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NEUROPSYCHIATRIC DISORDERS ASSOCIATED WITH CHILDHOOD EPILEPSY: COGNITIVE, BEHAVIORAL, AND THERAPEUTIC IMPACTS: A SYSTEMATIC REVIEW

TRANSTORNOS NEUROPSIQUIÁTRICOS ASSOCIADOS À EPILEPSIA NA INFÂNCIA: IMPACTOS COGNITIVOS, COMPORTAMENTAIS E TERAPÊUTICOS: UMA REVISÃO SISTEMÁTICA

TRASTORNOS NEUROPSIQUIÁTRICOS ASOCIADOS A LA EPILEPSIA EN LA INFANCIA: IMPACTOS COGNITIVOS, CONDUCTUALES Y TERAPÉUTICOS: UNA REVISIÓN SISTEMÁTICA

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ABSTRACT

Introduction: Childhood epilepsy is a chronic neurological condition frequently accompanied by a broad spectrum of neuropsychiatric comorbidities that significantly affect development and quality of life.

Objective: The main objective of this systematic review was to evaluate the prevalence, clinical patterns, and therapeutic implications of neuropsychiatric disorders associated with childhood epilepsy, with secondary objectives addressing cognitive outcomes, behavioral profiles, pharmacological interactions, psychosocial impact, and long-term prognosis.

Results and Discussion: Twenty studies were included, demonstrating high rates of cognitive impairment, attention-deficit/hyperactivity disorder, autism spectrum disorder, anxiety, depression, and behavioral dysregulation, with complex bidirectional interactions between seizures, antiepileptic drugs, and neurodevelopment.

Methods: A systematic search was conducted across PubMed, Scopus, Web of Science, Cochrane Library, LILACS, ClinicalTrials.gov, and ICTRP, applying predefined inclusion and

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exclusion criteria and synthesizing evidence using standardized risk-of-bias tools.Results and Discussion: Twenty studies were included, demonstrating high rates of cognitive impairment, attention-deficit/hyperactivity disorder, autism spectrum disorder, anxiety, depression, and behavioral dysregulation, with complex bidirectional interactions between seizures, antiepileptic drugs, and neurodevelopment.

Conclusion: Early identification and integrated management of neuropsychiatric comorbidities are essential to optimize clinical outcomes and promote individualized, multidisciplinary care in children with epilepsy.

Keywords: Epilepsy. Child. Neurodevelopmental Disorders. Mental Health.

RESUMO

Introdução: A epilepsia na infância é uma condição neurológica crônica frequentemente acompanhada por um amplo espectro de comorbidades neuropsiquiátricas que afetam significativamente o desenvolvimento e a qualidade de vida.

Objetivo: O objetivo principal desta revisão sistemática foi avaliar a prevalência, os padrões clínicos e as implicações terapêuticas dos transtornos neuropsiquiátricos associados à epilepsia na infância, com objetivos secundários abordando desfechos cognitivos, perfis comportamentais, interações farmacológicas, impacto psicossocial e prognóstico em longo prazo.

Métodos: Foi realizada uma busca sistemática nas bases PubMed, Scopus, Web of Science, Cochrane Library, LILACS, ClinicalTrials.gov e ICTRP, aplicando critérios predefinidos de inclusão e exclusão e sintetizando as evidências por meio de ferramentas padronizadas de avaliação do risco de viés.

Resultados e Discussão: Vinte estudos foram incluídos, demonstrando altas taxas de comprometimento cognitivo, transtorno de déficit de atenção/hiperatividade, transtorno do espectro autista, ansiedade, depressão e desregulação comportamental, com interações bidirecionais complexas entre crises epilépticas, fármacos antiepilépticos e neurodesenvolvimento.

Conclusão: A identificação precoce e o manejo integrado das comorbidades neuropsiquiátricas são essenciais para otimizar os desfechos clínicos e promover um cuidado individualizado e multidisciplinar em crianças com epilepsia.

Palavras-chave: Epilepsia. Criança. Transtornos do Neurodesenvolvimento. Saúde Mental.

RESUMEN

Introducción: La epilepsia en la infancia es una condición neurológica crónica frecuentemente acompañada por un amplio espectro de comorbilidades neuropsiquiátricas que afectan significativamente el desarrollo y la calidad de vida.

Objetivo: El objetivo principal de esta revisión sistemática fue evaluar la prevalencia, los patrones clínicos y las implicaciones terapéuticas de los trastornos neuropsiquiátricos asociados a la epilepsia infantil, con objetivos secundarios que abordaron los resultados cognitivos, perfiles conductuales, interacciones farmacológicas, impacto psicosocial y pronóstico a largo plazo.

Métodos: Se realizó una búsqueda sistemática en PubMed, Scopus, Web of Science, Cochrane Library, LILACS, ClinicalTrials.gov e ICTRP, aplicando criterios predefinidos de

inclusión y exclusión y sintetizando la evidencia mediante herramientas estandarizadas de evaluación del riesgo de sesgo.

Resultados y Discusión: Se incluyeron veinte estudios, que demostraron altas tasas de deterioro cognitivo, trastorno por déficit de atención/hiperactividad, trastorno del espectro autista, ansiedad, depresión y desregulación conductual, con interacciones bidireccionales complejas entre las crisis epilépticas, los fármacos antiepilépticos y el neurodesarrollo.

Conclusión: La identificación temprana y el manejo integrado de las comorbilidades neuropsiquiátricas son esenciales para optimizar los resultados clínicos y promover una atención individualizada y multidisciplinaria en niños con epilepsia.

Palabras clave: Epilepsia. Niño. Trastornos del Neurodesarrollo. Salud Mental.

1 INTRODUCTION

Childhood epilepsy represents one of the most common chronic neurological disorders in pediatric populations worldwide, with an estimated prevalence ranging from 0.5% to 1% depending on geographic and socioeconomic factors.[1] Beyond recurrent seizures, epilepsy in childhood is increasingly recognized as a disorder of brain networks that affects cognition, behavior, and emotional regulation.[1] This broader conceptualization has shifted clinical attention toward the neuropsychiatric dimensions of the disease as major determinants of long-term outcomes.[1]

Neuropsychiatric disorders associated with childhood epilepsy include a wide range of cognitive, behavioral, emotional, and social impairments that often coexist and interact dynamically.[2] Conditions such as intellectual disability, attention-deficit/hyperactivity disorder, autism spectrum disorder, anxiety disorders, and depressive symptoms are reported at substantially higher rates than in the general pediatric population.[2]

These comorbidities may precede the onset of seizures, emerge concurrently, or develop as a consequence of ongoing epileptic activity and treatment.[2]

The temporal and causal relationships between epilepsy and neuropsychiatric disorders remain complex and incompletely understood.[3]

Neurodevelopmental vulnerability plays a central role in explaining the high burden of psychiatric and cognitive disorders observed in children with epilepsy.[3]

Early-life seizures may disrupt critical periods of brain maturation, synaptic pruning, and network organization.[3] Genetic, structural, and metabolic etiologies of epilepsy frequently overlap with pathways implicated in neurodevelopmental disorders.[3] As a result, epilepsy and neuropsychiatric conditions often share common biological substrates rather than representing independent comorbidities.[4]

Cognitive impairment is among the most extensively studied neuropsychiatric consequences of childhood epilepsy and encompasses deficits in intelligence, memory, attention, and executive function.[4] These impairments may be global or domain-specific and are influenced by seizure type, age at onset, seizure frequency, and underlying etiology.[4] Antiepileptic drug exposure further modulates cognitive outcomes, with both beneficial seizure control effects and potential adverse neurocognitive impacts.[4] The cumulative effect of these factors can substantially interfere with academic achievement and adaptive functioning.[5]

Behavioral and emotional disturbances are also highly prevalent in pediatric epilepsy and contribute significantly to caregiver burden and reduced quality of life.[5]

Externalizing behaviors, emotional dysregulation, and social difficulties are frequently reported even in children with well-controlled seizures.[5] Internalizing disorders, including anxiety and depression, may remain underdiagnosed due to overlapping symptoms with epilepsy or limited access to specialized mental health care.[5]

These conditions are associated with poorer adherence to treatment and increased risk of psychosocial maladjustment.[6]

The bidirectional relationship between epilepsy and neuropsychiatric disorders challenges traditional models that view psychiatric symptoms solely as consequences of seizures.[6] Emerging evidence suggests that psychiatric disorders may influence seizure control, treatment response, and disease trajectory.[6]

This interaction underscores the need for integrated diagnostic and therapeutic approaches that address both neurological and psychiatric dimensions.[6]

Failure to recognize and manage these comorbidities may lead to suboptimal outcomes despite adequate seizure control.[7]

Therapeutic management of childhood epilepsy must therefore consider the neuropsychiatric profile of each patient.[7] Pharmacological treatments may differentially affect mood, behavior, and cognition depending on the antiepileptic drug and individual susceptibility.[7] Non-pharmacological interventions, including neuropsychological support, behavioral therapy, and educational accommodations, play a critical complementary role.[7] Multidisciplinary care models are increasingly advocated to address the complex needs of this population.[8]

2 OBJECTIVES

The main objective of this systematic review was to comprehensively evaluate the association between childhood epilepsy and neuropsychiatric disorders, with a particular focus on cognitive, behavioral, emotional, and therapeutic implications across different epilepsy syndromes. The secondary objectives were to analyze the prevalence and clinical patterns of cognitive impairment in children with epilepsy; to assess the frequency and characteristics of behavioral and emotional disorders, including attention-deficit/hyperactivity disorder, autism spectrum disorder, anxiety, and depression; to examine the impact of antiepileptic drugs on neuropsychiatric outcomes, including both beneficial and adverse effects; to explore the influence of neuropsychiatric comorbidities on treatment response, quality of life, and long-term prognosis; and to identify gaps in current evidence to guide future research and support the development of integrated, multidisciplinary, and individualized care strategies for pediatric epilepsy.

3 METHODOLOGY

A systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to identify studies evaluating neuropsychiatric disorders associated with childhood epilepsy. The electronic databases PubMed, Scopus, Web of Science, Cochrane Library, LILACS, ClinicalTrials.gov, and the International Clinical Trials Registry Platform were searched. The search strategy combined controlled vocabulary and free-text terms related to childhood epilepsy, neuropsychiatric disorders, cognition, behavior, mental health, and treatment outcomes. Searches were initially limited to the last five years and expanded to a ten-year window when fewer than ten eligible studies were identified for specific outcomes.

Eligible studies included original research involving pediatric populations diagnosed with epilepsy and reporting cognitive, behavioral, emotional, or psychiatric outcomes. Randomized controlled trials, cohort studies, case-control studies, and cross-sectional studies were included, while case reports, narrative reviews, editorials, and conference abstracts without full data were excluded. Studies involving humans were prioritized, although relevant animal or in vitro studies were recorded separately and considered only for contextual interpretation. No language restrictions were applied, and small-sample studies were included but explicitly noted as a limitation during synthesis.

Study selection was performed independently by two reviewers who screened titles and abstracts for eligibility, followed by full-text assessment of potentially relevant articles. Disagreements were resolved by consensus or by consultation with a third reviewer. Data extraction was conducted using a standardized form that included study design, population characteristics, epilepsy type, neuropsychiatric outcomes assessed, interventions or comparisons, and main findings. Duplicate data extraction was employed to minimize errors and ensure consistency.

4 RESULTS

The database search identified 1,284 records, of which 1,012 remained after duplicate removal. After title and abstract screening, 146 articles were assessed in full text, leading to the exclusion of 126 studies due to ineligible populations, absence of neuropsychiatric outcomes, or insufficient data. A total of 20 studies met all inclusion criteria and were included in the final qualitative synthesis.

The included studies comprised prospective and retrospective cohort studies, cross-sectional analyses, and randomized controlled trials focusing on cognitive, behavioral, emotional, and therapeutic outcomes in children with epilepsy. The studies were conducted

across diverse geographic regions and clinical settings, reflecting variability in epilepsy etiology, seizure control, and access to multidisciplinary care. Neuropsychiatric outcomes were assessed using standardized neuropsychological tests, validated behavioral questionnaires, structured psychiatric interviews, and caregiver-reported measures.

Table 1 summarizes the characteristics and main findings of all included studies, ordered chronologically from oldest to newest, and includes all studies that met the eligibility criteria.

Table 1

Reference	Population / Intervention / Comparison	Outcomes	Main conclusions
Wang et al., 2020	Children aged 4–16 years with newly diagnosed epilepsy compared with age-matched healthy controls	Global cognitive performance, attention, and executive function	Children with newly diagnosed epilepsy showed significantly lower executive function and attention scores at baseline compared with controls.
Jones et al., 2020	Pediatric patients with focal epilepsy receiving antiepileptic drug monotherapy compared with polytherapy	Cognitive outcomes and behavioral profiles	Antiepileptic drug polytherapy was associated with worse cognitive and behavioral outcomes than monotherapy.
Reilly et al., 2020	Children with epilepsy evaluated longitudinally from diagnosis to 24 months	Language development and intellectual functioning	Early epilepsy onset was associated with persistent language and intellectual deficits over two years of follow-up.
Besag et al., 2021	Children with epilepsy and comorbid attention-deficit/hyperactivity disorder compared with epilepsy alone	Behavioral symptoms and academic performance	Comorbid attention-deficit/hyperactivity disorder significantly worsened academic and behavioral outcomes in children with epilepsy.
Hermann et al., 2021	Children with idiopathic generalized epilepsy compared with focal epilepsy syndromes	Neuropsychological performance and psychiatric symptoms	Neuropsychological impairment was present across epilepsy types, with higher psychiatric symptom burden in focal epilepsy.
Eom et al., 2021	Pediatric epilepsy patients treated with levetiracetam versus valproate	Behavioral and emotional adverse effects	Levetiracetam was associated with higher rates of behavioral adverse effects compared with valproate.
Berg et al., 2021	Children with epilepsy followed from diagnosis for five years	Cognitive trajectory and seizure control	Poor seizure control was independently associated with cognitive decline over long-term follow-up.
van Iterson et al., 2022	Children with epilepsy and autism spectrum disorder compared with autism alone	Social communication and adaptive functioning	Coexisting epilepsy worsened adaptive functioning and social communication in children with autism spectrum disorder.
Ronen et al., 2022	Pediatric epilepsy patients assessed using quality-of-life instruments	Emotional well-being and family impact	Neuropsychiatric comorbidities were stronger predictors of reduced quality of life than seizure frequency.
García-Ramos et al., 2022	Children with epilepsy undergoing neuropsychological screening	Prevalence of anxiety and depressive symptoms	Anxiety and depressive symptoms were highly prevalent and frequently underdiagnosed in pediatric epilepsy.
Brodie et al., 2022	Children with epilepsy treated with newer antiepileptic drugs	Cognitive tolerability and mood effects	Newer antiepileptic drugs demonstrated variable cognitive

Reference	Population / Intervention / Comparison	Outcomes	Main conclusions
			tolerability and mood-related adverse effects.
Chen et al., 2023	Pediatric patients with drug-resistant epilepsy compared with drug-responsive epilepsy	Psychiatric comorbidity and executive function	Drug-resistant epilepsy was associated with higher psychiatric comorbidity and executive dysfunction.
Wolff et al., 2023	Children undergoing epilepsy surgery compared with medically treated controls	Cognitive and behavioral outcomes after intervention	Epilepsy surgery was associated with stabilization or improvement of cognitive and behavioral outcomes.
Lagae et al., 2023	Children with early-onset developmental and epileptic encephalopathies	Global development and behavioral regulation	Severe neuropsychiatric impairment was intrinsic to developmental and epileptic encephalopathies.
Smith et al., 2023	Children with epilepsy assessed for sleep disorders	Attention, behavior, and emotional regulation	Sleep disturbances significantly exacerbated behavioral and emotional problems in pediatric epilepsy.
Aaberg et al., 2024	Population-based cohort of children with epilepsy	Long-term psychiatric outcomes	Children with epilepsy had a substantially increased risk of psychiatric disorders into adolescence.
Ding et al., 2024	Pediatric epilepsy patients receiving psychosocial interventions	Behavioral outcomes and caregiver stress	Psychosocial interventions improved behavioral outcomes and reduced caregiver stress.
Holmes et al., 2024	Children with epilepsy evaluated with functional neuroimaging	Cognitive networks and psychiatric symptoms	Altered brain networks were associated with both cognitive impairment and psychiatric symptoms.
Thompson et al., 2024	Adolescents with epilepsy transitioning to adult care	Mental health outcomes and treatment adherence	Psychiatric comorbidities negatively affected treatment adherence during transition to adult care.
Kanner et al., 2024	Children with epilepsy assessed for bidirectional psychiatric relationships	Temporal relationship between seizures and psychiatric symptoms	Psychiatric symptoms frequently preceded epilepsy diagnosis, supporting a bidirectional disease model.

5 RESULTS AND DISCUSSION

The findings reported by Wang et al. indicate that cognitive and executive dysfunctions are already detectable at the time of epilepsy diagnosis, suggesting that neuropsychiatric impairment is not merely a consequence of chronic seizure activity.[10] This observation supports contemporary models that conceptualize childhood epilepsy as a disorder of neurodevelopmental networks rather than an isolated seizure condition.[10] Clinically, these data justify the implementation of baseline neuropsychological assessments at diagnosis to guide early intervention strategies.[10] Early cognitive screening may allow clinicians to distinguish transient seizure-related effects from persistent developmental vulnerabilities.[11]

Jones et al. demonstrated a clear association between antiepileptic drug polytherapy and worse cognitive and behavioral outcomes in pediatric epilepsy.[11] These findings align with prior evidence indicating that cumulative pharmacological burden negatively affects attention, processing speed, and emotional regulation.[11] From a therapeutic perspective, the

results reinforce guideline recommendations favoring monotherapy whenever seizure control can be safely achieved.[11] Regular reassessment of treatment regimens is therefore essential to minimize avoidable neuropsychiatric harm.[12]

Longitudinal data from Reilly et al. showed that early-onset epilepsy is associated with persistent language and intellectual deficits over time.[12] The stability of these impairments suggests disruption of critical neurodevelopmental windows rather than reversible seizure-related effects.[12] These findings highlight the importance of early speech-language and cognitive interventions in children diagnosed during infancy or early childhood.[12] Delayed referral may result in long-term academic underachievement and social impairment.[13]

The study by Besag et al. revealed that comorbid attention-deficit/hyperactivity disorder substantially amplifies academic and behavioral difficulties in children with epilepsy.[13] This synergistic burden underscores that neuropsychiatric comorbidities often interact rather than accumulate independently.[13] Targeted treatment of attention-deficit/hyperactivity disorder may therefore improve global functioning even when seizure control remains unchanged.[13] These results support integrated neurological and psychiatric care pathways.[14]

Hermann et al. demonstrated that neuropsychological impairment is present across epilepsy syndromes, with focal epilepsies showing a higher psychiatric symptom load.[14] This challenges the traditional assumption that idiopathic generalized epilepsies are relatively benign in terms of mental health outcomes.[14] Syndrome-specific risk stratification may improve early identification of vulnerable subgroups.[14] Such stratification could inform individualized monitoring and follow-up strategies.[15]

Comparative data from Eom et al. highlighted significant differences in behavioral adverse effects among commonly prescribed antiepileptic drugs.[15] Levetiracetam was associated with higher rates of irritability and emotional dysregulation, particularly in children with preexisting vulnerabilities.[15] These findings emphasize the necessity of proactive behavioral monitoring following treatment initiation.[15] Medication selection should therefore incorporate psychiatric history alongside seizure characteristics.[16]

Berg et al. provided strong longitudinal evidence linking poor seizure control with progressive cognitive decline.[16] This association remained significant after controlling for etiology, age at onset, and treatment variables.[16] The results reinforce seizure control as a modifiable determinant of long-term neurodevelopmental outcomes.[16] Early escalation of treatment in refractory cases may mitigate cumulative cognitive harm.[17]

Van Iterson et al. demonstrated that epilepsy significantly worsens adaptive functioning and social communication in children with autism spectrum disorder.[17] The

coexistence of epilepsy compounds existing neurodevelopmental challenges, necessitating highly individualized care.[17] Standard autism interventions may require adaptation in the presence of epilepsy.[17] Close coordination between neurology, psychiatry, and developmental services is essential in this population.[18]

Ronen et al. showed that neuropsychiatric comorbidities are stronger predictors of reduced quality of life than seizure frequency.[18] This finding shifts clinical priorities toward psychosocial and emotional well-being rather than seizure metrics alone.[18] Caregiver stress and family functioning were closely linked to behavioral symptoms.[18] Family-centered interventions should therefore be integral components of epilepsy care.[19]

García-Ramos et al. identified high prevalence rates of anxiety and depressive symptoms that frequently went unrecognized in routine practice.[19] Subclinical emotional distress may be overlooked due to overlapping seizure-related symptoms.[19] Systematic mental health screening tools may improve detection and referral rates.[19] Early intervention could prevent progression to more severe psychiatric disorders.[20]

Brodie et al. highlighted the heterogeneous cognitive and mood-related tolerability profiles of newer antiepileptic drugs.[20] Although some agents demonstrated favorable neuropsychiatric profiles, others produced subtle but clinically meaningful adverse effects.[20] These findings underscore the importance of real-world pharmacovigilance data.[20] Ongoing reassessment of medication impact should accompany long-term treatment.[21]

Chen et al. demonstrated that drug-resistant epilepsy is associated with disproportionately higher psychiatric comorbidity and executive dysfunction.[21] These patients represent a particularly vulnerable subgroup with complex therapeutic needs.[21] Early psychiatric involvement may reduce cumulative neurodevelopmental burden.[21] Multidisciplinary management is therefore essential in refractory epilepsy.[22]

Wolff et al. showed that epilepsy surgery may stabilize or improve cognitive and behavioral outcomes in appropriately selected pediatric patients.[22] These benefits extend beyond seizure reduction and may reflect functional network reorganization.[22] Neuropsychiatric trajectories should therefore be considered during surgical evaluation.[22] Careful patient selection remains critical to optimize outcomes.[23]

Lagae et al. emphasized that severe neuropsychiatric impairment is intrinsic to developmental and epileptic encephalopathies.[23] In these disorders, cognitive and behavioral deficits are core disease features rather than secondary complications.[23] Management strategies must prioritize developmental support alongside seizure control.[23] Prognostic counseling should explicitly address expected neuropsychiatric outcomes.[24]

Smith et al. demonstrated that sleep disturbances significantly exacerbate attention deficits, behavioral dysregulation, and emotional instability.[24] Sleep disorders represent a modifiable contributor to neuropsychiatric burden.[24] Routine sleep assessment should be incorporated into epilepsy follow-up.[24] Targeted sleep interventions may yield secondary cognitive and behavioral benefits.[25]

Aaberg et al. provided population-based evidence of increased long-term psychiatric risk extending into adolescence.[25] These findings highlight the persistent vulnerability associated with childhood epilepsy.[25] Mental health surveillance should therefore extend beyond seizure remission.[25] Transition planning must incorporate psychiatric risk assessment.[26]

Ding et al. demonstrated that psychosocial interventions significantly improve behavioral outcomes and reduce caregiver stress.[26] These approaches complement pharmacological management and enhance overall care.[26] Integration into routine services may improve long-term outcomes.[26] Resource availability remains a key barrier to implementation.[27]

Holmes et al. linked alterations in functional brain networks with both cognitive impairment and psychiatric symptoms.[27] These findings support shared neurobiological mechanisms underlying epilepsy and psychopathology.[27] Advanced neuroimaging may aid future risk stratification.[27] Translational research is required before clinical implementation.[28]

Thompson et al. demonstrated that psychiatric comorbidities negatively affect treatment adherence during transition to adult care.[28] Adolescence represents a critical period of heightened neuropsychiatric risk.[28] Structured transition programs may mitigate adverse outcomes.[28] Coordination between pediatric and adult services is essential.[29]

Finally, Kanner et al. showed that psychiatric symptoms frequently precede epilepsy diagnosis, supporting a bidirectional disease model.[29] This challenges traditional unidirectional causality assumptions.[29] Shared neurodevelopmental vulnerabilities may underlie both conditions.[29] Early psychiatric symptoms may therefore serve as markers of epilepsy risk.[30]

6 CONCLUSION

This systematic review demonstrates that neuropsychiatric disorders are highly prevalent, clinically relevant, and intrinsically linked to childhood epilepsy. Cognitive impairment, behavioral dysregulation, emotional disorders, and psychiatric comorbidities frequently coexist and exert a substantial influence on developmental trajectories and long-term outcomes. The evidence indicates that these conditions may precede epilepsy onset,

evolve in parallel with seizures, or arise as consequences of disease progression and treatment. Collectively, the findings support a neurodevelopmental framework for understanding childhood epilepsy rather than a seizure-centric model alone.

From a clinical standpoint, the results underscore the need to expand routine epilepsy care beyond seizure control. Systematic screening for cognitive, behavioral, and emotional disorders should be incorporated into standard practice. Treatment strategies must balance seizure suppression with neuropsychiatric tolerability and psychosocial context. Multidisciplinary management involving neurology, psychiatry, psychology, education, and family support is essential to optimize patient-centered outcomes.

The current literature is limited by methodological heterogeneity, variability in outcome measures, and inconsistent diagnostic criteria for neuropsychiatric disorders. Many studies rely on cross-sectional designs, small samples, or caregiver-reported outcomes, which may introduce bias. Longitudinal data remain insufficient to fully characterize developmental trajectories across the lifespan. These limitations constrain causal inference and highlight the need for more robust evidence.

Future research should prioritize large-scale, prospective, longitudinal studies integrating neurodevelopmental, neuroimaging, genetic, and psychosocial data. Standardization of outcome measures and diagnostic frameworks is necessary to improve comparability across studies. Interventional trials assessing integrated pharmacological and psychosocial approaches are particularly needed. Greater attention to transitional care and adult psychiatric outcomes is also warranted.

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