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## Assessment of psychiatric comorbidity in epilepsy patients and burden of caregiver's: A hospital based cross sectional study

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### Abstract

**Aims and Objectives:** This cross-sectional study aimed to explore intricate relationship between epilepsy, mental health, sexual dysfunction, and caregiver burden within adverse demographic.

**Materials and Methods:** Among 250 participants assessed at the Department of Psychiatry, MMIMSR, Mullana, findings revealed a spectrum of demographic characteristics, including age, gender, family structure, BMI, locality, education, and socio economic status.

**Results:** Seizure characteristics varied, with focal seizures being predominant, and a minority displaying abnormal EEG results. Mental health concerns were noted in a subset of participants, highlighting the necessity for comprehensive care addressing both physical and psychological aspects of epilepsy. Sexual dysfunction was prevalent, emphasizing the importance of addressing sexual health issues in epilepsy management. Caregiver burden varied among participants, with a significant proportion reporting mild to severe burden. This underscores the need for targeted support and resources to alleviate caregiver stress and enhance their well-being. The study's MINI score indicated moderately elevated levels of psychiatric symptoms, suggesting the importance of mental health support and intervention strategies.

**Conclusion:** In conclusion, the study underscores the complex interplay between epilepsy, mental health, sexual functioning, and caregiver burden. Future interventions should consider these multi face aspects to provide holistic care, ultimately improving the quality of life and well-being of individuals with epilepsy and their caregivers.

**Keywords:** Epilepsy, neurological disorder, sexual disfunctions, caregivers

### Introduction

Epilepsy, a neurological disorder characterized by recurrent seizures, often accompanied by changes in cognition and behavior, is also known as seizure disorder. It affects individuals of all ages and ranks as the 2nd most common globally, with more prevalence among men than women<sup>[1]</sup>.

Prevalence rates of psychiatric disorders among Patients with epilepsy (PWE) in globally. For instance, up to 43% of (PWE) exhibit psychiatric disorders, with depression, anxiety, psychosis being among the most common comorbidities. However, despite the significant burden of psychiatric comorbidities, only a third of affected people receive adequate mental health treatment<sup>[2, 3]</sup>.

Psychiatric disorders greatly impact the health-related quality of life of PWE, often leading to social stigma, discrimination, and social withdrawal. Additionally, the social limitations imposed by epilepsy, such as loss of driving privileges, along with the unpredictability of seizures, can contribute to low self-esteem and depression<sup>[4]</sup>.

From a neurobiological perspective, studies have shown abnormalities in brain networks overlapping with those involved in epilepsy, particularly in the amygdala and hippocampi. Moreover, psychiatric symptoms can manifest pericritally, before, during, or after a seizure, or as a consequence of epilepsy treatment, including ant seizure medications or surgery<sup>[5]</sup>. This complex interplay between epilepsy and psychiatric comorbidities under scores the importance of integrated multidisciplinary teams to effectively manage both conditions and improve outcomes for individuals living with epilepsy<sup>[6]</sup>.

Psychiatric issues with epilepsy may arise from shared neurobiological mechanisms, the consequences of epilepsy itself, or the unfortunate co-occurrence of both conditions in the same individual and the second thing is sexual dysfunction is a common comorbidity among people with epilepsy (PWE) and is associated with impaired quality of life [7]. Reported prevalence rates vary widely among studies due to differences in patient populations, severity and type of ant seizure medication (ASM) used, and assessment tools employed for sexual dysfunction evaluation [8].

Patients with uncontrolled epilepsy, longer duration of epilepsy, focal epilepsy, higher seizure frequency, and those receiving enzyme-inducing and multiple ASMs are more prone to sexual dysfunction. In females, sexual dysfunction often manifests in the form of desire-related issues, while males commonly experience arousal disorders such as erectile dysfunction and premature ejaculation [9].

Various mechanisms, including direct effects of epilepsy, ASM effects, and psychosocial factors, contribute to sexual dysfunction in epilepsy. Enzyme-inducing ASMs can affect gonadal steroid metabolism, further impacting sexual function [10].

Men with epilepsy on ASMs demonstrate an increased incidence of psychiatric comorbidities and alterations in sexual performance, particularly erectile dysfunction, compared to men without epilepsy. Specific ASMs have been implicated in affecting sexual function, reproductive hormone levels, and sperm characteristics such as motility, morphology, and count, when compared to controls and here the major role of caregivers [11].

A caregiver is someone tasked with tending to the physical and psychological needs of a person with an illness. Caring for Person with epilepsy presents significant challenges, causing stress and burden on the caregivers [12]. They must manage medical appointments, medication schedules, and cope with changes in their adolescent's well-being. It's a stigma and difficulty finding adequate support further compound the stress and some factors are involved like lower education level and longer care giving duration exacerbate the burden. This emotional strain can impact the quality of care provided, potentially affecting the patients' prognosis and the caregiver burden encompasses emotional, psychological, physical, and economic impacts, as well as feelings of humiliation, anger, guilt, and self-blame [12, 13].

It can manifest in various symptoms such as mood swings, fatigue, headaches, and conflicts, leading to mental health issues. Studies on caregiver burden in epilepsy patients have shown mild to moderate levels of burden, affecting the caregivers' quality of life and the factors are involved like the number of medications and the patients' neuropsychological performance correlate with higher burden levels [14].

Care-giving is defined as regular assistance within families. Caregiver burden refers to the stress and negative appraisal experienced when caring for individual, particularly someone with chronic mental illness. This burden impacts the caregiver's psychological, physical, and emotional after all that caregiver caring for epilepsy patients that is the major significance of challenges and burden. Providing caregivers with appropriate resources, including knowledge and self-management skills, can enhance their understanding and coping mechanisms, ultimately improving their ability to support epilepsy patients.

## Materials and Methods

### Study Site, Design & Study Population

This is a cross sectional study conducted in the department of psychiatry of Maharishi Markandeshwar Institute of Medical Sciences and Research (MMIMS&R), Mullana, Ambala, India. The study was conducted for a period of 18 months. The sample of the study taken from different wards like Psychiatry, Medicine, Neurology-in-patient's department (IPD). In this study the sample size of 250 patients were calculated. The patients were recruited according to our study inclusion and exclusion criteria.

### Inclusion Criteria for patients

1. Patients Diagnosed with all kinds of epilepsy based on clinical semiology, EEG and neuroimaging attending department of psychiatry, neurology, medicine
2. Age of the patient between 18 to 50 yrs.
3. Minimum duration of seizure disorder > 6 months.
4. Patients who are willing to give informed consent form (ICF) in own language (English, Hindi, or Punjabi).

### Exclusion Criteria for patients

1. Patients who are having intellectual disability.
2. Age less than 18 and more than 50.
3. Patients who are not willing to give informed consent.
4. Patient with diagnosed primary psychiatric illness before the onset of epilepsy.

### Inclusion Criteria for caregivers

1. Care givers of the patients diagnosed with epilepsy with age > 20 years
2. Minimum duration of stay of caregiver with patient during illness > 6 months.
3. Caregivers who are willing to give informed consent in the language they understand (Hindi, Punjabi, English).

### Exclusion Criteria for care givers

1. Care givers who are having intellectual disability.
2. Age less than 18 and more than 50.
3. Care givers who are not willing to give informed consent.

### Instruments Used

1. **Socio-Demographic Data Sheet:** This arranged format were used to assess the variables of socio-demographic profile such as sex, age, education, marital status, religion, income, occupation, and type of family [15].
2. **Clinical Profile of Patient:** This includes the clinical profile of patient in which we'll assess the patient's age of onset, total duration of illness, investigations done and other relevant data.
3. **Mini-international neuro psychiatric interview (mini) for psychiatric comorbidity:** The M.I.N.I. was designed as a brief structured interview for the major Axis I psychiatric disorders in DSM-IV and ICD-10. M.I.N.I. has acceptably high validation and reliability scores but can be administered in a much shorter period of time (mean  $18.7 \pm 11.6$  minutes, median 15 minutes). Clinicians can use it after a brief training session. The inter-rater reliability is satisfactory (0.67 to 0.85). It is also highly sensitive (i.e., a high proportion of patients with disorders can be detected by the instrument). It is specific (i.e., it has the ability to screen out patients without disorders). The MINI is compatible with

international diagnostic criteria, including the International Classification of Disease (ICD-10) as well as the Diagnostic and Statistical Manual of Mental Disorders (DSM). It is useful in clinical psychiatry as well as in research settings [16].

4. **Zarit care given burden:** Zarit Burden Interview (ZBI) is a 22-item scale and is most widely used scale for assessing caregiver burden. The 22 items evaluate the effect of disease on the quality of life of caregiver, psychological suffering, financial difficulty, and shame, guilt, and difficulty in social and family relationships. Scores range from 0 to 88 with higher scores indicating higher burden (<20: little or no burden, 21-40: mild-to-moderate burden, 41-60: moderate-to severe burden, 61-88: severe burden) [17].
5. **Arizona Sexual Experiences Scale (ASEX):** Arizona Sexual Experiences Scale (ASEX) is a five item edinventory which mainly concentrates and quantifies ex interest, stimulation, vaginal lubrication, peniserection, capability to reach orgasm, and gratification from orgasm. It is easy to score and interpret. Possible scores may range from 5 to a maximum score of 30. As the score increases greater is the degree of sexual dysfunction. Each item is scored on a 6-point scale, with higher scores indicating greater dysfunction. The total ASEX score can range from 5 to 30 [18].

### Statistical Analysis

All the collected data was entered in Microsoft Excel sheet and then transferred to SPSS software ver. 26 for analysis. Qualitative data was presented as frequency and percentages. Quantitative data was presented as mean and SD.

### Results

**Table 1:** Age distribution amongst study population

Age distribution	Number	Percent
0.19-30years	102	41
31-40years	98	39
41-50years	50	20
Total	250	100

Table 1, shows the age distribution of the sample a relatively balanced representation across different age groups. The largest proportion (41%) falls within the 19-30 age range, followed closely by 39% in the 31-40 age range, and a smaller yet significant 20% in the 41-50 age range. This distribution indicates a diverse age demographic among the participants.

**Table 2:** Age of caregiver amongst study population

Age of Caregiver	Number	Percent
19-30 years	48	19%
31-40 years	85	34%
41-50 years	110	44%
51-60 years	7	3%
>60 years	0	0%
Total	250	100%

Table 2, shows caregiver age, notable concentration in the 41-50 age group, comprising 44% of the sample. The 31-40 age groups follows closely behind, representing 34% of

caregivers. A smaller proportion (19%) consists of caregivers aged 19-30 years, while only a negligible percentage (3%) falls within the 51-60age range. This distribution suggests apred ominant involvement of middle-aged individuals in care giving roles.

**Table 3:** Gender distribution among care givers amongst study population

Gender	Number	Percent
Female	221	88%
Male	29	12%
Total	250	100%

Table 3, Shows Gender distribution among caregivers show scacle AR majority of female participants, constituting 88% of the sample, compared to 12% male care givers. This indicates a higher representation of male caregivers.

**Table 4:** Gender distribution amongst patient

Gender	Number	Percent
Female	82	33%
Male	168	67%
Total	250	100%

Table 4, Shows Gender distribution among patients shows a clear majority of male participants, constituting 67% of the sample, compared to 33% female caregivers. This indicates a higher representation of male patients.

**Table 5:** BMI distribution amongst study population

BMI Range	Number	Percent
Less than 20	8	3%
20 - 25	38	15%
25 - 30	147	59%
More than 30	57	23%
Total	250	100%

Table 5, Shows Analysis of BMI distribution reveals that a significant portion (59%) of participants fall within the overweight category (BMI 25-30). Additionally, 23% of the sample is classified as obese (BMI>30), while only a small percentage (3%) falls into the underweight category (BMI < 20). This highlights a considerable prevalence of overweight and obesity among the participants.

**Table 6:** Education of patients amongst study population

Education Level	Number	Percent
Illiterate	13	5%
Primary school	59	24%
Secondary school	92	37%
High school	45	18%
Graduate	33	13%
Postgraduate	8	3%
Total	250	100%

Table 6 shows the analysis of caregiver education levels. It reveals that the highest proportion (37%) completed secondary school education, 18% have a high school education, and 24% have primary school education. Only a small percentage (3%) have attained postgraduate qualifications. This distribution reflects a diverse educational background among caregivers, with a notable proportion having completed secondary education.

**Table 7:** Socio economic status amongst study population

SES	Number	Percent
I	20	8%
II	33	13%
III	111	45%
IV	73	29%
V	13	5%
Total	250	100%

Table 7, Shows Analysis of socioeconomic status (SES) reveals that (45%) fall into SES III, followed by 29% in SES IV. SES I and SES II have lower representation, with 8% and 13% respectively. This suggests a diverse socio economic composition within the sample, with a significant proportion falling into the middle SES categories.

**Table 8:** Occupation of caregiver amongst study population

Occupation of caregiver	Number	Percent
Housewife	217	87%
Government employee	3	1%
Self-employed	30	12%
Total	250	100%

Table 8 shows The majority of caregivers (87%) are identified as housewives , while a smaller percentage are self-employed (12%), and only an eligible portion are government employees (1%). This indicates a predominant involvement of homemakers in caregiving roles within the sample.

**Table 9:** Various other parameters amongst study population

Parameter	Mean	SD
Age	38.4	17.4
WBC	11730.2	5124.4
HSCRIP	21.3	29.4
ESR	18.6	15.1
Ferritin	103.2	101.1

Table 9, Shows the mean age of participants is 38.4 years, with a standard deviation of 17.4, indicating are natively wide age distribution

**Table 10:** Type of therapy amongst study population

Type of therapy	Number	Percent
Polytherapy	35	14
Monotherapy	215	86
Total	250	100

Table 10, Shows the majority of participants (86%) are undergoing immunotherapy, while the remaining 14% are on polytherapy.

**Table 11:** Score amongst study population

Scale	Mean	SD
Arizona Sexual Experiences Scale (ASEX) score	12.93	3.7
Zarit Burden Interview (ZBI) score	18.11	6.2

Table 11, Shows Participants in the study On average, individuals have an ASEX score of 12.93, with a standard deviation of 3.7, indicating diverse experiences with sexual functioning, In 44 out of 250 (17.6%) had sexual dysfunction.. Furthermore, the mean ZARIT Burden Interview (ZBI) score is18.11, with a standard deviation of

6.2, suggesting varying degrees of burden experienced by caregivers within the study. The mean ASEX score of 12.93 suggests sexual dysfunction among the participants, with relatively low variability (SD=3.7). The ZBI score measures care giver burden. The mean score of 18.11 indicates a moderate level of care giver burden within the sample population, with a moderate degree of variability (SD=6.2).

## Discussion

The epidemiological link between epilepsy and psychiatric disease is well established. All psychiatric disorders are more common in PWE than in those without. A recent review based on meta-analyses of population-based studies, affirms that PWE are burdened by a high prevalence of the major psychiatric disorders, including depression (23%), anxiety (20%) and psychosis (5-7%)<sup>[19]</sup>.

The risk for developing psychiatric comorbidity in epilepsy is complex. Various factors may interact in the same patient. The psychosocial consequences of the diagnosis of epilepsy, such as stigma and uncontrolled seizures along with negative psychotropic effects of anti-seizure medications (ASMs) have traditionally been considered the most important underlying factors<sup>[20]</sup>.

In the present study, the age distribution of the sample shows a relatively balanced representation across different age groups. The largest proportion (41%) falls within the 19-30 age range, followed closely by 39% in the 31-40age range, and a smaller yet significant 20% in the 41-50 age range. The mean age of participants is 38.4 years, with a standard deviation of 17.4, indicating a relatively wide age distribution<sup>[21]</sup>. 39.4 years with a SD of 16.7. The majority of participants (39%) experienced epilepsy onset before the age of 18, followed by 23% between 18 and 39years, 20% between 40 and 59 years, and 18% above 60 years<sup>[22]</sup>.

In the present study caregiver age is in notable concentration in the 41-50 age group, comprising 44% of the sample. The 31-40 age group follows closely behind, representing 34% of caregivers. A smaller proportion (19%) consists of care givers aged 19-30 years, while only an eligible percentage (3%) falls within the 51-60 age range. This distribution suggests a predominant involvement of middle-aged individuals in caregiving roles.

In the present study, Gender distribution among caregivers shows a clear majority of female participants, constituting 88% of the sample, compared to 12% male care givers. This indicates a higher representation of male care givers.

In the present study, gender distribution among patients shows a clear majority of male participants, constituting 67% of the sample, compared to 33% female caregivers. This indicates a higher representation of male patients. Similarly, in the study conducted by Pokharel R, *et al.* in which majority of caregivers are female, with 76 individuals accounting for 71.7% of the total. Male caregivers are significantly fewer, with 30 individuals representing 28.3 % of the total<sup>[23]</sup>.

In the present study, analysis of socioeconomic status (SES) reveals that the highest percentage of participants (45%) fall into SES III, followed by 29% in SESIV. SESI and SESII have lower representation, with 8% and 13%respectively. This suggests a diverse socioeconomic composition within the sample, with a significant proportion falling into the middle SES categories. In the present study, the majority of participants (86%) are undergoing monotherapy, while the remaining 14% are on polytherapy.

In the present study, the mean age of seizure onset within the study population is 28.1 years, with a standard deviation of 5.38 years, indicating a relatively consistent age range for the commencement of seizures. Participants, on average, have been experiencing seizures for approximately 14.67 years, with a standard deviation of 3.49 years, suggesting a significant duration of seizure activity within the study. Moreover, individuals within the sample have, on average, encountered around 3.14 seizures in the last year, with a standard deviation of 0.5, shedding light on the frequency of seizure occurrences over the recent past.

In the present study, focal seizures are the most prevalent type within the study population, constituting 45 % of cases, followed closely by generalized seizures at 37%. Additionally, a portion of seizures is categorized as unknown (12%) or unclassified (6%). This finding was in agreement with the study conducted by ElineRevdal *et al.*, in which epilepsy type analysis reveals that the majority of cases (75%) are classified as focal seizures, followed by generalized seizures (13%) and a small proportion categorized as combined seizures (1%). Additionally, 11% of cases are labeled as unknown type [24].

In the present study, after applying MINI we find 17% having major depressive disorder followed by anxiety disorder (9%). On average, individuals have an ASEX score of 12.93, with a standard deviation of 3.7, indicating diverse experiences with sexual functioning. In 44 out of 250 (17.6%) had sexual dysfunction. Furthermore, the mean ZARIT Burden Interview (ZBI) score is 18.11, with a standard deviation of 6.2, suggesting varying degrees of burden experienced by care givers with in the study. The sensitivity and specificity of the ASEX were: 80.8%, (95% CI = 70.0%-88.5%) and 88.1% (95%CI=76.5%-94.7%), and them is classification rate was 9.5% [25].

In the present study, Caregivers within the study population experience varying levels of burden, with 36% reporting mild burden, 22% experiencing moderate burden, and 13% facing severe burden. However, (29%) report no significant burden. Rita Pokharel *et al.*, reported that more than half of the caregivers (58.5%) had no to mild level of burden. Mild to moderate level of burden was present in 27.4% caregivers and remaining 13.9% had high level of burden. Higher proportion of caregivers comprised of female [26].

Caregivers within the study population experience varying levels of burden, with 36% reporting mild burden, 22% experiencing moderate burden, and 13% facing severe burden. The mild and no burden experienced by some caregivers can be attributed to several factors. Higher socioeconomic status allows caregivers to afford better healthcare, professional support, and necessary caregiving supplies, reducing their overall stress.

Additionally, educated caregivers have better access to information and effective caregiving strategies, leading to more efficient management of caregiving tasks. Strong family and social support networks help distribute caregiving responsibilities, easing the burden on individual caregivers. Flexible work arrangements and supportive employers also enable caregivers to balance work and caregiving duties more effectively. Furthermore, caregivers with extensive experience, access to community resources, and patients with stable conditions face fewer challenges. These factors collectively contribute to a more manageable caregiving experience, explaining why some caregivers

report only mild or no burden despite the demands of their role.

## Conclusion

Our study showed the major depressive episodes and anxiety disorder 17% and 9% of population respectively and the mean ZBI score of 18.11 signifies Caregiver burden varies, with 36% reporting mild burden, 22% experiencing moderate burden, and 13% facing severe burden; 29% report no significant burden.

Mean ASEX score of 12.93 indicates sexual dysfunction among participants. In 44 out of 250 (17.6%) had sexual dysfunction. The study population shows a diverse age range, with most participants aged 19-40 years where as Middle-aged individuals (41-50 years) are the predominant caregivers. A higher proportion of patients are male (67%), A majority of caregivers are female (88%).

Nuclear families dominate the sample (76%), the majority of participants (68%) reside in rural areas, and The majority of caregivers are housewives (87%). Most patients have secondary (37%) or primary (24%) education. Most participants (86%) are on monotherapy. Focal seizures are most common (45%), minority (13%) have abnormal EEG readings.

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