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ASSESSMENT OF PSYCHIATRIC COMORBIDITIES AMONG PATIENTS WITH EPILEPSY: A CROSS-SECTIONAL STUDY

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ABSTRACT **Background:** Psychiatric comorbidities are common in patients with epilepsy and can significantly impact their quality of life. This study aimed to assess the prevalence and associated factors of psychiatric comorbidities among patients with epilepsy in India. **Methods:** A cross-sectional study was conducted at a tertiary care hospital, including 330 adult patients with epilepsy. Psychiatric comorbidities were assessed using standardized screening tools and diagnostic interviews. Sociodemographic and clinical data were collected using a structured questionnaire. **Results:** The overall prevalence of any psychiatric comorbidity was 56.4% (95% CI: 50.8%-61.8%). Depression was the most common comorbidity (33.6%), followed by anxiety disorders (28.5%), ADHD (17.3%), and psychosis (5.8%). Unemployment (aOR: 1.87; 95% CI: 1.13-3.10; p=0.015), seizure frequency >3/month (aOR: 2.08; 95% CI: 1.27-3.42; p=0.004), irregular drug compliance (aOR: 2.29; 95% CI: 1.34-3.92; p=0.002), and previous psychiatric diagnosis (aOR: 4.27; 95% CI: 2.10-8.68; p<0.001) were significant independent predictors of psychiatric comorbidities. Patients with psychiatric comorbidities had poorer seizure control (p<0.001), lower treatment adherence (p=0.001), and lower quality of life scores (p<0.001) compared to those without comorbidities. **Conclusions:** Psychiatric comorbidities are highly prevalent among patients with epilepsy and are associated with poor epilepsy-related outcomes. Regular screening and timely intervention for psychiatric comorbidities are essential to improve the overall well-being and quality of life of patients with epilepsy.

KEYWORDS : Epilepsy, Psychiatric Comorbidities, Depression, Anxiety, ADHD

INTRODUCTION

Epilepsy, a chronic neurological disorder characterized by recurrent and unprovoked seizures, affects approximately 50 million people worldwide [1]. Patients with epilepsy often experience a high prevalence of psychiatric comorbidities, which can significantly impact their quality of life, treatment outcomes, and overall well-being [2]. The most common psychiatric comorbidities associated with epilepsy include depression, anxiety disorders, psychotic disorders, and attention-deficit/hyperactivity disorder (ADHD) [3].

The relationship between epilepsy and psychiatric comorbidities is complex and bidirectional, with each condition influencing the other [4]. Epilepsy can lead to the development of psychiatric disorders through various mechanisms, such as the direct effect of seizures on brain function, the psychosocial impact of living with a chronic condition, and the side effects of antiepileptic drugs (AEDs) [5]. Conversely, psychiatric disorders can exacerbate seizure frequency and severity, as well as reduce adherence to AEDs, thereby worsening seizure control [6].

Assessing psychiatric comorbidities among patients with epilepsy is crucial for providing comprehensive care and improving patient outcomes. However, diagnosing psychiatric disorders in this population can be challenging due to the overlap of symptoms between epilepsy and psychiatric conditions, as well as the lack of standardized screening tools [7]. Consequently, psychiatric comorbidities often remain underdiagnosed and undertreated in patients with epilepsy [8].

Given the significant impact of psychiatric comorbidities on the lives of patients with epilepsy, this article aims to assess the prevalence and factors associated with psychiatric disorders in a cross-sectional study of patients with epilepsy. By understanding the magnitude and determinants of psychiatric comorbidities, healthcare professionals can develop tailored interventions to improve the overall well-being and treatment outcomes of this vulnerable population.

Aims and Objectives

The primary aim of this cross-sectional study was to comprehensively assess the prevalence and clinical characteristics of psychiatric comorbidities among patients with epilepsy. The specific objectives were: 1) to determine the prevalence of depression, anxiety disorders, psychosis, and attention-deficit/hyperactivity disorder (ADHD) in a sample of epilepsy patients; 2) to evaluate the sociodemographic and clinical variables associated with the presence of psychiatric comorbidities; 3) to examine the impact of psychiatric comorbidities on seizure control, treatment adherence, quality of life, and healthcare utilization; and 4) to identify potential predictors of psychiatric comorbidities in patients with epilepsy.

MATERIALS AND METHODS

Study Design and Setting

This cross-sectional study was conducted at the outpatient epilepsy clinic of a tertiary care hospital in india. The study was approved by the Institutional Ethics Committee, and all participants provided written informed consent prior to their enrollment.

Study Population and Sampling

The target population consisted of adult patients (aged 18-65 years) with a confirmed diagnosis of epilepsy, based on the International League Against Epilepsy (ILAE) criteria. Patients were recruited using a convenience sampling method over a period of 12 months (April 2023 to March 2024). The sample size was calculated using the formula for cross-sectional studies, considering a 95% confidence level, 5% margin of error, and an estimated prevalence of psychiatric comorbidities in epilepsy of 30% based on previous literature.[9] The calculated sample size was 323, which was rounded up to 330 to account for potential dropouts or incomplete data.

Inclusion and Exclusion Criteria

The inclusion criteria for the study were: 1) confirmed diagnosis of epilepsy by a neurologist; 2) age between 18 and 65 years; 3) stable antiepileptic drug (AED) regimen for at least 3 months; and 4) ability to provide informed consent and complete the study assessments. The exclusion criteria were: 1) presence of severe cognitive impairment or intellectual disability that would preclude the ability to participate in the study; 2) history of major psychiatric disorder prior to the onset of epilepsy; 3) current or past diagnosis of substance use disorder; 4) presence of progressive neurological disorders or other severe medical comorbidities; and 5) refusal to provide informed consent.

Data Collection and Study Procedures

Eligible patients were approached during their routine clinic visits and invited to participate in the study. After obtaining informed consent, a trained research assistant collected sociodemographic and clinical data using a structured questionnaire. The sociodemographic variables included age, gender, education level, occupation, marital status, family income, residence (rural/urban), religion, and type of family (nuclear/joint). The clinical variables related to epilepsy included age

at onset, duration of epilepsy, type of seizures, seizure frequency, last seizure episode, precipitating factors, current AEDs, number of AEDs, drug compliance, side effects of AEDs, and family history of epilepsy.

Psychiatric comorbidities were assessed using a multi-step approach. First, all participants completed self-report screening tools, including the Patient Health Questionnaire-9 (PHQ-9) for depression, the Generalized Anxiety Disorder-7 (GAD-7) scale for anxiety, the Adult ADHD Self-Report Scale (ASRS-v1.1) for attention-deficit/hyperactivity disorder (ADHD), and the Mood Disorder Questionnaire (MDQ) for bipolar disorder. The ASRS-v1.1 is an 18-item scale that assesses the frequency of ADHD symptoms in adults, with a score ≥4 on Part A indicating a high likelihood of ADHD. The MDQ is a 13-item questionnaire that screens for bipolar disorder, with a score ≥7 and a endorsement of functional impairment suggesting a positive screen. Second, participants who screened positive on any of these tools (PHQ-9 score ≥10, GAD-7 score ≥7, ASRS-v1.1 score ≥4 on Part A, or MDQ score ≥7 with functional impairment) underwent a structured diagnostic interview using the Mini-International Neuropsychiatric Interview (MINI) to confirm the presence of psychiatric disorders based on the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria. The MINI was administered by a member of the research team who was trained in its use and blinded to the participants' screening tool scores. Additional psychiatric variables collected included previous psychiatric diagnoses, duration of psychiatric symptoms, family history of psychiatric illness, current psychiatric medications, and history of substance use.

Participants also underwent a brief clinical examination, which included measurements of height, weight, and body mass index (BMI), assessment of other medical comorbidities, and a focused physical and neurological examination. The treating neurologist provided information on the participants' epilepsy characteristics, including seizure type, frequency, and treatment history.

Data Analysis

Statistical analysis was performed using IBM-SPSS version 26. Descriptive statistics were used to summarize the sociodemographic and clinical characteristics of the study population. Continuous variables were expressed as mean ± standard deviation or median (interquartile range), depending on the normality of distribution. Categorical variables were presented as frequencies and percentages. The prevalence of each psychiatric comorbidity (depression, anxiety disorders, psychosis, and ADHD) was calculated as the proportion of participants meeting the diagnostic criteria based on the MINI interview.

Univariate and multivariate logistic regression analyses were conducted to identify factors associated with the presence of psychiatric comorbidities. Variables with a p-value <0.2 in the univariate analysis were included in the multivariate model. Adjusted odds ratios (aOR) with 95% confidence intervals (CI) were reported for the final model. The impact of psychiatric comorbidities on seizure control, treatment adherence, quality of life, and healthcare utilization was assessed using appropriate statistical tests, such as independent t-tests, chi-square tests, or Mann-Whitney U tests, depending on the nature and distribution of the variables. Quality of life was evaluated using a validated epilepsy-specific scale, such as the Quality of Life in Epilepsy Inventory-31 (QOLIE-31).

A p-value <0.05 was considered statistically significant for all analyses. Missing data were handled using appropriate imputation techniques, such as multiple imputation or last observation carried forward, depending on the extent and pattern of missingness. Sensitivity analyses were conducted to assess the robustness of the findings. Subgroup analyses based on epilepsy type, seizure frequency, and treatment response were performed to explore potential heterogeneity in the associations between psychiatric comorbidities and epilepsy-related variables.

The study results were reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies. Potential limitations, such as selection bias, information bias, and confounding, were acknowledged and discussed in the context of the study findings. The implications of the study results for clinical practice, future research, and healthcare policy were highlighted, emphasizing the need for integrated care models and targeted interventions for epilepsy patients with psychiatric comorbidities.

RESULTS

Sociodemographic Characteristics

The study included 330 participants with a mean age of 35.8 ± 11.2 years (range: 18-65 years). The sample had a slight male predominance, with 172 (52.1%) males and 158 (47.9%) females. Most participants had completed secondary education (45.8%), followed by higher education (32.4%) and primary education (21.8%). The majority of the participants were employed (62.1%), while 37.9% were unemployed. More than half of the participants were married (55.5%), 32.7% were single, and 11.8% were divorced or widowed. The median family income was ₹18,000 (IQR: ₹12,000-₹28,000). The sample had a slightly higher proportion of urban residents (53.6%) compared to rural residents (46.4%). Hinduism was the predominant religion (67.9%), followed by Islam (19.7%), Christianity (8.5%), and others (3.9%). Most participants belonged to nuclear families (64.8%), while 35.2% were from joint families (Table 1).

Clinical Characteristics

The mean age at the onset of epilepsy was 19.3 ± 8.1 years (range: 5-42 years), and the mean duration of epilepsy was 10.2 ± 6.4 years (range: 1-32 years). Generalized seizures were slightly more common (52.7%) than focal seizures (47.3%). The median seizure frequency was 3 (IQR: 1-6) per month, and the median time since the last seizure episode was 18 (IQR: 9-34) days. The most common precipitating factors for seizures were sleep deprivation (30.9%), stress (27.0%), alcohol (17.0%), and others (25.2%). Valproate was the most frequently prescribed antiepileptic drug (AED) (36.1%), followed by carbamazepine (29.4%), levetiracetam (22.7%), and others (11.8%). The mean number of AEDs used was 1.6 ± 0.7 (range: 1-4). Regular drug compliance was reported by 71.2% of the participants, while 28.8% had irregular compliance. Side effects of AEDs were experienced by 40.6% of the participants. A family history of epilepsy was present in 15.5% of the cases (Table 2).

Prevalence of Psychiatric Comorbidities

The overall prevalence of any psychiatric comorbidity was 56.4% (95% CI: 50.8%-61.8%). Depression was the most common comorbidity, affecting 33.6% (95% CI: 28.5%-39.1%) of the participants, followed by anxiety disorders (28.5%; 95% CI: 23.7%-33.7%), ADHD (17.3%; 95% CI: 13.4%-21.8%), and psychosis (5.8%; 95% CI: 3.5%-8.8%) (Table 3).

Factors Associated with Psychiatric Comorbidities

Univariate analysis revealed that female gender (OR: 1.79; 95% CI: 1.13-2.83; p=0.013), unemployment (OR: 2.11; 95% CI: 1.31-3.40; p=0.002), seizure frequency >3/month (OR: 2.39; 95% CI: 1.49-3.84; p<0.001), irregular drug compliance (OR: 2.73; 95% CI: 1.64-4.54; p<0.001), side effects of AEDs (OR: 1.95; 95% CI: 1.22-3.12; p=0.005), and previous psychiatric diagnosis (OR: 4.76; 95% CI: 2.41-9.40; p<0.001) were significantly associated with psychiatric comorbidities (Table 4).

Multivariate analysis showed that unemployment (aOR: 1.87; 95% CI: 1.13-3.10; p=0.015), seizure frequency >3/month (aOR: 2.08; 95% CI: 1.27-3.42; p=0.004), irregular drug compliance (aOR: 2.29; 95% CI: 1.34-3.92; p=0.002), and previous psychiatric diagnosis (aOR: 4.27; 95% CI: 2.10-8.68; p<0.001) remained significant independent predictors of psychiatric comorbidities (Table 5).

Impact of Psychiatric Comorbidities on Epilepsy-Related Outcomes

Participants with psychiatric comorbidities had significantly poorer seizure control compared to those without comorbidities (38.7% vs. 67.4%; p<0.001). Treatment adherence was also lower in the comorbidity group (64.0% vs. 80.6%; p=0.001). The mean quality of life score was significantly lower in participants with psychiatric comorbidities (51.7 ± 15.1) compared to those without (68.2 ± 13.6; p<0.001) (Table 6).

Screening Tool Scores and Diagnostic Outcomes

The mean PHQ-9 score was 8.7 ± 6.5 (range: 0-27), indicating mild to moderate depressive symptoms. The mean GAD-7 score was 7.2 ± 5.9 (range: 0-21), suggesting mild anxiety levels. The mean ASRS-v1.1 score was 2.9 ± 2.2 (range: 0-6), indicating a moderate likelihood of ADHD. Based on the MINI diagnostic outcomes, major depressive disorder was the most prevalent diagnosis, affecting 30.6% of the participants (Table 7).

Table 1: Sociodemographic Characteristics of the Study Population (n=330)

Characteristic	Value
Age, mean ± SD (range)	35.8 ± 11.2 (18–65)

Gender, n (%)	
- Male	172 (52.1%)
- Female	158 (47.9%)
Education Level, n (%)	
- Primary	72 (21.8%)
- Secondary	151 (45.8%)
- Higher	107 (32.4%)
Occupation, n (%)	
- Employed	205 (62.1%)
- Unemployed	125 (37.9%)
Marital Status, n (%)	
- Single	108 (32.7%)
- Married	183 (55.5%)
- Divorced/Widowed	39 (11.8%)
Family Income, median (IQR)	₹18,000 (₹12,000–₹28,000)
Residence, n (%)	
- Rural	153 (46.4%)
- Urban	177 (53.6%)
Religion, n (%)	
- Hindu	224 (67.9%)
- Muslim	65 (19.7%)
- Christian	28 (8.5%)
- Others	13 (3.9%)
Type of Family, n (%)	
- Nuclear	214 (64.8%)
- Joint	116 (35.2%)

Table 2: Clinical Characteristics of the Study Population (n=330)

Characteristic	Value
Age at Onset of Epilepsy, mean ± SD (range)	19.3 ± 8.1 (5–42)
Duration of Epilepsy, mean ± SD (range)	10.2 ± 6.4 (1–32)
Type of Seizures, n (%)	
- Generalized	174 (52.7%)
- Focal	156 (47.3%)
Seizure Frequency, median (IQR)	3 (1–6) per month
Last Seizure Episode, median (IQR)	18 (9–34) days ago
Precipitating Factors, n (%)	
- Sleep Deprivation	102 (30.9%)
- Stress	89 (27.0%)
- Alcohol	56 (17.0%)
- Others	83 (25.2%)
Current AEDs, n (%)	
- Valproate	119 (36.1%)
- Carbamazepine	97 (29.4%)
- Levetiracetam	75 (22.7%)
- Others	39 (11.8%)
Number of AEDs, mean ± SD (range)	1.6 ± 0.7 (1–4)
Drug Compliance, n (%)	
- Regular	235 (71.2%)
- Irregular	95 (28.8%)
Side Effects of AEDs, n (%)	134 (40.6%)
Family History of Epilepsy, n (%)	51 (15.5%)

Table 3: Prevalence of Psychiatric Comorbidities (n=330)

Psychiatric Comorbidity	n (%)	95% CI
Depression	111 (33.6%)	28.5%–39.1%
Anxiety Disorders	94 (28.5%)	23.7%–33.7%
Psychosis	19 (5.8%)	3.5%–8.8%
ADHD	57 (17.3%)	13.4%–21.8%
Any Psychiatric Comorbidity	186 (56.4%)	50.8%–61.8%

Table 4: Factors Associated with Psychiatric Comorbidities (Univariate Analysis)

Factor	OR	95% CI	p-value
Age (>35 years)	1.58	0.99–2.51	0.055
Female Gender	1.79	1.13–2.83	0.013
Unemployment	2.11	1.31–3.40	0.002
Focal Seizures	1.39	0.88–2.20	0.158
Seizure Frequency (>3/month)	2.39	1.49–3.84	<0.001
Irregular Drug Compliance	2.73	1.64–4.54	<0.001
Side Effects of AEDs	1.95	1.22–3.12	0.005
Previous Psychiatric Diagnosis	4.76	2.41–9.40	<0.001

Table 5: Factors Associated with Psychiatric Comorbidities (Multivariate Analysis)

Factor	aOR	95% CI	p-value
Unemployment	1.87	1.13–3.10	0.015
Seizure Frequency (>3/month)	2.08	1.27–3.42	0.004
Irregular Drug Compliance	2.29	1.34–3.92	0.002
Previous Psychiatric Diagnosis	4.27	2.10–8.68	<0.001

Table 6: Impact of Psychiatric Comorbidities on Epilepsy-Related Outcomes

Outcome	With Comorbidity	Without Comorbidity	p-value
Seizure Control, n (%)			
- Controlled	72 (38.7%)	97 (67.4%)	<0.001
- Uncontrolled	114 (61.3%)	47 (32.6%)	
Treatment Adherence, n (%)			
- Adherent	119 (64.0%)	116 (80.6%)	0.001
- Non-adherent	67 (36.0%)	28 (19.4%)	
Quality of Life, mean ± SD	51.7 ± 15.1	68.2 ± 13.6	<0.001

Table 7: Screening Tool Scores and Diagnostic Outcomes

Screening Tool/Diagnosis	Value
PHQ-9 Score	8.7 ± 6.5 (0–27)
GAD-7 Score	7.2 ± 5.9 (0–21)
ASRS-v1.1 Score	2.9 ± 2.2 (0–6)
Major Depressive Disorder	101 (30.6%)

DISCUSSION

The present cross-sectional study aimed to assess the prevalence of psychiatric comorbidities and their associated factors among patients with epilepsy. The overall prevalence of psychiatric comorbidities in this study was 56.4%, which is consistent with the findings of previous studies. A study by Muhigwa et al. (2020) reported a pooled prevalence of 50.9% for any psychiatric comorbidity in patients with epilepsy in low and middle-income countries [10]. Similarly, a study by Gandhi et al. (2022) found a prevalence of 53.8% for psychiatric comorbidities in an Indian epilepsy population [11].

Depression was the most common psychiatric comorbidity in our study, with a prevalence of 33.6%. This finding is in line with the results of a study by Rodríguez et al. (2022), which reported a prevalence ranging from 20% to 55% for depression in patients with epilepsy [12]. However, our prevalence rate is slightly higher than that reported by Goel et al. (2023), who found a prevalence of 28.4% for depression among epilepsy patients in disadvantaged communities [13].

Anxiety disorders were the second most prevalent psychiatric comorbidity in our study, affecting 28.5% of the participants. This finding is consistent with the results of a study by Mula et al. (2021), which reported a prevalence of 20-30% for anxiety disorders in patients with epilepsy [3]. A study by Revdal et al. (2023) found a slightly lower prevalence of anxiety disorders (25.7%) in a Norwegian epilepsy population [14].

The prevalence of ADHD in our study was 17.3%, which is higher than the reported prevalence in the general adult population (2.5-4.4%) [15]. This finding is consistent with the results of a study by Rodríguez et al. (2022), which found a prevalence of 15-30% for ADHD in patients with epilepsy [12]. A study by Gandhi et al. (2022) reported a similar prevalence of ADHD (16.2%) in an Indian epilepsy population [11].

Psychosis was the least common psychiatric comorbidity in our study, with a prevalence of 5.8%. This finding is consistent with the results of a study by Muhigwa et al. (2020), which reported a pooled prevalence of 5.2% for psychosis in patients with epilepsy in low and middle-income countries [10]. A study by Mula et al. (2021) found a slightly higher prevalence of psychosis (7-8%) in patients with epilepsy [3].

Our study identified several factors associated with psychiatric comorbidities in patients with epilepsy. Unemployment, seizure frequency >3/month, irregular drug compliance, and previous psychiatric diagnosis were found to be significant independent predictors of psychiatric comorbidities. These findings are consistent with the results of previous studies. A study by Revdal et al. (2023) found that unemployment (OR: 2.1; 95% CI: 1.2-3.8; p=0.01) and frequent seizures (OR: 2.5; 95% CI: 1.5-4.3; p=0.001) were significantly associated with psychiatric comorbidities in patients with epilepsy [14]. A study by Goel et al. (2023) reported that irregular medication adherence (OR: 2.4; 95% CI: 1.5-3.9; p=0.001) and a

history of psychiatric disorders (OR: 4.5; 95% CI: 2.3-8.8; p<0.001) were significant predictors of psychiatric comorbidities in patients with epilepsy [13].

Our study also found that psychiatric comorbidities had a significant impact on epilepsy-related outcomes. Participants with psychiatric comorbidities had poorer seizure control, lower treatment adherence, and lower quality of life scores compared to those without comorbidities. These findings are consistent with the results of previous studies. A study by Gandhi et al. (2022) found that patients with epilepsy and depression had significantly poorer seizure control (OR: 2.1; 95% CI: 1.3-3.2; p=0.002) and lower quality of life scores (p<0.001) compared to those without depression [11]. A study by Muhigwa et al. (2020) reported that patients with epilepsy and anxiety disorders had significantly lower treatment adherence (p=0.003) and quality of life scores (p<0.001) compared to those without anxiety disorders [10].

The strengths of our study include the use of standardized diagnostic tools (MINI) and the assessment of multiple psychiatric comorbidities. However, our study also has some limitations. The cross-sectional design of the study does not allow for the establishment of causal relationships between psychiatric comorbidities and their associated factors. Additionally, the study was conducted in a tertiary care hospital, which may limit the generalizability of the findings to other settings.

This study highlights the high prevalence of psychiatric comorbidities among patients with epilepsy and their significant impact on epilepsy-related outcomes. Regular screening for psychiatric comorbidities and timely intervention may help improve the overall well-being and quality of life of patients with epilepsy. Future longitudinal studies are needed to better understand the complex interplay between epilepsy and psychiatric comorbidities and to develop effective management strategies.

CONCLUSION

In conclusion, the present study highlights the high prevalence and significant impact of psychiatric comorbidities in patients with epilepsy. The findings underscore the need for routine screening, comprehensive evaluation, and integrated management of these disorders in epilepsy care. The use of validated screening tools and structured diagnostic interviews can help identify patients who may benefit from further evaluation and treatment. A multidisciplinary approach involving neurologists, psychiatrists, psychologists, and other healthcare professionals is essential for the effective management of psychiatric comorbidities in epilepsy. Future studies with larger sample sizes and prospective designs are needed to confirm and extend our findings and to evaluate the effectiveness of integrated care models for epilepsy and psychiatric comorb
idities.

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