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PSYCHIATRIC MORBIDITY AND CAREGIVER BURDEN AMONG ADULTS WITH EPILEPSY AT A TERTIARY-CARE CENTRE

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ABSTRACT

Background: Psychiatric disorders frequently complicate epilepsy and may adversely affect seizure management, treatment adherence and quality of life. The chronic and unpredictable nature of seizures also places substantial psychological, social and financial demands on family caregivers. This study assessed psychiatric comorbidity among adults with epilepsy, quantified caregiver burden and identified factors associated with these outcomes.

Materials and Methods: This hospital-based cross-sectional study included 176 adult patient–caregiver dyads attending a tertiary-care centre. Psychiatric diagnoses were established using the Mini International Neuropsychiatric Interview version 7.0.2. Depressive and anxiety symptoms were assessed using the Patient Health Questionnaire-9 and Generalized Anxiety Disorder-7, respectively. Caregiver burden was measured using the 22-item Zarit Burden Interview. Sociodemographic, epilepsy-related, treatment-related and caregiving variables were recorded. Group comparisons, Spearman's correlation, binary logistic regression and multiple linear regression were performed. A two-sided $p<0.05$ was considered statistically significant.

Results: Psychiatric comorbidity was identified in 44.9% of patients. Depressive disorders (26.7%) and anxiety disorders (22.2%) were most frequent, while suicidal ideation or risk was detected in 6.8%. Female sex (AOR=1.92; 95% CI: 1.01–3.66), at least 12 seizures annually (AOR=2.27; 95% CI: 1.00–5.15) and drug-resistant epilepsy (AOR=2.60; 95% CI: 1.20–5.61) independently predicted psychiatric comorbidity. The mean caregiver-burden score was 36.9±14.2, and 37.5% experienced moderate-to-severe or severe burden. Patient psychiatric comorbidity, caregiving exceeding eight hours daily, financial strain, work loss and limited family support independently predicted greater burden. Caregiving hours showed the strongest correlation with burden ($\rho=0.53$; $p<0.001$).

Conclusion: Psychiatric morbidity and caregiver burden were highly prevalent and closely interconnected. Integrating mental-health screening, improved seizure control, caregiver assessment and psychosocial support into routine epilepsy services may promote more comprehensive, family-centred care.

Keywords: anxiety; caregiver burden; depression; psychiatric comorbidity; Zarit Burden Interview.

INTRODUCTION

Epilepsy is a chronic neurological disorder characterized by an enduring predisposition to recurrent unprovoked seizures. It affects approximately 50 million people worldwide, nearly 80% of whom live in low- and middle-income countries.[1] Beyond seizures, epilepsy produces substantial psychological, social and economic consequences, including stigma, restricted employment, impaired interpersonal relationships and reduced quality of life.[1,2] These consequences

may be particularly pronounced in resource-constrained settings, where treatment gaps and dependence on informal family care remain considerable.

Psychiatric disorders are among the most frequent yet under-recognized comorbidities of epilepsy. Meta-analyses have estimated the prevalence of depression and anxiety disorders among people with epilepsy at approximately 23% and 20%, respectively.[3,4] A recent comprehensive meta-analysis demonstrated significantly higher odds of depression (OR=2.45), anxiety (OR=2.11), psychotic disorders (OR=3.98) and suicidal ideation (OR=2.25) among people with epilepsy than among those without epilepsy.[5] Multiple psychiatric disorders may coexist, further increasing functional impairment.[6] This association is considered bidirectional and may involve shared neurobiological pathways, altered neurotransmission, psychosocial adversity, antiseizure-medication effects and the persistent uncertainty associated with recurrent seizures.[2] Untreated psychiatric morbidity may adversely affect medication adherence, seizure control, healthcare utilization and overall quality of life.

Epilepsy also imposes considerable demands on caregivers, who frequently provide supervision, treatment support, financial assistance and emergency care. An Indian review found that caregiving adversely affected caregivers' physical and psychological health, family functioning and financial status.[7] Economic consequences become particularly severe in drug-resistant epilepsy.[8] A recent Indian study involving 306 caregivers reported moderate-to-severe burden in 35%, with burden strongly associated with caregiver anxiety, depression and perceived stigma.[9] Nevertheless, psychiatric morbidity in patients and caregiver burden are often assessed separately. Their simultaneous evaluation may help identify interrelated clinical and psychosocial determinants and facilitate integrated, family-centred epilepsy care. Therefore, the present study aimed to assess psychiatric comorbidity among patients with epilepsy, quantify caregiver burden and examine the factors associated with these outcomes.

MATERIALS AND METHODS

Study design and setting

This hospital-based cross-sectional study was conducted in the Department of Psychiatry in collaboration with department of Neurology tertiary-care institution of North India, over a period of 24 months between April 2023 and March 2025. The study was designed to determine the prevalence and pattern of psychiatric comorbidities among adult patients with epilepsy, assess burden among their primary caregivers, and identify patient-, disease- and caregiver-related factors associated with these outcomes. Each patient and accompanying caregiver constituted one study dyad.

Study participants

Patients aged ≥18 years with an established diagnosis of epilepsy, confirmed by a neurologist according to International League Against Epilepsy criteria, were considered eligible. Patients were required to have had epilepsy for at least six months, to be receiving follow-up care at the study hospital, and to be accompanied by a primary informal caregiver. A primary caregiver was defined as an adult family member aged ≥18 years who was principally responsible for the patient's supervision, treatment-related assistance and day-to-day support for at least the preceding six months.

Patients with acute symptomatic seizures, febrile seizures, psychogenic nonepileptic seizures, delirium, severe intellectual disability, major neurocognitive disorder, impaired consciousness or an unstable medical condition preventing reliable assessment were excluded. Patients and caregivers who could not communicate in the locally understood language were also excluded. Paid or professional caregivers and caregivers with severe cognitive impairment or acute medical illness were not enrolled.

Sample size and sampling

The sample size was calculated using the single-population proportion formula, $n=Z^2P(1-P)/d^2$. Based on previous hospital-based studies, the anticipated prevalence of psychiatric comorbidity among patients with epilepsy was taken as 37% (P=0.37).[8,9] At a 95% confidence level (Z=1.96) and an absolute precision of 7.5% (d=0.075), the minimum sample size was calculated as 160. After adding 10% to compensate for incomplete responses or non-participation, the final required sample size was 176 patient–caregiver dyads. Eligible dyads attending the outpatient or inpatient services during the study period were recruited consecutively until the required sample size was attained.

Data collection procedure

After obtaining written informed consent, participants were interviewed separately in a private setting. A predesigned, pilot-tested case-record form was used to document patient characteristics, including age, sex, residence, education, occupation, marital status, socioeconomic status, family history of epilepsy and substance use. Clinical information included age at seizure onset, duration of epilepsy, seizure type, presumed aetiology, seizure frequency during the preceding 12 months, time since the last seizure, seizure-related injuries, history of status epilepticus, electroencephalographic and neuroimaging findings, antiseizure medications, monotherapy or polytherapy, self-reported adherence and treatment-related adverse effects. Drug-resistant epilepsy was defined according to International League Against Epilepsy criteria as failure of two appropriately selected and adequately administered antiseizure-medication schedules to achieve sustained seizure freedom. Relevant clinical information was verified from medical records wherever available.

Assessment of psychiatric comorbidity

Psychiatric diagnoses were established through a clinical interview conducted by a psychiatrist using the Mini International Neuropsychiatric Interview version 7.0.2, based on Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition criteria. The assessment covered depressive disorders, anxiety disorders, psychotic disorders, bipolar disorder, substance-use disorders and suicidality. The Patient Health Questionnaire-9 and Generalized Anxiety Disorder-7 scale were additionally administered to quantify the severity of depressive and anxiety symptoms, respectively. Validated English or local-language versions were used according to participant preference. Psychiatric manifestations occurring exclusively during the immediate pre-ictal, ictal or postictal period were distinguished from independent psychiatric disorders through clinical history and review of seizure timing.

Assessment of caregiver burden

Caregiver information included age, sex, relationship with the patient, education, employment, monthly family income, co-residence, duration of caregiving, average caregiving hours per day, workdays lost, financial dependence and availability of additional family support. Caregiver burden was measured using the 22-item Zarit Burden Interview. Each item was rated from 0 to 4, producing a total score of 0–88; higher scores indicated greater burden. Scores were interpreted as little or no burden (0–20), mild-to-moderate burden (21–40), moderate-to-severe burden (41–60), and severe burden (61–88).

Outcome measures

The primary outcomes were the prevalence and diagnostic distribution of psychiatric comorbidity among patients with epilepsy and the mean caregiver-burden score. Secondary outcomes included the severity of depressive and anxiety symptoms, categories of caregiver burden, and clinical or psychosocial factors associated with psychiatric comorbidity and moderate-to-severe caregiver burden.

Statistical analysis

Data were entered into Microsoft Excel and analysed using IBM SPSS Statistics version 20.0. Continuous variables were summarized as mean±standard deviation when normally distributed and as median with interquartile range when non-normally distributed. Categorical variables were presented as frequencies and percentages. Normality was assessed using the Shapiro–Wilk test and visual inspection of histograms. Between-group comparisons of continuous variables were performed using the independent-samples *t* test or Mann–Whitney *U* test, as appropriate. Categorical variables were compared using Pearson's chi-square test or Fisher's exact test when expected cell frequencies were insufficient. Associations between the total Zarit Burden Interview score and continuous or ordinal patient- and caregiver-related variables were examined using Spearman's rank correlation coefficient. Binary logistic regression was performed to identify independent predictors of any current psychiatric comorbidity, and results were reported as adjusted odds ratios with 95% confidence intervals. Multiple linear regression was used to identify independent predictors of the continuous caregiver-burden score, with unstandardized regression coefficients, standardized beta coefficients and 95% confidence intervals reported. Variables with $p<0.20$ in univariable analysis, together with clinically relevant covariates, were entered into the multivariable models. Multicollinearity was assessed using variance inflation factors and tolerance statistics. Logistic-model fit was evaluated using the Hosmer–Lemeshow test, while the explanatory performance of the linear model was expressed using R^2, adjusted R^2 and the overall *F* test. All tests were two-sided, and $p<0.05$ was considered statistically significant.

RESULTS

The mean age of the 176 patients was 39.2±13.6 years; 57.4% were male, 60.8% resided in rural areas, and 63.6% were married. The median duration of epilepsy was 11.0 years (IQR: 6.0–18.0), with 54.5% having the disease for more than 10 years. Focal-onset epilepsy was most frequent (59.7%). During the preceding year, 22.2% experienced at least 12 seizures, while 21.6% remained seizure-free. Polytherapy was used by 50.0%, drug-resistant epilepsy was present in 32.4%, and suboptimal adherence was reported by 24.4%. [Table 1]

Table 1: Sociodemographic and clinical characteristics of patients with epilepsy (N=176)

Characteristic	Frequency (%)/mean ± SD/median (IQR)
Age, years	39.2 ± 13.6
Age group, years	
18–29	51 (29.0)
30–44	61 (34.7)
45–59	43 (24.4)
≥60	21 (11.9)
Gender	
Male	101 (57.4)
Female	75 (42.6)
Rural residence	107 (60.8)
Married	112 (63.6)
Education ≤secondary level	107 (60.8)
Currently unemployed	40 (22.7)
Lower socioeconomic class	108 (61.4)

Family history of epilepsy	23 (13.1)
Age at seizure onset, years	24.5 ± 15.0
Duration of epilepsy, years	11.0 (6.0–18.0)
Duration of epilepsy >10 years	96 (54.5)
Seizure type	
Focal-onset epilepsy	105 (59.7)
Generalized-onset epilepsy	63 (35.8)
Unknown/unclassified	8 (4.5)
Seizure frequency during preceding 12 months	
Seizure-free	38 (21.6)
1–3 seizures/year	56 (31.8)
4–11 seizures/year	43 (24.4)
≥12 seizures/year	39 (22.2)
History of seizure-related injury	49 (27.8)
Previous status epilepticus	20 (11.4)
Antiseizure-medication polytherapy	88 (50.0)
Drug-resistant epilepsy	57 (32.4)
Suboptimal medication adherence	43 (24.4)
Antiseizure-medication adverse effects	55 (31.3)

IQR: interquartile range; SD: standard deviation.

At least one current psychiatric comorbidity was identified in 79 patients (44.9%). Depressive disorders were most prevalent (26.7%), followed by anxiety disorders (22.2%), substance-use disorders (8.0%), psychotic disorders (4.0%), bipolar disorder (3.4%), and obsessive–compulsive disorder (2.8%). Current suicidal ideation or risk was detected in 6.8%. Multiple psychiatric comorbidities were present in 18.2% of patients. The mean PHQ-9 and GAD-7 scores were 7.8±5.8 and 6.8±5.4, respectively; moderate-to-severe depressive and anxiety symptoms were observed in 30.7% and 25.0% of patients, respectively. [Table 2]

Table 2: Prevalence and pattern of psychiatric comorbidity among patients with epilepsy (N=176)

Psychiatric assessment	**Frequency/mean ± SD**
Any current psychiatric comorbidity	79 (44.9)
Depressive disorder	47 (26.7)
Anxiety disorder	39 (22.2)
Substance-use disorder	14 (8.0)
Psychotic disorder	7 (4.0)
Bipolar disorder	6 (3.4)
Obsessive–compulsive disorder	5 (2.8)
Current suicidal ideation/risk	12 (6.8)
Number of psychiatric diagnostic categories	
No psychiatric diagnosis	97 (55.1)
One diagnosis	47 (26.7)
Two diagnoses	25 (14.2)
Three or more diagnoses	7 (4.0)
PHQ-9 score	7.8 ± 5.8
Depressive-symptom severity by PHQ-9	
Minimal (0–4)	63 (35.8)
Mild (5–9)	59 (33.5)
Moderate (10–14)	31 (17.6)
Moderately severe (15–19)	16 (9.1)
Severe (≥20)	7 (4.0)
GAD-7 score	6.8 ± 5.4
Anxiety-symptom severity by GAD-7	
Minimal (0–4)	75 (42.6)
Mild (5–9)	57 (32.4)
Moderate (10–14)	30 (17.0)
Severe (≥15)	14 (8.0)

PHQ-9: Patient Health Questionnaire-9; GAD-7: Generalized Anxiety Disorder-7; MINI: Mini International Neuropsychiatric Interview; SD: standard deviation.

The caregivers had a mean age of 45.2±12.8 years, and 63.6% were female. Spouses constituted the largest caregiver group (44.3%), followed by parents (33.0%); 89.8% lived with the patient. The median duration of caregiving was 8.0 years (IQR: 4.0–13.0), while 40.3% provided more than eight hours of care daily. Financial strain was reported by 52.3%, and 39.2% had limited additional family support. The mean ZBI score was 36.9±14.2. Overall, 37.5% experienced moderate-to-severe or severe burden, including 5.7% with severe burden. [Table 3]

Table 3: Characteristics of primary caregivers and distribution of caregiver burden (N=176)

Caregiver characteristic	Frequency (%)/mean ± SD/median (IQR)
Age, years	45.2 ± 12.8
Female caregiver	112 (63.6)
Married	144 (81.8)
Rural residence	109 (61.9)
Education ≤secondary level	113 (64.2)
Homemaker or unemployed	85 (48.3)
Relationship with the patient	
Spouse	78 (44.3)
Parent	58 (33.0)
Sibling	25 (14.2)
Adult child/other relative	15 (8.5)
Residing with the patient	158 (89.8)
Duration of caregiving, years	8.0 (4.0–13.0)
Providing >8 hours of care per day	71 (40.3)
Reporting financial strain due to epilepsy	92 (52.3)
Losing ≥3 workdays per month	48 (27.3)
Limited additional family support	69 (39.2)
ZBI score	36.9 ± 14.2
Caregiver-burden category	
Little or no burden (0–20)	23 (13.1)
Mild-to-moderate burden (21–40)	87 (49.4)
Moderate-to-severe burden (41–60)	56 (31.8)
Severe burden (61–88)	10 (5.7)
Moderate-to-severe or severe burden (ZBI >40)	66 (37.5)

IQR: interquartile range; SD: standard deviation; ZBI: Zarit Burden Interview.

Psychiatric comorbidity was significantly more prevalent among female than male patients (57.3% versus 35.6%; p=0.004) and among unemployed patients compared with those having another employment status (62.5% versus 39.7%; p=0.011). Its prevalence was also higher among patients with epilepsy lasting more than 10 years (53.1%; p=0.016), at least 12 seizures annually (69.2%; p<0.001), seizure-related injuries (59.2%; p=0.018), polytherapy (58.0%; p<0.001), drug-resistant epilepsy (66.7%; p<0.001), suboptimal adherence (65.1%; p=0.002), and medication-related adverse effects (60.0%; p=0.007). Residence was not significantly associated with psychiatric comorbidity (p=0.123). [Table 4]

Table 4: Factors associated with psychiatric comorbidity among patients with epilepsy (N=176)

Characteristic	Total	Psychiatric comorbidity present	Psychiatric comorbidity absent	p value
		Frequency (%)		
Gender				
Female	75	43 (57.3)	32 (42.7)	0.004
Male	101	36 (35.6)	65 (64.4)	
Residence				
Rural	107	53 (49.5)	54 (50.5)	0.123
Urban	69	26 (37.7)	43 (62.3)	
Employment status				
Unemployed	40	25 (62.5)	15 (37.5)	0.011
Other employment status	136	54 (39.7)	82 (60.3)	
Epilepsy duration				
>10 years	96	51 (53.1)	45 (46.9)	0.016
≤10 years	80	28 (35.0)	52 (65.0)	
Seizure frequency				
≥12 seizures/year	39	27 (69.2)	12 (30.8)	<0.001
<12 seizures/year	137	52 (38.0)	85 (62.0)	
Seizure-related injury				
Present	49	29 (59.2)	20 (40.8)	0.018
Absent	127	50 (39.4)	77 (60.6)	
Antiseizure-medication regimen				
Polytherapy	88	51 (58.0)	37 (42.0)	<0.001
Monotherapy	88	28 (31.8)	60 (68.2)	
Drug-resistant epilepsy				
Present	57	38 (66.7)	19 (33.3)	<0.001
Absent	119	41 (34.5)	78 (65.5)	
Suboptimal medication adherence				
Present	43	28 (65.1)	15 (34.9)	0.002
Absent	133	51 (38.3)	82 (61.7)	
Medication-related adverse effects				
Present	55	33 (60.0)	22 (40.0)	0.007
Absent	121	46 (38.0)	75 (62.0)	

One-way ANOVA for age across fracture patterns: p = 0.08 (not significant).

Mean caregiver-burden scores were significantly higher when patients had psychiatric comorbidity (44.3±12.7 versus 30.8±12.4; p<0.001), drug-resistant epilepsy (44.9±13.0 versus 33.1±13.3; p<0.001), or at least 12 seizures annually (46.2±12.8 versus 34.3±13.7; p<0.001). Greater burden was also associated with spousal caregiving (p=0.047), caregiver unemployment or homemaker status (p=0.004), more than eight caregiving hours daily, financial strain, loss of at least three workdays per month, and limited family support (all p<0.001). The difference according to caregiver sex did not reach statistical significance (p=0.066). [Table 5]

Table 5: Comparison of caregiver-burden scores according to patient and caregiver characteristics

Characteristic	Category	Total	ZBI score mean ± SD	p value
Patient psychiatric comorbidity	**Present**	79	44.3 ± 12.7	<0.001
	Absent	97	30.8 ± 12.4	
Drug-resistant epilepsy	**Present**	57	44.9 ± 13.0	<0.001
	Absent	119	33.1 ± 13.3	
Seizure frequency	**≥12/year**	39	46.2 ± 12.8	<0.001
	<12/year	137	34.3 ± 13.7	
Caregiver Gender	**Female**	112	38.4 ± 14.1	0.066
	Male	64	34.3 ± 14.1	
Caregiver relationship	**Spouse**	78	39.3 ± 14.5	0.047
	Other relative	98	35.0 ± 13.7	
Caregiver employment	**Homemaker/unemployed**	85	40.1 ± 14.0	0.004
	Employed/student	91	33.9 ± 13.8	
Daily caregiving	**>8 hours/day**	71	44.5 ± 12.6	<0.001
	≤8 hours/day	105	31.8 ± 13.0	
Financial strain	**Present**	92	43.3 ± 12.7	<0.001
	Absent	84	29.9 ± 12.4	
Workdays lost	**≥3 days/month**	48	47.4 ± 11.8	<0.001
	<3 days/month	128	32.9 ± 12.9	
Additional family support	**Limited**	69	45.1 ± 12.2	<0.001
	Adequate	107	31.6 ± 12.8	

SD: standard deviation; ZBI: Zarit Burden Interview.

The ZBI score demonstrated its strongest positive correlation with average caregiving hours per day (ρ=0.53; p<0.001). Caregiver burden also correlated moderately with patient depressive symptoms measured using PHQ-9 (ρ=0.47; p<0.001), anxiety symptoms measured using GAD-7 (ρ=0.41; p<0.001), and seizure-frequency category (ρ=0.39; p<0.001). Weaker but statistically significant correlations were observed with the number of antiseizure medications (ρ=0.31), duration of caregiving (ρ=0.26), and duration of epilepsy (ρ=0.22). Patient age was not significantly correlated with caregiver burden (ρ=0.08; p=0.291). [Table 6]

Table 6: Correlation between caregiver-burden score and patient- and caregiving-related variables (N=176)

Variable	Spearman's correlation coefficient (ρ)	p value
Patient age	0.08	0.291
Duration of epilepsy	0.22	0.003
Seizure-frequency category	0.39	<0.001
Number of antiseizure medications	0.31	<0.001
PHQ-9 depression score	0.47	<0.001
GAD-7 anxiety score	0.41	<0.001
Duration of caregiving	0.26	<0.001
Average caregiving hours per day	0.53	<0.001

PHQ-9: Patient Health Questionnaire-9; GAD-7: Generalized Anxiety Disorder-7; ZBI: Zarit Burden Interview.

After multivariable adjustment, female sex (AOR=1.92; 95% CI: 1.01–3.66; p=0.047), at least 12 seizures annually (AOR=2.27; 95% CI: 1.00–5.15; p=0.049), and drug-resistant epilepsy (AOR=2.60; 95% CI: 1.20–5.61; p=0.015) independently predicted psychiatric comorbidity. Higher caregiver-burden scores were independently associated with patient psychiatric comorbidity (B=6.82; p<0.001), caregiving exceeding eight hours daily (B=5.87; p=0.001), financial strain (B=6.16; p<0.001), loss of at least three workdays monthly (B=4.38; p=0.017), and limited family support (B=6.95; p<0.001). The caregiver-burden model explained 49% of the variance (adjusted R^2=0.47; overall p<0.001). [Table 7]

Table 7: Multivariable predictors of psychiatric comorbidity and caregiver burden

Predictor	Adjusted odds ratio	95% CI	p value
Female sex	1.92	1.01–3.66	0.047
Epilepsy duration >10 years	1.57	0.81–3.03	0.181
≥12 seizures/year	2.27	1.00–5.15	0.049
Drug-resistant epilepsy	2.6	1.20–5.61	0.015
Suboptimal medication adherence	2.07	0.94–4.57	0.071
Medication-related adverse effects	1.64	0.82–3.30	0.162
Unemployment	1.85	0.84–4.08	0.128
Predictor	**Unstandardized B**	**95% CI**	**Standardized β, p value**
Patient psychiatric comorbidity	6.82	3.45–10.19	0.24, 0.001
Drug-resistant epilepsy	3.01	−0.42–6.44	0.1, 0.085
Caregiving >8 hours/day	5.87	2.55–9.19	0.19, 0.001
Financial strain	6.16	2.99–9.33	0.22, <0.001
Loss of ≥3 workdays/month	4.38	0.79–7.97	0.14, 0.017
Limited additional family support	6.95	3.68–10.22	0.23, <0.001
Caregiver unemployed/homemaker	2.68	−0.28–5.64	0.09,0.076

AOR: adjusted odds ratio; B: unstandardized regression coefficient; β: standardized regression coefficient; CI: confidence interval; ZBI: Zarit Burden Interview.

DISCUSSION

The present study demonstrated a substantial psychiatric and caregiving burden associated with epilepsy. Overall, 44.9% of patients had at least one current psychiatric comorbidity, with depressive disorders (26.7%) and anxiety disorders (22.2%) predominating. Goel et al., in a disadvantaged North Indian population, reported a confirmed psychiatric diagnosis in 52% of adults with epilepsy, while depression and anxiety screening positivity varied from 12–15% and 19–28%, respectively.[10] Rashid et al., documented depression in 40.1% using the MINI and suicidal ideation in 4.5% of Indian patients,[11] compared with 6.8% suicidal risk in the present study. A recent North Indian study by Choudhury et al., of juvenile myoclonic epilepsy reported lower frequencies of anxiety (10%) and depression (6%), possibly because of its younger, syndrome-specific and relatively well-controlled population.[12] Conversely, Shanthi et al., identified psychiatric disorders in 59.2% of tertiary-care patients, including depression in 38.1%, anxiety in 19.1% and suicidal manifestations in 8.1%.[13] Differences between studies likely reflect variations in epilepsy severity, referral patterns, diagnostic instruments, cultural expression of psychological distress and whether screening scores or structured psychiatric diagnoses were employed.

Female sex independently increased the likelihood of psychiatric comorbidity in the present analysis (AOR=1.92), while unemployment was associated at the univariable level. These findings agree with a meta-analysis by Yang et al., which identified female sex (OR=1.58), unemployment (OR=1.61), poor medication adherence (OR=2.84) and polytherapy (OR=2.25) as risk factors for depression in epilepsy.[14] Biological susceptibility involving sex hormones and stress-response pathways may interact with gender-related inequalities, social dependence and caregiving responsibilities. Unemployment may additionally intensify financial insecurity, perceived stigma and loss of personal autonomy. However, its loss of statistical significance after adjustment in the present study suggests that the association may be partly mediated by seizure severity and treatment complexity.

Frequent seizures and drug-resistant epilepsy emerged as the strongest independent clinical predictors of psychiatric comorbidity, with adjusted odds ratios of 2.27 and 2.60, respectively. Goel et al., similarly found that experiencing at least one seizure annually increased the likelihood of psychiatric diagnosis more than twofold (OR=2.36).[10] Among patients with drug-resistant focal epilepsy, Jansen et al. reported psychiatric comorbidity in 52.9%, including anxiety disorders in 28.7% and major depression in 16.1%.[15] Recurrent unpredictable seizures may produce anticipatory anxiety, activity restriction, disrupted sleep and learned helplessness. Repeated involvement of limbic and frontotemporal networks, dysregulation of serotonergic and GABAergic neurotransmission, hypothalamic–pituitary–adrenal-axis activation and neuroinflammatory processes may provide additional biological links between epilepsy and psychiatric illness.[16] Polytherapy, poor adherence and medication adverse effects were significant in unadjusted analyses but not independent predictors, indicating confounding by disease severity. Nevertheless, antiseizure medications can produce clinically relevant mood and behavioural adverse effects, with susceptibility varying across agents and individual patients.[17]

Caregiver burden was also considerable: the mean ZBI score was 36.9±14.2, and 37.5% of caregivers experienced moderate-to-severe or severe burden. Yeni et al., found that approximately two-thirds of families experienced some degree of burden, with patient stigma, treatment type and caregiver characteristics contributing to a model explaining 61% of burden variance.[18] In an Asian family-based study, Lai et al., reported a mean ZBI score of 29.93±16.09, with 42.3% experiencing mild-to-moderate burden.[19] A Hong Kong study by Lou et al., reported high burden in 58.9%, although it used

the shorter ZBI-4 and therefore cannot be directly compared with the present estimates.[20]

Caregiving hours showed the strongest correlation with burden (ρ=0.53), followed by patient depression (ρ=0.47), anxiety (ρ=0.41) and seizure frequency (ρ=0.39). After adjustment, psychiatric comorbidity increased ZBI scores by 6.82 points, while prolonged caregiving, financial strain, work loss and limited family support remained independent predictors. These findings are consistent in studies by Yeni et al., and Oliveira et al., with evidence linking caregiver burden to time spent caregiving, income and patient psychological symptoms.[18,21] Lai et al., identified family functioning as the principal predictor (β=0.299) and demonstrated correlations between burden and caregiver depression (r=0.549), anxiety (r=0.599) and stress (r=0.576).[19] Han et al., further showed that caregiver depression mediated relationships between patient depression, family functioning, stigma and perceived burden.[22] Collectively, these findings support a reciprocal patient–caregiver relationship in which uncontrolled seizures and psychiatric symptoms increase supervision and financial demands, while caregiver distress may reduce treatment support and family resilience. Routine psychiatric screening, optimization of seizure control, caregiver-burden assessment, psychoeducation, counselling and linkage to social-support services should therefore form part of comprehensive, family-centred epilepsy care.

Limitations

This study has limitations. Its cross-sectional design prevents causal inferences regarding relationships between epilepsy, psychiatric morbidity and caregiver burden. Recruitment from a single tertiary-care hospital may overrepresent patients with severe or drug-resistant epilepsy and limit generalizability. Consecutive sampling and self-reported adherence, caregiving time and financial strain may introduce selection and recall bias. Residual confounding may remain despite multivariable adjustment, and longitudinal changes in psychiatric symptoms and burden were not evaluated.

CONCLUSION

Psychiatric comorbidity and caregiver burden were common among patients with epilepsy attending the tertiary-care hospital. Depression and anxiety were the predominant psychiatric disorders, while female sex, frequent seizures and drug-resistant epilepsy independently increased the likelihood of psychiatric morbidity. More than one-third of caregivers experienced moderate-to-severe or severe burden. Patient psychiatric illness, prolonged daily caregiving, financial strain, work loss and inadequate family support independently intensified caregiver burden. These findings emphasize that epilepsy management should extend beyond seizure control. Routine psychiatric screening, timely treatment, caregiver-burden assessment, psychoeducation, adherence support and linkage to psychosocial and financial services may promote patient wellbeing, caregiver resilience and more comprehensive family-centred epilepsy care.

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