INTERNATIONAL SEVEN JOURNAL
OF MULTIDISCIPLINARY
ISSN: 2764-9547

NEUROLOGICAL THEORIES IN THE MANAGEMENT OF ADHD IN CHILDREN: A NARRATIVE REVIEW OF THE LITERATURE

https://doi.org/10.56238/isevmjv3n6-001

Receipt of originals: 10/04/2024 **Acceptance for publication:** 11/04/2024

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ABSTRACT

Objective: To analyze the neurological theories in the management of ADHD in children. Literature Review: Attention deficit hyperactivity disorder (ADHD) is a developmental disorder of strong neurobiological influence, most common in childhood, affecting 7% of children, and being characterized by a persistent pattern of inattention and/or hyperactivity and impulsivity, which manifest itself in at least two environments such as home and school. ADHD symptoms occur due to dysfunctions in brain functioning. However, the neurobiological origins of ADHD have not been fully elucidated. The neurobiological mechanisms that participate in ADHD are complex in nature and are not dependent on a single neurotransmitter. The clinical variation of ADHD cases already reflects the intense complexity of the inhibitory and excitatory neurochemical processes involved in the origin of its symptoms. Final considerations: It should be noted that the intensity and manifestations of ADHD symptoms will depend directly on various personal aspects, genetic or not, on the family context of those involved, on the support they receive at home or in school and professional environments.

Keywords: ADHD. Neurobiology. Child development.

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INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is a developmental disorder, with a strong neurobiological influence, more common in childhood, affecting 7% of children, and being characterized by a persistent pattern of inattention and/or hyperactivity and impulsivity, which manifest itself in at least two environments such as home and school.

For a long time, attention deficit disorder (ADHD) was mistakenly understood as a diagnosis with few implications in the lives of patients. Commonly, the child was evaluated and treated by a non-specialist, who relies on complaints of hyperactivity and impulsivity to make the diagnosis, reported by parents or teachers, with the belief of remission of symptoms at puberty remaining. The belief that it was a disorder that mainly affects boys with behavioral problems is still widespread. In recent years, however, both clinical experience and recent research in genetics, neuroimaging, and neuropsychology have contributed to a drastic change in the way ADHD is understood.

According to the Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-5)4, dysfunctional behaviors such as those caused by ADHD reduce school performance, promote social rejection, and generate high levels of interpersonal conflicts, which can contribute to future psychosocial disorders in adolescence and adulthood, as well as a greater probability of substance use. being more likely to be involved in accidents, traffic violations, and arrest.

There are three forms of combinations for ADHD, namely: with a predominance of symptoms of inattention; with a predominance of hyperactivity/impulsivity symptoms and with combined symptoms. ADHD symptoms overlap with a range of other medical and psychiatric conditions, including psychosocial and environmental factors, and may be associated with conflict or emotional trauma.

Also according to the DSM-5, this disorder is found in several cultures and affects approximately 5% of children. In Brazil, the average prevalence is 6.7%. Regarding gender, ADHD has been more prevalent in male children compared to female children, showing higher rates of behavioral problems, generating a ratio of 2:1. It should be noted that in females, characteristics of inattention predominate primarily when compared to males.

LITERATURE REVIEW

ADHD symptoms occur due to dysfunctions in brain functioning. However, the neurobiological origins of ADHD have not been fully elucidated. The neurobiological mechanisms that participate in ADHD are complex in nature and are not dependent on a single neurotransmitter. The clinical variation of ADHD cases already reflects the intense complexity of the inhibitory and excitatory neurochemical processes involved in the origin of its symptoms.

Several theories have been formulated to explain the pathophysiology of ADHD. There are reports that, in neuropsychological tests of children with ADHD, they presented impaired performance in tasks that required cognitive functions, such as attention, perception, organization and planning, since these processes are related to the frontal lobe and subcortical areas. Pharmacological evidence favored, at first, the dopaminergic theory of ADHD, according to which dopamine deficits in the frontal cortex and striatum nucleus would be responsible for the manifestations of symptoms.

ADHD is also considered a heterogeneous disorder of multifactorial origin, in which its symptoms and severity are related to the interaction between genetic factors, with multiple associated genes, neurobiological, environmental and social factors.

Regarding genetic factors, the literature currently supports the role of genes encoding dopaminergic (DRD4, DRD5) and serotonergic (HTR1B) receptors, dopamine transporters (DAT-SL-SLC6A3) and proteins involved in the regulation of neurotransmitter release (SNAP 25) in the etiology of the disorder. Therefore, possible alterations in areas involved in this process, such as the prefrontal cortex and the parietal cortex, may be responsible for a deficit in inhibitory behavior and so-called executive functions.

Executive functions (EF) are cognitive skills that control actions, thoughts, planning, flexible reasoning, focused attention, behavioral inhibition, and emotions. They are divided into hot and cold, with hot ones connected to the orbitofrontal prefrontal cortex and involve the regulation of social behaviors, with the ability to regulate emotions; and cold ones are related to the dorsolateral prefrontal cortex and are more focused on cognitive abilities.

There is a great deal of complexity in relation to neurotransmitters and their different actions in each region of the central nervous system, and it seems to be increasingly clear that one set of dysfunctions can explain only one subtype of ADHD,

with different characteristics, evolution, associations, and gradations, in relation to another. The most comprehensive and complete anatomical and functional view of ADHD includes a circuit with two attentional systems. The former, which seems to be predominantly dopaminergic, involves frontal cortical areas and their mesocortical connections, acting in the mediation of cognitive functions such as verbal fluency, vigilance during executive functions, maintenance and concentration of attention, and prioritization of behavior, based on social cues.

The posterior attentional system is noradrenergic and is related to selective attention, including areas such as the parietal region and the locus ceruleus. The posterior parietal region would disconnect the brain from new stimuli and the superior colliculi would play a role in the change of focus. The cause of ADHD is multifactorial, with genetic and environmental factors in different combinations.

The diagnosis should be based on the clinical behavioral picture, since there is no defined biological marker for all cases of ADHD. The DSM-IV classifies ADHD patients into three groups: combined ADHD, predominantly inattentive ADHD, predominantly hyperactive/impulsive ADHD. The criteria for ADHD, according to the DSM IV (1994), are used to evaluate children and adolescents, when the presence of six of the criteria involving signs of inattention, hyperactivity and impulsivity is important. A positive family history of ADHD or other behavioral disorder should also be investigated, as significant familial recurrence of such a disorder may occur. The risk of ADHD appears to be two to eight times higher in children of affected parents than in the general population.

FINAL CONSIDERATIONS

It is noteworthy that the intensity and manifestations of ADHD symptoms will depend directly on various genetic or non-genetic personal aspects, on the family context of those involved, on the support they receive at home or in school and professional environments, on habits they have learned throughout their lives (organization, patience), on the way they have learned to deal with emotions and everyday situations (low frustration threshold, opposition, lack of control, anxiety, feeling of powerlessness or encouraging adversity) and how the case was conducted.

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