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Original Research Article

Assessment of the risk factors, depression and quality of life in epileptic patients: a prospective study

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ABSTRACT

Background: Assessing depression and quality of life in epileptic patients is crucial due to epilepsy's neurological and psychological effects. This study examines depression prevalence and severity highlighting the burden on patients and its effect on quality of life, emphasizing the importance of thorough clinical evaluations for effective management.
Methods: A six-month prospective observational study included 120 patients from the inpatient general medicine department. Depression was assessed by patient health questionnaire-9 and quality of life in epilepsy-10 inventory was used to assess quality of life. Statistical analysis was performed using descriptive statistics, the chi-square test, and the Wilcoxon Rank-Sum test.
Results: The severity of depression assessed, revealed that 13.3% experienced minimal, 35.8% had mild, 30% showed moderate, 14.2% had moderately severe, and 6.7% were severe depression. Females exhibited higher depression rates (55.7%) compared to males (44.3%). Highest depression rates were found in patients aged 31-40 (44.3%). Monotherapy was slightly associated with higher depression rates (54.1%) than polytherapy (45.9%). Chi-square analysis indicated a significant association between depression and quality of life (p=0.033*). The Wilcoxon Rank-Sum test showed substantial differences in Epilepsy Effects, Role Functioning, and Mental Health domains between depressed and non-depressed patients, with p-values of 0.019*, 0.017*, and 0.146*, respectively.
Conclusions: The study highlights the need to address depression in epilepsy patients due to its significant impact on mental well-being and overall quality of life. Effective management should consider both neurological and psychological aspects for optimal patient care.

Keywords: Depression, Epilepsy, Mental health, Polytherapy, Quality of life

INTRODUCTION

Epilepsy is a brain disorder marked by frequent and erratic seizures due to abnormal neuronal activity. An epileptic episode, according to the International Bureau for Epilepsy (IBE) and the International League Against Epilepsy (ILAE), is a brief period of signs and symptoms brought on by excessive or synchronized neural activity. Epilepsy is diagnosed by the presence of at least one epileptic seizure, accompanied by psychological, cognitive, and neurological effects.[1] Affecting 65 million people worldwide, epilepsy is the fourth most prevalent neurological illness.[2] The International League Against Epilepsy classifies epilepsy etiology into six categories: genetic, metabolic, structural, immune, infectious, and unknown.[3-5] Epilepsy is characterized by recurrent, unprovoked seizures. Various risk factors can contribute to the development of epilepsy, which can be broadly categorized into genetic, immune, metabolic, infectious, structural, and unknown origins.[6-8]

Depression is a psychological condition that results in an ongoing feeling of sorrow and disinterest. Patients with persistent epilepsy often experience depression, a

psychological consequence that is claimed to affect over 30% of people with epilepsy in the general population and 20% to 55% of people with epilepsy in tertiary epileptic centers.

It is a comorbid condition that, regardless of seizure frequency, negatively impacts patients' overall health and quality of life. Although there have been significant advancements in our awareness and treatment of epilepsy, problems with depression and suicidality in PWE are still not well understood or addressed since these conditions are frequently not diagnosed.[9-11]

One of the most reliable indicators of low quality of life in individuals with epilepsy is depression. The frequency of seizures and the side effects of antiepileptic medications (AEDs) are significant factors that may impact the quality of life concerning the features of epilepsy. The general health of epilepsy patients may be enhanced by early detection and treatment of depression. QOL assessment also plays a predictive role in treatment success and overall prognosis, highlighting its importance in medical decision-making.[12,13]

METHODS

Study design

This is six-month prospective observational research carried out at the general medicine inpatient department of Gandhi Hospital, a tertiary care facility in Secunderabad, Telangana, from January to June 2024. In all, 120 patients were included in the research.

Participants

The study enrolled adult male and female patients with an epileptic history of at least 6 months who were above 18 years old, demonstrated excellent compliance, and were willing to collaborate with the research. Patients were excluded if they were aged above 70, pregnant and breastfeeding women, or patients with other psychological conditions. Patients with incomplete information or in case the patient left the hospital during their course of treatment were dropped out.

Data collection

The patient case sheet was reviewed and the cases were collected following the exclusion and inclusion standards. The patient's consent for the study was obtained. Socio-demographic details including marital status, age, sex, educational level, co-morbid conditions, past medical history, and diagnosis were collected. Clinical information including frequency and disease course, type of seizures, and AED therapy regimen, was compiled from each patient's medical record. Assessment of depression in patients of epilepsy was done by patient health questionnaire -9 (PHQ-9) and to evaluate the quality of life, the QOLIE-10 questionnaire was utilized.

PHQ-9 questionnaire

The patient health questionnaire 9 (PHQ-9), a self-administered screening tool, was utilized to determine the extent of depression symptoms. The PHQ-9 consists of 9 components, this questionnaire evaluates how frequently subjects experienced each of the 9 symptoms during the past 2 weeks. Every PHQ-9 item has a score between 0 and 3. A score ranging from 0 to 3 is assigned to each PHQ-9 item. The overall scores range between 0 and 27, where mild depression is indicated by scores of 5 to 9, moderate depression by scores of 10 to 14, moderately severe depression by scores of 15 to 19, and severe depression by scores of 20 or higher.[14]

QOILE-10 questionnaire

The self-administered QOLIE-10 (Quality of Life in Epilepsy questionnaire-10) consists of ten questions drawn from seven QOLIE-31 subscales. It is composed of three sections: Effects of Epilepsy (memory, physical, and mental side effects of medicine), mental health (depression, energy, and general quality of life), and role functioning (social boundaries, seizure worry, job, and driving).[15]

Ethics statement and consent form

The Institutional Ethics Committee (CMR College of Pharmacy, Hyderabad) approved the research procedure. All individuals gave their informed consent to participate in this prospective study.

Statistical analysis

The SPSS program for Windows, version 29.0.1.0, was used to conduct statistical analysis. Chi-square tests were used to evaluate categorical data, while Mann-Whitney U tests were used to assess continuous variables. The analysis of the data was done via descriptive statistics. The mean and standard error was used to evaluate the quantitative feature.

RESULTS

During the study, 120 patients were found to be eligible. Of these, 56 patients were men and 64 patients were women. The mean age of the patients, who ranged in age from 18 to 70, was 38.57 years (standard deviation: 14.228). of them, 80 patients were married and 40 were unmarried. Distribution of depression among socio-demographic characteristics of participants revealed that depression among female patients shows a higher prevalence (55.7%) when compared to males (44.3%,). It shows that female epilepsy patients may be more prone to experiencing more severe depression than males. The age group of 21-30 years old has the lowest prevalence of depression (4.9%), while the age group of 31-40 years old has the highest prevalence (44.3%). This suggests that middle-aged epilepsy patients are at a higher risk of depression.

Table 1: Distribution of depression among socio-demographic characteristics of participants.

Variable	Category	Number of patients (%) (n=120)	Depression	
			With depression (%) (n=61)	Without depression (%) (n=59)
Gender	Male	56 (46.7)	27 (44.3)	29 (49.2)
	Female	64 (53.3)	34 (55.7)	30 (50.8)
Age (years)	18-20	23 (19.2)	10 (16.4)	13 (22)
	21 -30	12 (10)	3 (4.9)	9 (15.3)
	31-40	41 (34.2)	27 (44.3)	14 (23.7)
	41-50	20 (16.6)	11 (18)	9 (15.3)
	51-60	10 (8.3)	6 (9.8)	4 (6.8)
	61-70	14 (11.7)	4 (6.6)	10 (16.9)
Marital status	Married	80 (66.7)	42 (68.9)	38 (64.4)
	Unmarried	40 (33.3)	19 (31.1)	21 (35.6)

Table 2: Depression in PWE with clinically related factors.

Variables	Category	Depression		Total (n=120)
		With depression (%) (n=61)	Without depression (%) (n=59)	No. of patients (%)
Type of therapy	Monotherapy	33 (54.1)	32 (54.2)	65 (54.1)
	Polytherapy	28 (45.9)	27 (45.8)	55 (45.9)
Disease history	Less than 1 year	20 (32.8)	30 (50.9)	50 (41.7)
	1- 5 years	22 (36)	16 (27.1)	38 (31.6)
	6-10 years	10 (16.4)	12 (20.3)	22 (18.3)
	11-15 years	5 (8.2)	1 (1.7)	6 (5)
	16-20 years	2 (3.3)	0	2 (1.7)
	More than 20 years	2 (3.3)	0	2 (1.7)
Type of epilepsy	GTCS (generalized tonic-clonic seizure)	32 (52.5)	30 (50.9)	62 (51.6)
	Focal	18 (29.5)	17 (28.8)	35 (29.2)
	Undetermined	11 (18)	12 (20.3)	23 (19.2)

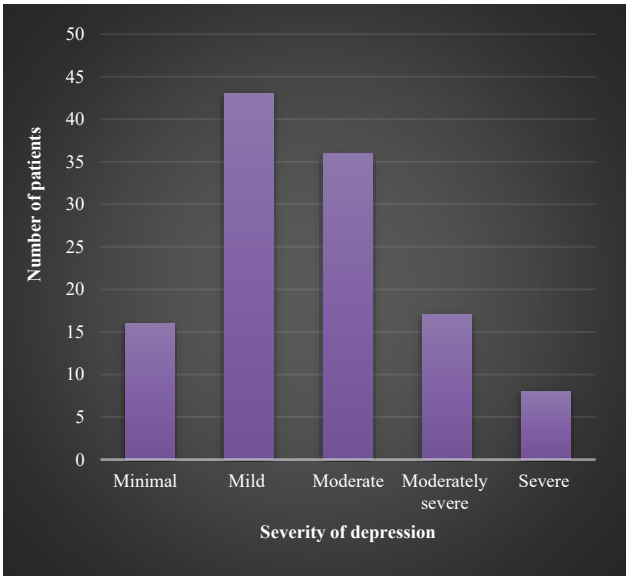

Figure 1: Severity of depression in patients with epilepsy (PHQ - 9).

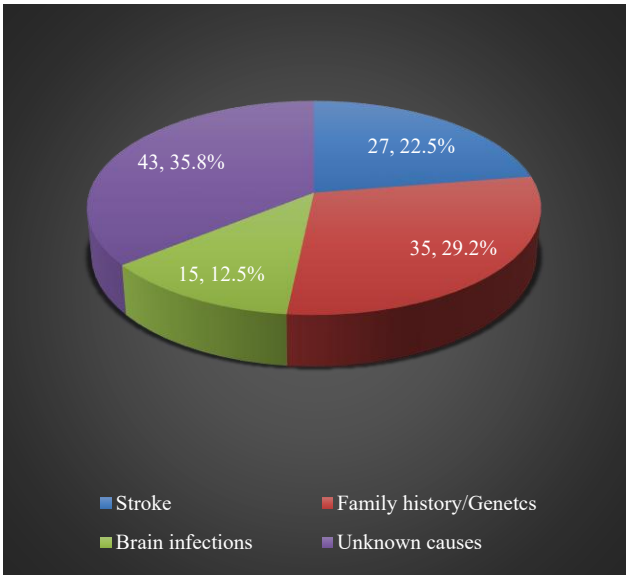

Figure 2: Risk factors of epilepsy.

Married patients exhibit a higher percentage of depression (68.9%) compared to unmarried patients (31.1%). However, the difference is not substantial, suggesting that marital status alone might not be a strong predictor of depression among epileptic patients (Table 1). The depression is slightly more prevalent in patients on monotherapy (54.1%) compared to polytherapy (45.9%). It indicates that depression is most prevalent in individuals with a disease history of 1-5 years (36%). Epileptic patients with a prolonged history, particularly those with a disease history of more than 15 years, show a higher percentage of depression. Generalized tonic-clonic seizures are the most common, affecting 52.5% of patients while focal seizures are observed in 29.5% of patients and 18% of cases have undetermined seizure types. It reveals that individuals with focal seizures or other unidentified forms of seizures are less likely to experience depression than those with generalized tonic-clonic seizures (Table 2).

Severity of depression in patients with epilepsy (PHQ - 9)

The extent of depression in epileptic patients, as measured by the PHQ-9 scale reveals that a significant portion of the patients falls within the mild to moderate range of depression. Specifically, 43 patients suffer from mild depression, 36 patients from moderate depression, 16 patients exhibit minimal depression, and 17 patients suffer from moderately severe depression. Severe depression is relatively less common with 8 patients but still significant (Figure 1).

Risk factors of epilepsy

In epilepsy, family history or genetics (29.2%) and stroke (22.5%) are significant risk factors. Brain infections are less common (12.5%) while a majority of patients are with unknown causes (35.8%) (Figure 2).

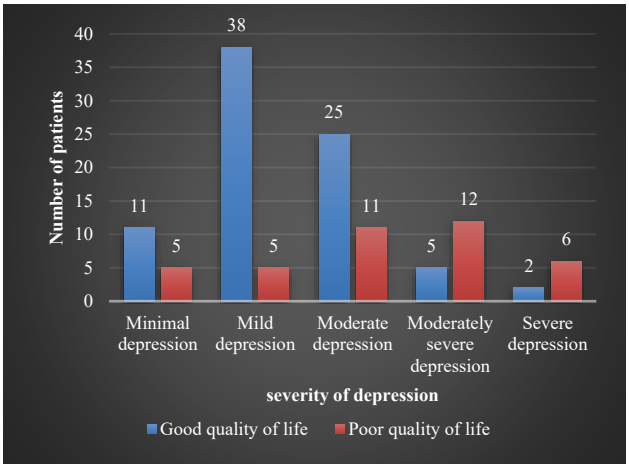

Figure 3: Chi-square analysis between severity of depression and quality of life.

Table 3: Descriptive statistics for PHQ-9 and QOLIE-10.

PHQ-9		
Variable	**Mean (n=120)**	**Standard deviation (n=120)**
PHQ scoring	10.43	5.541
Little interest in accomplishing things?	0.99	1.134
Feeling low or hopeless?	1.32	1.004
Sleep disturbance?	1.25	1.190
Lacking of energy?	1.36	1.187
Poor diet?	1.20	1.220
Feeling sad about yourself?	1.28	0.927
Trouble concentrating?	1.12	1.030
Restless or fidgety?	1.46	1.076
Thoughts that you want to die, or thoughts of hurting yourself?	0.85	1.010
QOLIE-10		
	Mean (n=120)	**Standard deviation (n=120)**
Epilepsy effect domain	1.93	0.759
Mental health domain	3.48	1.015
Role functioning domain	2.29	0.670
Ranking of overall QOL	2.54	0.532
The sum of QOL scoring	25.3583	5.31969

Statistical analysis

To perform the statistical analysis, SPSS software version 29.0.1.0 was used. The aforementioned parameters were evaluated by the Pearson chi-square test, and its results showed that the p-value of less than 0.05 possesses statistical significance. The PHQ-9 scores, with a mean of 10.43 with an SD of 5.541, show moderate depressive symptoms in the study population (Table 3). Analysis of individual PHQ-9 items revealed that feelings of

tiredness, restlessness, and low energy were the most prevalent symptoms, while suicidal thoughts were less commonly reported. Table 4 highlights the QOLIE-10 scores across different domains that are related to quality of life. The mean score for the epilepsy effect domain is 1.93, which indicates a moderate impact. The mental health domain has a higher mean score of 3.48, which shows a greater impact on mental health. The role functioning domain and ranking of overall quality of life have mean scores of 2.29 and 2.54, respectively, showing varied impacts on different aspects of life whereas the sum of QOLIE-10 scoring has a mean of 25.3583.

Table 4: Wilcoxon Rank-Sum test between QOL domains and depression.

QOLIE-10 DOMAINS	Not Depressed		Depressed		P value
	Number of patients	Mean rank	Number of patients	Mean rank	
Epilepsy effect	59	53.09	61	67.66	0.019*
Role functioning	59	52.88	61	67.87	0.017*
Mental health	59	55.83	61	65.02	0.146
Overall QOL	59	51.73	61	68.98	0.006*

*Significant

Statistical analysis between depression and QOL

The chi-square analysis between PHQ-9 stages and QOL in PWE is represented in Figure 3. The P value of 0.033 ($p<0.05$) for the Pearson Chi-Square test indicates a statistically significant connection between the PHQ-9 stages and QOL of epilepsy patients. The Wilcoxon Rank-Sum test results revealed differences in several domains of quality of life between the not-depressed and depressed patients. Significant differences were found ($p<0.05$) in the epilepsy effect domain with a p-value of 0.019, role functioning domain the P value was 0.017, and overall QOL, the p-value was 0.006 among the two groups, while no significant difference was observed in the mental health domain scores the P value of 0.146 (Table 4).

DISCUSSION

A prospective, observational study was carried out to assess the interrelationship between risk factors, depression, and quality of life in patients with epilepsy. We collected a total of 120 cases from the male and female wards of the general medicine department at Gandhi Hospital, Secunderabad between January 2024 to June 2024, utilizing the PHQ-9 and QOLIE-10 questionnaires. Our cohort included individuals between 18 and 70 years of age.

The prevalence of depression among female epilepsy patients is significantly higher compared to their male counterparts. Our study identified, the depression rate as 55.7% in females, whereas, in males, this rate is 44.3% which is similar to the study of Rashid H et al reported that female PWEs have 1.5 times the risk of depression compared to their male counterparts, highlighting the increased vulnerability of women to depression within this patient population.[16]

Several factors contribute to the raised likelihood of depression in epilepsy patients. Age is a significant determinant, with the highest prevalence of depression (44.3%) observed in the 31-40 age group and the lowest prevalence (4.9%) in the 21-30 age group. Marital status is another factor influencing depression rates among epilepsy patients. Married patients exhibit a slightly higher prevalence of depression (68.9%) compared to unmarried patients (31.1%). These observations are inconsistent with the findings of Yang L et al who noted that the risk of epilepsy and associated depression raises with age, particularly in 40-59 age group.[17] Also, single individuals face a higher risk of developing epilepsy and subsequent depression. The study revealed that individuals aged 40-59 have a 1.8 times higher risk of developing epilepsy and consequently experiencing depression compared to younger adults whereas single individuals are 2.8 times more likely to develop epilepsy and face associated mental health challenges compared to their married counterparts.

Seizure type also plays a vital role in the prevalence of depression among epilepsy patients. Generalized tonic-clonic seizures are associated with a higher incidence of depression (52.5%) compared to focal seizures (29.5%) and undetermined types (18%). This finding is supported by Jain R et al who observed a strong association between seizure type and the level of depression. Patients with generalized seizures tend to experience more severe depressive symptoms due to the more disruptive and unpredictable nature of their seizures.[18]

Additional significant risk factors for depression in epilepsy patients include family history/genetics (29.2%), stroke (22.5%), and brain infections (12.5%). Canpolat M et al identified similar contributors to epilepsy and subsequent depression.[19] The study reported that patients with a history of febrile convulsions, perinatal issues, head trauma, and central nervous system developmental

anomalies are at increased risk of developing epilepsy and experiencing depressive symptoms.

Medication adherence significantly impacts depression rates in epilepsy patients. The prevalence of depression is slightly higher in patients on monotherapy (54.1%) compared to those on polytherapy (45.9%). Andrews T et al reported that patients on polytherapy experience higher adverse effects and lower seizure-free rates compared to those on monotherapy.[20]

Another important factor for depression in epilepsy patients is disease history. The highest depression rates (36%) are observed among individuals who have had epilepsy for 1-5 years. Baniya GC et al similarly found that longer disease duration is associated with higher depression rates.[21]

Stigma exacerbates depression in epilepsy patients by increasing isolation and reducing social support. Although specific data on stigma is not provided, Mehta S et al highlighted the negative impact of stigma on the quality of life and depression in epileptic patients.[22] The study emphasized that stigma associated with epilepsy leads to social exclusion, reduced opportunities for education and employment, and limited access to healthcare, thereby worsening the patient's mental health).

CONCLUSION

To summarise, the detection of depression in patients with epilepsy is very important for public health perspective. Epilepsy being a neurological disorder has many psychological consequences. This study assessed the prevalence and severity of depression to understand the psychological burden faced by person with epilepsy. By the study we can conclude that females have higher chances of depression than males and the age group of 31-40 years have greater depression rate. The family history/ genetics was common risk factor for epilepsy. The depression was significant with the quality of life of epilepsy patients. Patients with depression has lower QOL than patients without depression. Epilepsy and depression are closely linked to the QOL but also, they make it hard for someone living with epilepsy to gain full control of their condition. Hence, the depression should be assessed and proper treatment should be implicated to improve patients care.

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