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Review

Child and Adolescent Attention-Deficit/Hyperactivity Disorder (ADHD): An Updated Literature Review

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ABSTRACT

Attention-Deficit/Hyperactivity Disorder (ADHD) is a prevalent neurodevelopmental disorder of childhood and adolescence, clinically defined by the triad of inattention, hyperactivity and impulsivity. It is estimated to affect 5 %–7 % of school-aged children worldwide, with profound repercussions for academic performance, interpersonal relationships and mental health. Etiology is multifactorial, featuring a strong genetic componente heritability of approximately 70 % and environmental influences related to the prenatal period and socioeconomic conditions. Diagnosis remains essentially clinical, guided by DSM-5 criteria and requiring assessment across multiple contexts to minimize both under-diagnosis and excessive medicalization. Management is multidisciplinary: psychostimulants particularly methylphenidate and lisdexamfetamine are first-line treatments, while non-pharmacological strategies (cognitive-behavioral therapy, parent training, school accommodations, neurofeedback and mindfulness programs) are indispensable for sustainable functional gains. Persistence of ADHD into adulthood, observed in 60 % of cases, underscores the need for early screening, continuous monitoring and psychoeducational support to mitigate long-term impacts such as occupational difficulties, heightened risk of mood disorders and substance use. Effective ADHD care therefore demands an integrated network linking health services, schools and families, grounded in up-to-date scientific evidence and public policies that ensure equitable access to specialized care.

Keywords: Attention deficit; Hyperactivity; ADHD; Child and adolescent; Neurodevelopment; Impulsivity

Introduction

Child and adolescent Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most clinically and socially consequential neuropsychiatric conditions of the present era, with a global prevalence of 5 %–7 % in school-aged children[1]. The disorder is characterized by the convergence of core symptoms -inattention, hyperactivity and impulsivity that persist across settings and significantly impair academic, family and social functioning[2]. Although historical descriptions date back to the 19th century, standardized diagnostic criteria were only consolidated after publication of the DSM-III in 1980, reflecting advances in the neurobiological and clinical understanding of the condition[1].

ADHD etiology is unequivocally multifactorial, with heritability around 70 % demonstrated in twin studies and environmental factors modulating phenotypic expression. prenatal toxin exposure, prematurity and early-life psychosocial adversity among them[3,4]. Genetically, variants in dopaminergic (e.g., DAT1, DRD4) and noradrenergic genes have been linked to inattentive and impulsive symptom subtypes, partly explaining observed clinical heterogeneity[3].

Structural neuroimaging studies reveal volumetric reductions in the dorsolateral prefrontal cortex, corpus callosum and basal ganglia-regions implicated in inhibitory control and attentional processing[5]. Functional connectivity analyses highlight instability within default-mode and executive networks, suggesting imbalances between internal and external attention processes[6].

Clinically, ADHD is frequently comorbid with conditions that worsen prognosis, including oppositional defiant disorder, learning disorders, anxiety and depression[7]. Such associations complicate diagnosis and treatment because overlapping symptoms may obscure the disorder or lead to inappropriate interventions. Persistence of symptoms into adulthood in about 60 % of cases further reinforces the importance of early screening and longitudinal follow-up[2]. Although diagnostic workups rely on DSM-5 criteria, they require multimodal evaluation clinical interviews, standardized scales (SNAP-IV, Conners) and observation in diverse environments[8].

Therapeutically, robust evidence positions psychostimulants (methylphenidate, lisdexamfetamine) as first-line treatment, reducing up to 80 % of core symptoms but necessitating careful monitoring of insomnia, appetite loss and cardiovascular effects[9]. Complementary non-pharmacological interventions-cognitive-behavioral therapy (CBT), parent training and school accommodations-are indispensable for sustainable functional gains, fostering self-regulation skills and diminishing family and school conflicts[8,10]. Meta-analyses indicate that combining pharmacotherapy with CBT enhances therapeutic benefits and quality-of-life indicators[8]. Emergent research focuses on precision medicine approaches that explore genetic markers, brain connectivity profiles and machine-learning analytics applied to digital games as screening and monitoring tools[11]. Simultaneously, tele-health modalities and online parental and psycho-pedagogical support platforms are expanding access to specialized care, particularly in underserved areas[12].

Objectives

This review aims to synthesize the most recent evidence on the diagnosis, etiology and management of child and adolescent ADHD, emphasizing evidence-based practices that improve symptomatology, functioning and quality of life.

Materials and Methods

A literature review was conducted using PubMed, SciELO, Google Scholar and ScienceDirect databases.

Discussion

Evaluating child and adolescent ADHD presents substantial challenges, beginning with the need to distinguish symptoms that overlap with anxiety, depression, sleep disorders or socio-emotional deprivation. Observing inattention, hyperactivity and impulsivity alone is insufficient to confirm the diagnosis, as such manifestations may appear in children without ADHD as adaptations to stress or adversity. Recommended practice therefore involves collecting data across multiple settings home, school and clinic using standardized scales such as SNAP-IV and Conners, complemented by qualitative assessments from family members, teachers and mental-health professionals[8]. These procedures aim to reduce observational bias and prevent both under-diagnosis, which delays important interventions and indiscriminate medicalization in high-pressure academic contexts[7].

Pharmacologically, psychostimulants remain the cornerstone of treatment; randomized studies demonstrate up to 80 % symptom reduction and significant improvements in academic performance and social behavior[9]. Nevertheless, adverse effects-insomnia, appetite loss, irritability, transient blood-pressure increases may compromise adherence. Individualizing dosage and employing extended-release formulations have proven effective, offering superior tolerability and facilitating daily routines[9]. When stimulants are ineffective or contraindicated, alternatives such as atomoxetine or α2-adrenergic agonists are considered, though they show slightly lower efficacy and distinct side-effect profiles[9]. Importantly, ADHD extends beyond neurobiological aspects responsive to medication; psychosocial interventions play an indispensable complementary role. CBT provides techniques for cognitive restructuring and coping-strategy training that, when combined with pharmacotherapy, significantly enhance long-term efficacy-reducing observable symptoms while improving self-esteem and social adjustment[8]. Parent-training programs, grounded in behavioral-analysis principles, equip caregivers to implement reinforcement systems that reward adaptive behaviors, diminishing family conflicts and improving daily interactions[8].

In the school environment, pedagogical accommodations segmented instructions, visual aids and movement breaks positively affect concentration and engagement of students with ADHD. Teacher training reduces punitive practices and promotes instructional strategies that pair academic success opportunities with positive behavioral reinforcement[10]. These adjustments not only enhance academic performance but also foster an inclusive environment where attention and regulation difficulties are not misconstrued as character flaws or lack of interest. Precision-medicine perspectives integrate genetic markers, brain-connectivity profiles and machine-learning algorithms within digital platforms. Such technologies promise more objective and personalized assessments, transcending the subjectivity inherent to traditional diagnostic methods. Cognitive-screening

games, for instance, can monitor attention, impulsivity and reaction time in real-time, enabling dynamic, data-oriented therapeutic adjustments[11]. These tools may complement-and in some respects anticipate clinical evaluations, paving the way for earlier interventions tailored to each child or adolescent.

Conclusion

This review underscores that child and adolescent ADHD is a multifaceted disorder whose effective understanding and management require integration of diverse knowledge and practices. First, diagnosis while grounded in DSM-5 criteria demands collaborative, multimodal assessment to capture clinical variability and avoid both under-diagnosis and excessive medicalization[2]. Gathering information across contexts and employing standardized scales are essential to enhance diagnostic precision[8]. Second, psychostimulant pharmacotherapy remains the first-line approach, with robust efficacy in mitigating core symptoms and positively influencing academic and behavioral indicators. Adequate management of adverse effects through extended-release formulations and individualized dosing is crucial for adherence and safety[9]. Third, psychosocial interventions CBT, parent training and school accommodations complement medication and elevate clinical gains to sustainable functionality. Integrating these strategies fosters self-regulation skills, improves family climate and reduces school barriers[8,10].

Moreover, expanding public policies to ensure continued professional education, establish adolescence-to-adult care transition protocols and monitor quality-of-life indicators beyond mere symptom counts is imperative[12]. Awareness campaigns are vital to reduce stigma and encourage families to seek specialized support early. Finally, precision-medicine and tele-health innovations-genetic markers, connectivity profiles, digital monitoring and intervention platforms-open new frontiers in ADHD diagnosis and care, offering more personalized, equitable solutions[11]. These advances stand to democratize access and enhance effectiveness for individuals living with ADHD[13-15].

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