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ASSESSING THE BURDEN OF MENTAL HEALTH PROBLEMS IN CHILDREN WITH SEIZURE AND ITS IMPACT ON THEIR QUALITY OF LIFE

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Abstract

Background: Children with epilepsy are at significantly higher risk of developing mental health problems compared to the general pediatric population. These psychiatric comorbidities can profoundly affect their quality of life (QoL) and overall functioning.

Objective: To assess the prevalence of mental health problems in children with seizure disorders and evaluate their impact on quality of life.

Methods: This cross-sectional study included 100 children aged 6-14 years diagnosed with epilepsy attending the pediatric neurology outpatient department. Mental health was assessed using the Child Behavior Checklist (CBCL), and quality of life was measured using the Pediatric Quality of Life Inventory (PedsQL). Demographic and clinical variables were analyzed using appropriate statistical tests.

Results: Mental health problems were identified in 38% of children with seizures. ADHD was the most prevalent disorder (26%), followed by anxiety disorders (18%) and depression (12%). Children with psychiatric comorbidities demonstrated significantly lower PedsQL scores across all domains ($p<0.001$). Uncontrolled seizures, polytherapy, and lower socioeconomic status were independent predictors of poor mental health outcomes.

Conclusion: Psychiatric comorbidities are common in children with epilepsy and significantly impair their quality of life. Routine mental health screening should be integrated into comprehensive epilepsy care.

Keywords: Epilepsy, Children, Mental health, Quality of life, CBCL, PedsQL

Introduction

Epilepsy represents one of the most common serious neurological disorders affecting children, with an estimated worldwide prevalence of 0.5-2.2%.[1] Beyond the burden of recurrent seizures, children with epilepsy face numerous challenges including high rates of psychiatric and behavioral comorbidities that frequently remain unrecognized and untreated.[2] Studies have consistently demonstrated that 30-50% of children with epilepsy experience significant mental health problems, a rate substantially higher than in the general pediatric population or children with other chronic conditions.[3]

The relationship between epilepsy and psychiatric disorders is complex and bidirectional. Psychiatric symptoms may predate seizure onset, persist despite seizure remission, or develop as a consequence of epilepsy, its treatment, or associated psychosocial factors.[4] The most commonly reported psychiatric comorbidities include attention deficit hyperactivity disorder (ADHD), anxiety disorders, depression, and disruptive behavior disorders. Davies et al. reported that DSM-IV-based psychiatric diagnoses were present in 37% of children with epilepsy, compared to 11% in children with diabetes and 9% in healthy controls.[5]

Attention deficit hyperactivity disorder is particularly prevalent among children with seizure disorders, with studies suggesting that 30-40% of children with epilepsy also present with ADHD, a rate 2.5 to 5.5 times higher than in the general population.[6] The inattentive subtype appears predominant in this population, which may contribute to underdiagnosis as hyperactive symptoms are more readily identified.[7] Depression and anxiety disorders are also significantly elevated, with some studies reporting rates of 22-36% for depression and 35% for anxiety disorders in children with new-onset epilepsy.[8]

The impact of psychiatric comorbidities extends beyond the mental health domain to significantly affect health-related quality of life (HRQoL). Baca et al. demonstrated that psychiatric comorbidity has a greater impact on quality of life than epilepsy remission status in adolescents with childhood-onset epilepsy, raising concerns about unmet mental health needs. Quality of life encompasses physical, emotional, social, and school functioning, all of which may be compromised in children with epilepsy and coexisting psychiatric disorders.[9]

Several factors have been associated with increased risk of mental health problems in children with epilepsy, including seizure frequency and control, age of seizure onset, type of seizure, antiepileptic drug use, and family history of psychiatric illness.[10] Antiepileptic drugs themselves may contribute to behavioral difficulties, with medications such as levetiracetam and phenobarbital associated with irritability and behavioral changes in some children.[11]

Despite the high prevalence and significant impact of psychiatric comorbidities, routine mental health screening is not standard practice in most pediatric epilepsy clinics. Dunn et al. found that two-thirds of children with epilepsy and behavioral problems had received no mental health treatment. Early identification and intervention could potentially improve outcomes and quality of life for these vulnerable children.[12]

The present study was designed to assess the burden of mental health problems in children with seizure disorders and evaluate the impact of these psychiatric comorbidities on their quality of life. We hypothesized that children with epilepsy would demonstrate elevated rates of psychiatric disorders compared to normative samples and that the presence of psychiatric comorbidity would be associated with significantly impaired quality of life across multiple domains.

Materials and Methods

Study Design and Setting

This cross-sectional, observational study was conducted in the Pediatric Neurology Outpatient Department of a tertiary care teaching hospital over a period of 18 months. The study protocol was approved by the Institutional Ethics Committee, and written informed consent was obtained from parents or legal guardians of all participating children. Assent was obtained from children aged 7 years and above.

Study Population

Children aged 6-14 years with a confirmed diagnosis of epilepsy, defined as having two or more unprovoked seizures occurring more than 24 hours apart, were eligible for inclusion. Epilepsy diagnosis was based on clinical history, seizure semiology, and electroencephalographic findings according to the International League Against Epilepsy (ILAE) criteria.

Inclusion criteria:

- Age 6-14 years

- Diagnosis of epilepsy for at least 6 months
- Currently on antiepileptic medication
- Parents/guardians willing to participate

Exclusion criteria:
- Children with intellectual disability (IQ <70)
- Progressive neurological disorders
- Acute febrile seizures or provoked seizures
- Children too unwell to complete assessments
- Parents unable to understand the questionnaires

Sample Size
Based on previous literature reporting psychiatric comorbidity prevalence of approximately 35% in children with epilepsy, with 95% confidence interval and 10% margin of error, a minimum sample of 88 children was required. We enrolled 100 children to account for potential dropouts.

Data Collection
Demographic data including age, sex, socioeconomic status (modified Kuppuswamy scale), parental education, and family structure were collected. Clinical information regarding seizure type, age of onset, duration of epilepsy, seizure frequency, antiepileptic drug therapy (monotherapy vs. polytherapy), and seizure control status was obtained from medical records and parental interviews. Seizures were classified according to ILAE 2017 classification into focal, generalized, or unknown onset.

Assessment Tools
Child Behavior Checklist (CBCL): The CBCL/6-18 is a standardized parent-report questionnaire designed to assess behavioral and emotional problems in children. It consists of 113 items rated on a 3-point scale. The CBCL provides scores for Total Problems, Internalizing Problems (anxious/depressed, withdrawn, somatic complaints), and Externalizing Problems (rule-breaking behavior, aggressive behavior), along with eight syndrome scales. T-scores ≥70 are considered clinically significant, while scores of 65-69 indicate borderline clinical range. The CBCL has been validated for use in children with epilepsy.

Pediatric Quality of Life Inventory (PedsQL 4.0): The PedsQL Generic Core Scales is a 23-item modular instrument designed to measure health-related quality of life in children. It encompasses four domains: physical functioning (8 items), emotional functioning (5 items), social functioning (5 items), and school functioning (5 items). Items are rated on a 5-point Likert scale, and scores are transformed to a 0-100 scale, with higher scores indicating better QoL. Both child self-report and parent proxy-report versions were administered.

Statistical Analysis
Data were entered and analyzed using free available online statcalulator Continuous variables were expressed as mean ± standard deviation, and categorical variables as frequencies and percentages. Normality of data distribution was assessed using the Kolmogorov-Smirnov test. Comparisons between groups were made using independent t-tests for normally distributed continuous variables and Mann-Whitney U tests for non-parametric data. Chi-square tests were used for categorical variables. Pearson's correlation coefficient was used to assess the relationship between CBCL scores and PedsQL scores. Multiple linear regression analysis was performed to identify independent predictors of quality of life. A p-value <0.05 was considered statistically significant.

Results

Demographic and Clinical Characteristics

A total of 100 children with epilepsy were enrolled in the study. The demographic and clinical characteristics are presented in Table 1.

Table 1: Demographic and Clinical Characteristics of Study Population (N=100)

Variable	n (%) or Mean ± SD
Age (years)	9.8 ± 2.4
Sex	
Male	58 (58%)
Female	42 (42%)
Socioeconomic Status	
Upper/Upper-middle	22 (22%)
Lower-middle	41 (41%)
Lower	37 (37%)
Parental Education	
Graduate and above	28 (28%)
High school	45 (45%)
Primary or below	27 (27%)
Age at Seizure Onset (years)	5.6 ± 3.1
Duration of Epilepsy (years)	4.2 ± 2.8
Seizure Type	
Generalized	54 (54%)
Focal	38 (38%)
Unknown onset	8 (8%)
Seizure Control	
Controlled (seizure-free ≥1 year)	62 (62%)
Uncontrolled	38 (38%)
Antiepileptic Therapy	
Monotherapy	71 (71%)
Polytherapy	29 (29%)
Family History of Psychiatric Illness	14 (14%)
Family History of Epilepsy	18 (18%)

The mean age of participants was 9.8 ± 2.4 years with male predominance (58%). The majority belonged to lower-middle socioeconomic class (41%). Generalized seizures were the most common seizure type (54%), followed by focal seizures (38%). Seizure control, defined as freedom from seizures for at least one year, was achieved in 62% of children. Most children (71%) were on monotherapy, while 29% required polytherapy for seizure control.

Prevalence of Mental Health Problems

Mental health assessment using the CBCL revealed that 38% of children had clinically significant behavioral or emotional problems (T-score ≥70), while an additional 17% were in the borderline range (T-score 65-69). The distribution of psychiatric problems is presented in Table 2.

Table 2: Prevalence of Mental Health Problems Based on CBCL (N=100)

CBCL Domain/Scale	Clinical Range n (%)	Borderline Range n (%)	Normal Range n (%)
Total Problems	38 (38%)	17 (17%)	45 (45%)
Internalizing Problems	32 (32%)	14 (14%)	54 (54%)
Externalizing Problems	24 (24%)	11 (11%)	65 (65%)
Syndrome Scales			
Anxious/Depressed	18 (18%)	9 (9%)	73 (73%)
Withdrawn/Depressed	12 (12%)	8 (8%)	80 (80%)

Somatic Complaints	15 (15%)	7 (7%)	78 (78%)
Social Problems	21 (21%)	10 (10%)	69 (69%)
Thought Problems	14 (14%)	6 (6%)	80 (80%)
Attention Problems	26 (26%)	12 (12%)	62 (62%)
Rule-Breaking Behavior	8 (8%)	5 (5%)	87 (87%)
Aggressive Behavior	16 (16%)	8 (8%)	76 (76%)

Attention problems were the most prevalent psychiatric concern, with 26% in the clinical range. Anxiety/depression affected 18% of children, followed by social problems (21%) and aggressive behavior (16%). Internalizing problems (32%) were more common than externalizing problems (24%).

Quality of Life Assessment

Quality of life scores measured by PedsQL are presented in Table 3. Mean scores across all domains were lower than published normative values for healthy children.

Table 3: PedsQL Scores in Children with Epilepsy

PedsQL Domain	Mean ± SD	Range
Physical Functioning	72.4 ± 18.6	31-100
Emotional Functioning	64.8 ± 21.3	20-100
Social Functioning	68.2 ± 19.7	25-100
School Functioning	61.5 ± 22.8	15-95
Total Score	**66.7 ± 17.4**	**28-96**

(N=100)

School functioning showed the lowest mean score (61.5 ± 22.8), followed by emotional functioning (64.8 ± 21.3). Physical functioning had the highest mean score (72.4 ± 18.6).

Comparison of QoL Between Children With and Without Mental Health Problems

Children with psychiatric comorbidities (CBCL Total T-score ≥70) demonstrated significantly lower PedsQL scores across all domains compared to those without mental health problems (Table 4).

Table 4: Comparison of PedsQL Scores Based on Mental Health Status

PedsQL Domain	With Mental Health Problems (n=38) Mean ± SD	Without Mental Health Problems (n=62) Mean ± SD	p-value
Physical Functioning	62.3 ± 19.2	78.6 ± 15.1	<0.001
Emotional Functioning	51.4 ± 18.7	73.0 ± 18.6	<0.001
Social Functioning	54.8 ± 17.9	76.4 ± 16.2	<0.001
School Functioning	48.7 ± 20.1	69.3 ± 20.5	<0.001
Total Score	**54.3 ± 14.8**	**74.3 ± 14.2**	**<0.001**

The difference was most pronounced in the emotional functioning domain, where children with mental health problems scored 21.6 points lower than those without. Overall QoL was 20 points lower in the group with psychiatric comorbidities.

Factors Associated with Mental Health Problems

Univariate analysis revealed several factors significantly associated with mental health problems in children with epilepsy (Table 5).

Table 5: Factors Associated with Mental Health Problems

Factor	Mental Health Problems Present (n=38)	Mental Health Problems Absent (n=62)	p-value
Age (years)	10.2 ± 2.3	9.5 ± 2.4	0.148
Male Sex	24 (63.2%)	34 (54.8%)	0.412
Lower SES	20 (52.6%)	17 (27.4%)	0.012
Seizure Type			0.086
Generalized	18 (47.4%)	36 (58.1%)	
Focal	18 (47.4%)	20 (32.3%)	
Unknown	2 (5.2%)	6 (9.6%)	
Uncontrolled Seizures	22 (57.9%)	16 (25.8%)	0.001
Polytherapy	17 (44.7%)	12 (19.4%)	0.007
Duration of Epilepsy >5 years	16 (42.1%)	14 (22.6%)	0.041
Age of Onset <5 years	19 (50.0%)	24 (38.7%)	0.272
Family History Psychiatric Illness	9 (23.7%)	5 (8.1%)	0.028

Uncontrolled seizures (p=0.001), polytherapy (p=0.007), lower socioeconomic status (p=0.012), longer duration of epilepsy (p=0.041), and family history of psychiatric illness (p=0.028) were significantly associated with mental health problems.

Correlation Between CBCL and PedsQL Scores

There was a significant negative correlation between CBCL Total Problems T-score and PedsQL Total Score ($r = -0.68$, $p<0.001$), indicating that higher behavioral problem scores were associated with lower quality of life. Strong negative correlations were also observed between CBCL Internalizing Problems and PedsQL Emotional Functioning ($r = -0.72$, $p<0.001$) and between CBCL Attention Problems and PedsQL School Functioning ($r = -0.65$, $p<0.001$).

Multivariate Analysis

Multiple linear regression analysis was performed to identify independent predictors of total PedsQL score (Table 6).

Table 6: Multiple Linear Regression Analysis for Predictors of Quality of Life

Variable	β Coefficient	95% CI	p-value
CBCL Total T-score	-0.52	-0.68 to -0.36	<0.001
Uncontrolled Seizures	-8.24	-13.1 to -3.4	0.001
Polytherapy	-5.87	-10.9 to -0.8	0.024
Lower SES	-4.12	-8.7 to 0.5	0.078
Duration of Epilepsy	-0.89	-1.9 to 0.1	0.086

The model explained 58.6% of the variance in quality of life ($R^2 = 0.586$). CBCL Total T-score emerged as the strongest independent predictor of poor quality of life ($\beta = -0.52$, $p<0.001$), followed by uncontrolled seizures ($\beta = -8.24$, $p=0.001$) and polytherapy ($\beta = -5.87$, $p=0.024$).

Discussion

This study examined the burden of mental health problems in children with epilepsy and their impact on quality of life. Our findings confirm that psychiatric comorbidities are highly prevalent in this population and are strongly associated with impaired quality of life across multiple domains.

The overall prevalence of mental health problems in our cohort was 38%, which is consistent with previous reports. Davies et al.[5] found psychiatric disorders in 37% of children with epilepsy in a population survey, while Caplan et al.[10] reported psychopathology in 55-63% using structured diagnostic interviews. The slight variation in prevalence rates across studies likely reflects differences in assessment tools, diagnostic criteria, and study populations. Our findings align closely with the meta-analysis reported by Dharmadhikari et al.,[1] who found psychiatric comorbidity prevalence of 31.2% in a rural population study of children with epilepsy.

Attention problems emerged as the most prevalent psychiatric concern in our study (26%), which is consistent with the established literature. Studies suggest that ADHD is the most common co-occurring disorder in children with epilepsy, affecting 30-40% of this population. Mulat et al.[7] reported ADHD prevalence of 44.2% among Ethiopian children with seizure disorders, with the inattentive subtype being predominant. The high prevalence of attention problems in our cohort underscores the need for systematic screening, as ADHD often remains unrecognized in epilepsy clinics where the focus is primarily on seizure control.

Anxiety and depression were also common in our sample, affecting 18% and 12% of children respectively. Jones et al. reported similar rates, finding depressive disorders in 22.6% and anxiety disorders in 35.8% of children within one year of epilepsy onset. Thome-Souza et al.[13] found even higher rates of depression (36.4%) in their Brazilian cohort, though their sample included children with intellectual disability. The presence of internalizing disorders in children with epilepsy is particularly concerning as these conditions may be less overtly visible and thus more likely to go undetected.

A key finding of our study was the significant impact of psychiatric comorbidity on quality of life. Children with mental health problems scored approximately 20 points lower on total PedsQL scores compared to those without such problems. This difference exceeds the minimal clinically important difference of 4.5 points established for the PedsQL, indicating a substantial and clinically meaningful impairment. Our results corroborate the findings of Baca et al.,[9] who demonstrated that psychiatric comorbidity was more strongly associated with quality of life than epilepsy remission status in adolescents with childhood-onset epilepsy.

The emotional and school functioning domains showed the greatest impairment in children with psychiatric comorbidities. This finding is consistent with studies showing that children with epilepsy experience significant difficulties in academic performance and peer relationships. The impact on school functioning is particularly concerning given the long-term implications for educational attainment and subsequent employment outcomes.

Several factors were identified as being associated with mental health problems in our cohort. Uncontrolled seizures emerged as a significant risk factor, consistent with the findings of Mulat et al.,[7] who reported that children with seizure episodes in the preceding six months had more than twice the risk of ADHD compared to seizure-free children. The relationship between seizure control and psychiatric morbidity may be bidirectional, as psychiatric symptoms can also interfere with medication adherence and seizure management.

Polytherapy was also associated with increased psychiatric morbidity in our study. Antiepileptic drugs are known to have behavioral side effects, and the use of multiple medications increases the likelihood of such adverse effects. Guilfoyle et al.[11] found that 70% of children with new-onset epilepsy had at-risk or clinically elevated baseline psychological symptoms, and that certain medications, particularly valproic acid and levetiracetam, were associated with greater behavioral side effects. These findings highlight the importance of considering psychiatric risk when selecting antiepileptic medications.

Family history of psychiatric illness was significantly associated with mental health problems in our cohort, suggesting a genetic predisposition. This finding aligns with the broader literature on the

heritability of psychiatric disorders and underscores the importance of obtaining comprehensive family history during clinical evaluation.

The strong negative correlation observed between CBCL scores and PedsQL scores emphasizes the intimate relationship between mental health and quality of life in children with epilepsy. In multivariate analysis, CBCL Total T-score was the strongest independent predictor of quality of life, explaining more variance than seizure-related factors. This finding supports the growing recognition that comprehensive epilepsy care must address psychiatric comorbidities alongside seizure control.

Our study has several limitations. The cross-sectional design precludes determination of causal relationships between variables. The use of parent-report measures may introduce informant bias, and the absence of child self-report for mental health assessment is a limitation. The study was conducted at a single tertiary care center, which may limit generalizability to community settings. Additionally, we excluded children with intellectual disability, who represent an important subgroup with potentially even higher rates of psychiatric morbidity.

Despite these limitations, our findings have important clinical implications. The high prevalence of mental health problems and their significant impact on quality of life argue strongly for routine psychiatric screening in pediatric epilepsy clinics. Tools such as the CBCL can be completed by parents in the waiting room and quickly scored, providing clinicians with valuable information to guide further assessment and intervention. Early identification and treatment of psychiatric comorbidities could potentially improve not only mental health outcomes but also seizure control and overall quality of life.

Conclusion - Psychiatric comorbidities are frequent in children with epilepsy and can substantially impair emotional well-being, behavior, school performance, and social functioning, thereby reducing overall quality of life. Incorporating routine mental health screening into comprehensive epilepsy care enables early detection and timely management of conditions such as anxiety, depression, and behavioral disorders, ultimately improving clinical outcomes and supporting both the child and family.

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