overall)	Mild depression	Moderate depression	Moderately severe depression	Severe depression
Age						
18-40	244 (59.1)	71 (57.7)	54 (61.4)	11 (47.8)	4 (44.4)	2 (66.7)
>40	169 (40.9)	52 (42.3)	34 (38.6)	12 (52.2)	5 (55.6)	1 (33.3)
Gender						
Male	236 (57.1)	66 (53.7)	46 (52.3)	12 (52.2)	6 (66.7)	2 66.7)
Female	177 (42.9)	57 (46.3)	42 (47.7)	11 (47.8)	3 (33.3)	1(33.3)
Occupation						
Employed	187 (45.3)	48 (39.1)	34 (38.6)	8 (34.8)	5 (55.6)	1 (33.3)
Unemployed	226 (54.7)	75 (60.9)	54 (61.4)	15 (65.2)	4 (44.4)	2 (66.7)
Marital Status						
Single	212 (51.3)	51 (41.5)	41 (46.6)	5 (21.8)	2 (22.2)	3 (100)
Married	198 (48.0)	70 (56.9)	46 (52.3)	17 (73.9)	7 (77.8)	0
Divorced	3 (0.7)	2 (1.6)	1 (1.1)	1 (4.3)	0	0

(Continued)

Sociodemographic characteristic	Total frequency (%)	Frequency (%)				
		Depression (overall)	Mild depression	Moderate depression	Moderately severe depression	Severe depression
Children						
No children	244 (59.1)	61 (49.6)	45 (51.1)	9 (39.1)	4 (44.4)	3 (100)
1 or more children	169 (40.9)	62 (50.4)	43 (48.9)	14 (60.9)	5 (55.6)	0
Education status						
No formal education	33 (8)	5 (4.1)	4 (4.5)	1 (4.3)	0	0
Primary education	75 (18.2)	20 (16.3)	14 (16)	3 (13.1)	2 (22.2)	1 (33.3)
Secondary education	290 (70.2)	95 (77.2)	67 (76.1)	19 (82.6)	7 (77.8)	2 (66.7)
Tertiary education	15 (3.6)	3 (2.4)	3 (3.4)	0	0	0
Ethnicity						
Sinhala	393 (95.2)	120 (97.6)	85 (96.6)	23 (100)	9 (100)	3 (100)
Muslim	19 (4.6)	3 (2.4)	3 (3.4)	0	0	0
Tamil	1 (0.2)	0	0	0	0	0
Religion						
Buddhist	392 (95)	119 (96.7)	85 (96.6)	22 (95.7)	9 (100)	3 (100)
Christian	1 (0.2)	1 (0.8)	0	1 (4.3)	0	0
Islamic	19 (4.6)	3 (2.5)	3 (3.4)	0	0	0
Hindu	1 (0.2)	0	0	0	0	0
Social support						
Good	369 (89.3)	110 (89.3)	77 (87.5)	21 (91.3)	9 (100)	3 (100)
Poor	44 (10.7)	13 (10.7)	11 (12.5)	2 (8.7)	0	0
Financial support						
Adequate	239 (57.9)	72 (58.5)	54 (61.4)	10 (43.5)	6 (66.7)	2 (66.7)
Inadequate	174 (42.1)	51 (41.5)	34 (38.6)	13 (56.5)	3 (33.3)	1 (33.3)

TABLE 2 Clinical characteristics of the study cohort categorised according to the severity of depression

Clinical characteristic	Total frequency (%)	Frequency (%)				
		Depression (overall)	Mild depression	Moderate depression	Moderately severe depression	Severe depression
Age at seizure onset						
<3 years	64 (15.5)	17 (13.8)	14 (15.9)	3 (13)	0	0
≥3 years	349 (84.5)	106 (86.2)	74 (84.1)	20 (87)	9 (100)	3 (100)
Seizure semiology						
Generalized	363 (87.9)	107 (86.9)	76 (86.4)	21 (91.3)	8 (88.9)	2 (66.7)
Focal	50 (12.1)	16 (13.1)	12 (13.6)	2 (8.7)	1 (11.1)	1 (33.3)
Presence of an aura						
Yes	41 (9.9)	12 (9.8)	7 (8)	3 (13)	2 (22.2)	0
No	372 (90.1)	111 (90.2)	81 (92)	20 (87)	7 (77.8)	3 (100)
Associated epilepsy syndrome						
Yes	18 (4.4)	5 (4.1)	5 (5.7)	0	0	0
No	395 (95.6)	118 (95.9)	83 (94.3)	23 (100)	9 (100)	3 (100)
Prior history of status epilepticus						
Yes	13 (3.1)	5 (4.1)	1 (1.1)	2 (8.7)	2 (22.2)	0
No	400 (96.9)	118 (95.9)	87 (98.9)	21 (91.3)	7 (77.8)	3 (100)
Family history of epilepsy						
Yes	73 (17.7)	28 (22.8)	21 (23.9)	4 (17.4)	3 (33.3)	0
No	340 (82.3)	95 (77.2)	67 (76.1)	19 (82.6)	6 (66.7)	3 (100)
Frequency of seizures in the last month						
0	235 (56.9)	54 (43.9)	41 (46.6)	10 (43.5)	2 (22.2)	1 (33.3)
≥1	178 (43.1)	69 (56.1)	47 (53.4)	13 (56.5)	7 (77.8)	2 (66.7)
EEG abnormalities detected						
Yes	169 (40.9)	57 (46.3)	40 (45.5)	12 (52.2)	4 (44.4)	1 (33.3)
No	244 (59.1)	66 (53.7)	48 (54.5)	11 (47.8)	5 (55.6)	2 (66.7)

(Continued)

Clinical characteristic	Total frequency (%)	Frequency (%)				
		Depression (overall)	Mild depression	Moderate depression	Moderately severe depression	Severe depression
CT/MRI abnormalities detected						
Yes	88 (21.3)	22 (17.9)	18 (20.5)	3 (13)	1 (11.1)	0
No	325 (78.7)	101 (82.1)	70 (79.5)	20 (87)	8 (88.9)	3 (100)
Number of drugs						
Monotherapy	164 (39.7)	51 (41.5)	41 (46.6)	7 (30.4)	2 (22.2)	1 (33.3)
Polytherapy	249 (60.3)	72 (58.5)	47 (53.4)	16 (69.6)	7 (77.8)	2 (66.7)
Comorbidities						
Yes	59 (14.3)	22 (17.9)	12 (13.6)	7 (30.4)	2 (22.2)	1 (33.3)
No	354 (85.7)	101 (82.1)	76 (86.4)	16 (69.6)	7 (77.8)	2 (66.7)

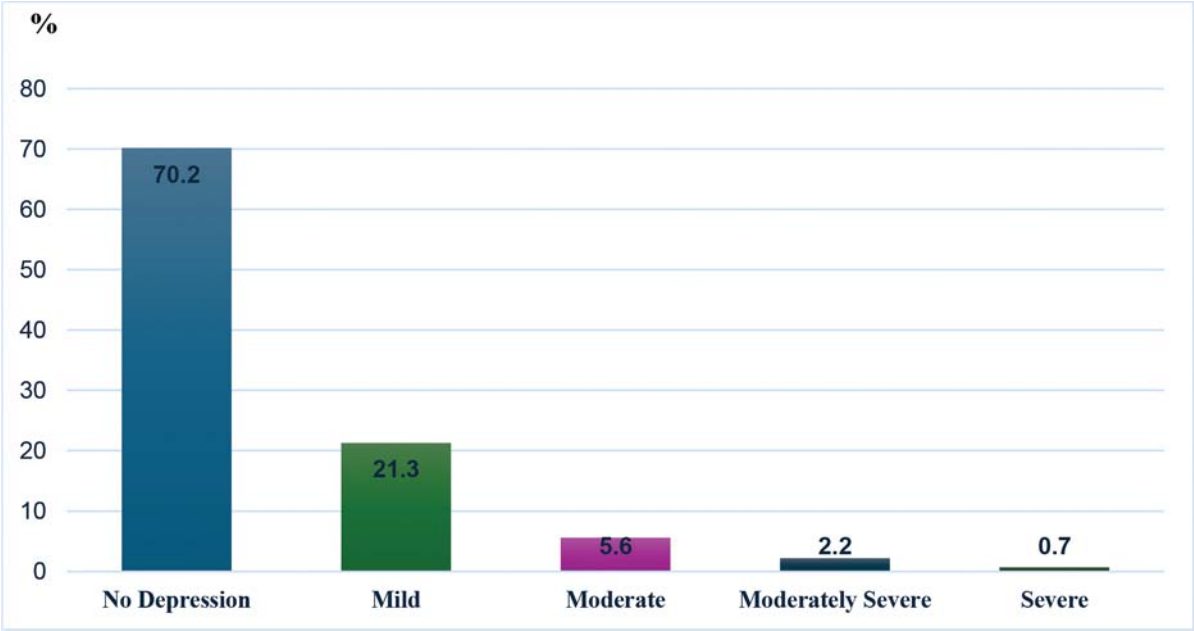

FIGURE 1 **Percentages of patients with depression and its severity.**

In our study population, a recent occurrence of seizures within the last month exhibited a significant association with the presence of depression (p=0.001). Additionally, patients who are currently or were previously married showed a notable association with depression (p=0.009). Similarly, parenthood status was found to be significantly associated with depression (p=0.011) Table 3.

TABLE 3 Sociodemographic and clinical variables associated with depression in patients with epilepsy

Sociodemographic variables	**Strength of association**	
Age (≥40yrs vs. >40yrs)	P =0.715	(χ^2=0.133, df=1)
Gender	P = 0.351	(χ^2=0.868, df=1)
Employment status (unemployed vs employed)	P =0.096	(χ^2=2.765, df=1)
Marital status (single vs ever-married)	P=0.009	(χ^2=6.828, df=1)
Presence of children	P=0.011	(χ^2=6.521, df=1)
Education status	P=0.055	(χ^2=3.671, df=1)
Ethnicity (Sinhalese vs non-Sinhalese)	P=0.138	(χ^2=2.196, df=1)
Religion (Buddhist, vs non-Buddhist)	P=0.27	(χ^2=1.219, df=1)
Social support (good vs poor)	P=0.971	(χ^2=0.001, df=1)
Financial support (adequate vs inadequate)	P=0.858	(χ^2=0.032, df=1)
Clinical variables	**Strength of association**	
Age at seizure onset (<3yrs vs ≥3yrs)	P=0.54	(χ^2=0.375, df=1)
Seizure semiology (generalized vs focal)	P=0.715	(χ^2=0.134, df=1)
Associated epilepsy syndrome	P=0.849	(χ^2=0.036, df=1)
Prior history of status epilepticus	P=0.487	(χ^2=0.484, df=1)
Family history of epilepsy	P=0.078	(χ^2=3.117, df=1)
Experiencing seizures during the last 30 days	P=0.001	(χ^2=12.068, df=1)
Presence of EEG abnormalities	P=0.144	(χ^2=2.13, df=1)
Presence of CT/MRI abnormalities	P=0.269	(χ^2=1.223, df=1)
Number of drugs (monotherapy vs polytherapy)	P=0.635	(χ^2=0.225, df=1)
Presence of comorbidities	P=0.173	(χ^2=1.854, df=1)

DISCUSSION

Our findings reveal a notable frequency of depression of 29.8% within our cohort of epilepsy patients. This rate surpasses the rate observed in the general Sri Lankan population.[25] These findings align with international studies, demonstrating a statistically significant elevation in the prevalence of depression among individuals with epilepsy.[3,4]

A comprehensive systematic review and meta-analysis encompassing 56 studies corroborated these findings, reporting an overall pooled prevalence of depression among 32% of patients with epilepsy.[26] Furthermore, trends indicate a doubling of the prevalence of depression in recent years, with higher rates observed in Asian populations compared to European populations.

Despite the high frequencies observed, depression in epilepsy remains under-recognised and inadequately managed across many Asian countries.[23] The scarcity of data, compounded by the absence of validated screening tools in numerous languages, underscores the urgent need for heightened awareness and routine screening protocols in epilepsy care.

Our study demonstrates an association between seizure frequency and depressive symptomatology. Individuals reporting no seizures in the preceding month exhibited lower PHQ-9 scores, suggesting a potential link between reduced seizure frequency and reduced depression severity. It could also be argued that patients who did not have depression or had less severe depression had better seizure control. This association may support intricate interplay between epilepsy control and mood regulation.

Moreover, our findings hint at the existence of shared neurobiological mechanisms underlying epilepsy and depression. While causality cannot be inferred from our cross-sectional study design, longitudinal investigations, have identified bidirectional relationships between depression scores and seizure frequency, lending credence to the hypothesis of shared neurobiology.[8]

Sociodemographic analyses reveal nuanced relationships between depression, marital status and parenthood, with married and divorced individuals and parents exhibiting higher PHQ-9 scores, possibly attributable to increased stressors and responsibilities. However, findings regarding the correlation between depression and other socio-demographic factors such as age, gender, education level, employment status, ethnicity, religion, the adequacy of social and financial support vary across studies,[27-30] reflecting the complex interplay of cultural norms and societal perceptions.

Clinical characteristics including age at seizure onset, seizure semiology, presence of an associated aura, an associated epilepsy syndrome, prior history of status epilepticus, family history of epilepsy, presence of associated EEG or imaging abnormalities, number of ASM the patient was on and the presence of comorbidities did not emerge as significant predictors of depression in our study. Contrasting findings from other studies[29] underscore the need for further exploration to elucidate the diverse array of factors influencing depression in epilepsy patients.

Our study has inherent limitations. One major limitation is the selection bias of the patient population. Conducted during the COVID-19 pandemic, the study period was marked by increased social isolation, which may have influenced our results. Furthermore, while the PHQ-9 is a valuable screening instrument, comprehensive diagnostic evaluation and clinical confirmation by a psychiatrist are essential for the definitive diagnosis of depression. Another potential confounding factor is the omission of antidepressant use status among participants. The use of antidepressants could have reduced PHQ-9 scores and potentially influenced seizure frequency by altering depression severity and, depending on the medication, affecting the seizure threshold. This study was conducted at a major tertiary care hospital, which may limit the generalisability of the findings to the broader population of epilepsy patients. It is likely that patients with more complex or uncontrolled epilepsy are overrepresented in this setting. Additionally, patients with severe depression may be underrepresented, as they are less likely to attend hospital clinics. Thus, the frequency of depression observed in this study may not accurately reflect that in the general community of epilepsy patients.

However, our study underscores the pressing need for enhanced recognition and management of depression among individuals with epilepsy in Sri Lanka. By evaluating the complex interplay between sociodemographic, clinical, and psychosocial factors, our findings pave the way for targeted interventions aimed at alleviating the burden of depression in this vulnerable population. Further research is warranted to unravel the multifaceted determinants of depression in epilepsy and generate evidence-based approaches to management.

CONCLUSION

This study revealed a higher frequency of depression among individuals with epilepsy in comparison to the general Sri Lankan population (4.1%).[25] The findings highlight the imperative for enhanced detection and management of depression in epilepsy patients, given the substantial frequency and under-recognition of this comorbidity. In keeping with the ILAE recommendation, we advocate routine and systematic implementation of validated screening tools, such as the PHQ-9 questionnaire, to facilitate early identification of depression in epilepsy patients. By integrating such screening protocols into routine clinical practice, healthcare providers can optimize patient management strategies, ultimately leading to more efficient utilisation of limited healthcare resources.

Conflicts of interests

There are no known conflicts of interest associated with this publication and the author(s) received no financial support for the research, authorship, and/or publication of this article.

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