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# ATTENTION DEFICIT HYPERACTIVITY DISORDER IN MEDICAL TRAINING: A LITERATURE REVIEW

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**Abstract:** Attention deficit hyperactivity disorder (ADHD) is a neurobiological disorder involving structural and functional changes in the human brain, according to the Brazilian Attention Deficit Disorder Association (ABDA). The diagnosis is most frequently made in childhood, extending into adulthood, affecting both sexes and impacting various areas of life, such as academic, professional, and socio-affective areas. The present study aimed to outline the main difficulties of undergraduate medical students diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) during their studies. To achieve this objective, an analytical study was conducted, in the form of an integrative literature review, using scientific articles indexed in the following databases: Publications of Medical Literature Analysis and Retrieval System Online (PubMed), Scientific Electronic Library Online (SciELO), Virtual Health Library (BVS), and Google Scholar. Descriptors such as "ADHD," "psycho-pedagogical support," "medical students," and "medical training" were used. Regarding data collection, 24 studies were used to compose the results of this review. It was concluded that medical students with ADHD have greater difficulties that hinder their learning in the course, requiring the development and improvement of psychopedagogical strategies that reduce these obstacles and enable quality medical education.
**Keywords**: ADHD. Psychopedagogical support. Medical students. Medical training.

## INTRO

Inattention is present among social circles formed by different individuals, especially in situations that require prolonged mental effort (Santos, 2020). The repercussions of moments of carelessness and distraction of reasoning revolve around communication failures and general activities, which include commitments, responsibilities, and attitudes that are the responsibility of young adults.

It is well known that after a long period of physical and intellectual concentration, natural fatigue triggered by work effort is to be expected. However, when dealing with the topic of "attention," attention should be paid to clinical presentations that differentiate previously healthy individuals from those with characteristics of mental state changes, classifying them within the framework of Attention Deficit Hyperactivity Disorder (ADHD) (Santos, 2020).

According to the Brazilian Attention Deficit Association (ABDA), "ADHD" is a neurobiological disorder with structural and functional changes in the human brain. Its etiologies are multifactorial, involving a combination of environmental, genetic, and social determinants.

As for environmental factors, there are important causal associations, such as large families, crime, low social class, severe emotional instability within the family, and exposure to alcohol and smoking during pregnancy. Perinatal predispositions include poor maternal health during pregnancy, eclampsia, fetal distress, low birth weight, and fetal stress (Castro, *et al.*, 2018).

ADHD is expressed as a neurodevelopmental disorder, diagnosed most frequently in childhood and extending into adulthood, affecting both sexes and various areas of life, such as academic, professional, and socio-affective areas (Silva; Laport, 2021).

The term ADHD was suggested by the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) of the American Psychiatric Association (APA), which divides the disorder into three subtypes: The first is the combined type, with hyperactive and impulsive behavior associated with inattention. The second is marked by a lack of attention and, unfortunately, is neglected and seen as daydreaming and disorganization. The third type is mainly characterized by hyperactivity,

agitation, and impulsivity. This disorder manifests itself in patients, in most cases, with a symptomatic triad: restlessness, impulsivity, and attention deficit. The symptoms usually appear in the school setting, where students tend to have poor academic performance, learning difficulties, hyperactivity, and inattention (Silva; Laport, 2021).

Accordingly, individuals who have already been diagnosed with ADHD, as well as other mental disorders, when entering higher education to pursue a degree in medicine, need to receive psycho-pedagogical and emotional support, in addition to the support of their family or support network with appropriate medical and psychological treatment, so that these students, whether young or not, in their first degree or not, can have access to quality education, social well-being, dignity, and health (Grigorio, Matheus Amorim, 2023).

Given this, the objective of this study is to highlight, through a literature review, the main difficulties faced by medical students diagnosed with ADHD during their medical degree.

## METHOD

This is an analytical study, of the integrative literature review type, justified by research in databases for bibliographic survey, in order to synthesize the results of the search with the objective of reflection and identification of gaps on the topic, through the analysis of several literary works with different methodologies, using different areas of knowledge.

For data collection, scientific articles indexed in the following databases were used: Publications of Medical Literature Analysis and Retrieval System Online (PubMed), Scientific Electronic Library Online (SciELO), Virtual Health Library (BVS), and Google Scholar. In addition, descriptors such as "ADHD," "psycho-pedagogical support," "medical academics," and "medical training" were used.

The inclusion criteria were scientific research papers dated within the last ten years (2013 to 2023) related to the topic, with an analysis of the adult and academic population of the medical course diagnosed with ADHD to methodologically support this study. Scientific articles that did not address the topic, repetitive topics, incomplete articles in abstract format, or articles that did not have a method consistent with the development of the work in an unreliable manner, as well as academic works outside the aforementioned time frame, were excluded.

The data obtained through the research were analyzed through critical and analytical reading, with the aim of organizing the information collected from the bibliographic sources, making it possible to obtain answers to the impasse of the repercussions of ADHD on medical training.

## RESULTS AND DISCUSSION

The discussion highlighted aspects and data evidenced through the analysis of the articles. The following aspects and their relationship with the subject under study were listed:

- The academic difficulties experienced by medical students diagnosed with ADHD

Based on the research and articles analyzed, it was noted that medical students diagnosed with ADHD have greater difficulties than others. When observing and considering the curriculum structure of the bachelor's degree in medicine, it was concluded that it requires more time and dedication, as it is a full-time course with an extensive syllabus. Therefore, some characteristics of the disorder end up being a barrier for people who have it (Njuwa, 2023).

The inattention found in these individuals is a form of presentation that corroborates the difficulty in memorizing and recalling

information already learned, with distractions when performing activities, contributing to poor academic performance (Darroz, 2022). In the professional sphere, research by Castro (2018) identified low performance; frequent job changes; absences and tardiness; excessive errors; difficulties in meeting the demands of activities; disorganization; forgetfulness; impulsive speech; problems with authority; distraction; slowness; and difficulty in starting or prioritizing tasks.

Therefore, it is essential to create support mechanisms and study strategies, as well as emotional and academic support from family members and educational institutions. The role of institutions is to promote accessibility and academic accommodations, and it is important to consider the need for extra time to complete assessments and to reserve a space with few noises and distractions for these tests (Grigorio, 2023).

Grigorio (2023), in his studies, identified that these characteristics contribute to increased bullying and exclusion from social groups due to their habits and mannerisms, making them targets of prejudice in academic medical environments. These individuals are seen as disconnected, slow, and end up being excluded from work and projects carried out by small groups.

Students with ADHD tend toward social isolation and low self-esteem, which is very harmful in a course that requires intense exposure and social interaction, both in an academic environment and, in the future, in the workplace. Therefore, it is important to consider psychological and social support services for these individuals in medical education institutions, as well as interventions such as cognitive behavioral therapy (CBT), which improve executive functioning and well-being (Godfrey-Harris, 2023).

- Chemical substance use and abuse by medical students with ADHD

Psychostimulant drugs are those that increase alertness and motivation, reducing the need for rest, and have antidepressant properties, improving mood and cognitive performance. The main substances used for this purpose are caffeine, methylphenidate, modafinil, piracetam, energy drinks, and amphetamines. Methylphenidate hydrochloride (MPH; Concerta®, Ritalin®) is one of the most commonly prescribed stimulants for the clinical management of ADHD, for the treatment of this disorder and specific cases of depressive disorder and fatigue (Tolentino *et al.*, 2019).

According to records from the United States Department of Justice Drug Enforcement Administration (DEA), MPH production increased by 298% between 1996 and 2006 (Maciel *et al.*, 2017). These drugs are widely consumed by university students, especially medical students. In addition, other students also consume it, but without a diagnosis of ADHD.

Students who use these psychostimulants notice improvements in their academic performance, which drives them to consume them more frequently and in greater quantities, not only for performance, but also for the effect of methylphenidate in increasing the amount of dopamine in post-synaptic stimuli, similar to the stimulating effect of other addictive illicit drugs (Tolentino *et al.*, 2019).

It is important to highlight the harmful effects of indiscriminate use of brain stimulants, especially in the long term, as they can trigger feelings of distress, agitation, nervousness, anxiety, dependence, and chemical tolerance. In addition, most psychoactive drug users consume alcohol together with psychotropic drugs, leading to greater risks, since alcohol can exacerbate the adverse effects of such drugs on the central nervous system (Oliveira *et al.*, 2023).

Methylphenidate can have neurological consequences, with adverse effects including headache, reduced appetite, insomnia, dependence, increased irritability, anxiety, and hyperactivity. Side effects include drowsiness and generalized pain. Rebound stress is also reported as a significant effect, associated with headache as a chronic consequence (SOUZA *et al.*, 2023).

- The co-occurrence of cognitive disorders and ADHD among medical students

The clinical presentation of mental disorders—such as ADHD—is predominantly accompanied by other symptoms and rarely expressed in isolation. Furthermore, a pilot study conducted at a Peruvian medical school found that of the 250 study participants, 81.6% had some mood disorder, and 32% were diagnosed with ADHD (Tapia, 2022).

In this study, the prevalence of anxiety disorder was 70.4%, followed by depression, with 62.8%. The direct relationship between ADHD and these mood disorders was confirmed by the study through the analysis of the odds ratio of an academic with ADHD developing such mental state changes, which was found to be high when compared to students who did not have a diagnosis of ADHD (Tapia, 2022).

Through the analysis of an experimental study, it was found that mental disorders tend to emerge in early adulthood, a period that coincides with the time of entering university. Such mental health disorders are more prevalent among medical students than in the general population. This is due to possible primary exposure to loneliness—due to time spent studying away from family and/or friends (support network)—the overload of academic responsibilities and theoretical volume, close contact with the meaning of life and death, and the pathological process of diseases (Tapia, 2022).

When ADHD was analyzed among medical students in this review, a high correlation with depression was found. A study conducted in a medical school in sub-Saharan Africa showed a prevalence of 25% of depressive disorder and 20.5% of anxiety, both found in 2020. About a quarter of the students evaluated in this study had symptoms of ADHD, leading to the conclusion that the coexistence of mental disorders is persistent and leads to chronicity (Njuwa *et al.*, 2023).

Furthermore, it is important to mention that these disorders may be a direct consequence of ADHD, since the subjective difficulties mentioned above contribute to the development of mental illness. In addition, somatic diseases are associated with ADHD, since the disruption of dopaminergic nerve pathways is present in the development of both pathophysiologies and is related to the development of chronic diseases (Njuwa *et al.,* 2023).

A study of a group of Chinese medical students with ADHD found that they experienced suicidal behavior associated with alcohol and tobacco abuse, as well as anxiety and depressive symptoms, as already mentioned in this review. It was concluded that medical students with ADHD are ten times more likely to develop suicidal behaviors, such as ideation, planning, and suicide attempts.

Unfortunately, the association between suicidal behavior and ADHD is due to the cumulative clinical picture with other mental disorders. Therefore, it is necessary to reflect on the mental health of young aspiring doctors so that they can enjoy full physical and mental health and, thus, experience the reality of being a healthy and fully satisfied caregiver, despite their neurodivergence (Shen *et al.*, 2021).

- Medical students with ADHD and the internet

Since the development and improvement of the global computer network in the twentieth century, various types of socialization and entertainment media have emerged and become popular and commonplace within the community, especially among university students.

An experimental study on internet use among medical students and medical residents diagnosed with ADHD showed that this group was found to be vulnerable to internet and digital game addiction, with a prevalence of 30%, four times higher than the general population. Male students diagnosed with ADHD had a higher prevalence. In addition, young age was considered a risk factor for computer game-related disorder (Gul *et al.*, 2023).

Consistent with this, it was noted that students diagnosed with ADHD who had impulsive and unreflective personalities showed a greater propensity for excessive use of the internet and entertainment apps, as these media were useful for coping with everyday stress and loneliness, added to the fact that, through the internet, this audience has access to a variety of information and opportunities for distraction, perpetuating its use, albeit inappropriately (SHEN Y.M., et al, 2021).

- The Association of ADHD with Mental Health and Spirituality

Research has found that students who professed some religion, even those who were less practicing, had a lower incidence of minor mental disorders in association with ADHD. By understanding the transience of human beings, their uniqueness, and their purpose, suffering is experienced rationally and interpreted as inherent to life (Reginato et al., 2016).

Individuals who manage their emotions well, supported by a sense of and appreciation for their spirituality, can experience satisfaction with their mental health. Thus, it can be concluded that encouraging reflection on spiritual care and faith can be a means for the good clinical management of neurocognitive disorders, associated with adequate medical and psychological treatment and institutional support, especially when these disorders are associated, as is the case with ADHD and depressive and anxiety disorders. In addition, it was found that students who seek to reflect on their inner selves about emotional issues, based on their interpretation of spirituality, may understand their patients in a more humane and efficient way as students and future professionals (Reginato *et al.*, 2016).

- Psycho-pedagogical support for students with ADHD in medical school.

Support for university students with ADHD is of fundamental importance for their development and success in their academic journey. It is important to emphasize the early diagnosis of these students as a way to prioritize appropriate intervention (Silva *et al.*, 2022). With regard to this support, the implementation of a schedule of daily activities so that students can organize their academic life is useful for managing their difficulties and clinical presentations.

This tool prevents the forgetting of daily activities, which is very common in these patients, and it should be adjusted with the aim of promoting autonomy and independence. Teachers should provide students with the conditions to anticipate their routine and obtain time to prepare for the activities developed (Grigorio *et al.*, 2023).

Cases of ADHD are increasingly common and, for this reason, we must seek to better understand the disorder, qualify and diversify approaches, leading to a better quality of life. Institutions must promote accessibility and

academic accommodations, observing them according to the particularities of medical students with ADHD. These students need extra time to take tests, in a reserved space with less noise and distractions. In addition, they should also receive support from psychologists and projects that include their rights to individual access to quality education ( *Grigorio et al.*, 2023).

New teaching methodologies, such as *Problem-Based Learning* (PBL), in which students are exposed to active learning methods, become a complicating factor when they do not receive adequate support from their medical school (Grigorio, 2023), in addition to other active problem-solving methodologies (DCNM/2014).

With regard to support for patients with ADHD, cognitive behavioral therapy (CBT) stands out, as well as institutional support for students. CBT works in conjunction with medication, when used. There are individual and group therapies for people who do not adhere to drug treatment. Knowledge of the limitations inherent in the disorder can clarify methods for dealing appropriately with these students. Several skills to be developed are proposed, such as organization, planning, and time management skills (Cardoso, 2017).

Prioritization techniques, such as lists, schedules, reminders, and breaking tasks down into smaller steps, are good alternatives for this audience. Strategies for managing distraction are also taught, including cognitive restructuring, Socratic debate, and monitoring dysfunctional thoughts, with the aim of reformulating beliefs about incapacity and low self-esteem and, in this way, exposing students to the real sense of their difficulties and how to manage them appropriately (Cardoso, 2017).

## CONCLUSION

In view of the studies conducted, it is important that educational institutions that train medical professionals promote the development and improvement of psychopedagogical strategies to reduce potential obstacles to the provision of quality medical education and also prioritize and protect the health of future doctors during their undergraduate studies.

Therefore, early and correct diagnosis and individualized monitoring by the educational institution dedicated to medical students with ADHD, together with the work of the support network, medical and psychological treatment, are necessary for these students to have adequate support in their daily activities and satisfactory development of medical skills (knowledge, abilities, and attitudes), so that the community and the professionals themselves can enjoy the right to health, which is fundamental in the training of a doctor who serves society.

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