

## The Interrelationship Between ADHD and Panic Attacks: A Case Study and Comprehensive Literature Review

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### ABSTRACT

This research investigates the possible correlation between Attention Deficit Hyperactivity Disorder (ADHD) and panic attacks. Through a detailed literature review, the study focuses on a veterinary student who has experienced both ADHD and panic attacks. The primary objective of this research is to address critical questions concerning the prevalence, underlying causes, and mechanisms that may connect these two disorders. An extensive examination of existing literature indicates notable associations, carrying crucial implications for treatment methodologies. The case study exemplifies the practical difficulties encountered by individuals suffering from both ADHD and panic attacks, highlighting the necessity for tailored and meticulous management strategies.

### Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder (1). It has been estimated that 6–7% of children and 4–5% of adults can have ADHD (2). Panic attacks, defined as sudden episodes of intense fear accompanied by physical symptoms, can occur independently or as part of anxiety disorders (3). These attacks can include symptoms such as palpitations, sweating,

shortness of breath, and feelings of impending doom (4). While ADHD and panic attacks are distinct conditions, emerging evidence suggests a potential overlap, particularly in individuals who have experienced prolonged treatment with stimulant medications (5, 6). These overlapping conditions pose challenges in diagnosis and treatment, as the symptoms may reinforce each other, leading to a cycle of anxiety and inattention

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(7, 8).

These overlapping conditions pose challenges in diagnosis and treatment, as the symptoms may reinforce each other, leading to a cycle of anxiety and inattention (9).

Diagnostic criteria and assessment tools for ADHD and anxiety include structured scales and questionnaires designed for accurate evaluation. For ADHD, tools like Conners' Adult ADHD Rating Scale (CAARS) assess symptoms in adults, while the Vanderbilt ADHD Diagnostic Rating Scale evaluates inattention, hyperactivity, and comorbidities in children(10). The Adult ADHD Self-Report Scale (ASRS) serves as a self-screening tool for adults, and the ADHD Rating Scale-IV measures symptom frequency and severity in children(11). For anxiety, the Generalized Anxiety Disorder-7 (GAD-7) is a self-report questionnaire for screening and severity assessment of generalized anxiety(12), while the Hamilton Anxiety Rating Scale (HAM-A) provides a clinician-administered evaluation of anxiety severity(13). The State-Trait Anxiety Inventory (STAI) assesses both situational and baseline anxiety(14), and the Beck Anxiety Inventory (BAI) focuses on cognitive and physical symptoms of anxiety, offering a comprehensive approach to understanding these conditions(14).

### Case Presentation

This case study focuses on a veterinary student who was diagnosed with ADHD in childhood. Despite early signs of high cognitive potential, such as learning to read and write by age four, the student consistently struggled with concentration and exhibited significant variability in academic performance throughout school years. The student's early educational journey was marked by periods

of high achievement, interspersed with episodes of academic decline, attributed to difficulties in maintaining focus and managing tasks. Upon entering veterinary school, the academic demands and pressure intensified, leading to increased reliance on stimulant medications, specifically Ritalin, which the student had been prescribed for several years. While Ritalin initially helped manage the ADHD symptoms, prolonged use led to side effects, including severe heart palpitations and sleep disturbances. Over time, these side effects became more pronounced, culminating in the onset of panic attacks characterized by intense fear, rapid heartbeat, dizziness, and a feeling of loss of control. The first panic attack occurred during an exam period when the stress was exceptionally high. The student described the experience as overwhelming, with an intense feeling of dread and physical symptoms that mimicked those of a heart attack. Following this event, the student experienced recurrent panic attacks, often triggered by academic stress or during the withdrawal periods from Ritalin. These panic attacks significantly impacted the student's ability to perform academically and socially, leading to increased anxiety and further deterioration of focus and concentration.

Literature review study involved reviewing the literature from PubMed, Web of Science, and Google Scholar. Keywords used included "ADHD," "panic attacks," "comorbidity," "stimulant medications," and "anxiety." Articles were selected based on their relevance to the research questions. The case study was analyzed in the context of these findings, focusing on the period from 2018 to 2024.

Indicatively, the prevalence of panic attacks is higher in individuals with ADHD compared to the general population (16). This is particularly

notable in those who have undergone long-term stimulant therapy, with estimates suggesting a comorbidity rate as high as 30-40% (17).

#### **Mechanisms Linking ADHD and Panic Attacks:**

The literature suggests that the dysregulation of the dopaminergic and noradrenergic systems in ADHD not only contributes to the core symptoms of ADHD (18) but also increases susceptibility to anxiety disorders, including panic attacks (19, 20). Chronic stress, common in individuals with ADHD, further exacerbates this vulnerability, potentially triggering panic episodes in stressful situations (21, 22).

#### **Impact of Stimulant Medications:**

Research indicated that while stimulant medications like Ritalin are effective in managing ADHD symptoms, they may also exacerbate anxiety and panic symptoms in some individuals, particularly during withdrawal periods (23). This was evident in the case study, where the discontinuation of Ritalin coincided with the onset of panic attacks, highlighting the importance of careful management and monitoring of medication use (23).

#### **Treatment Strategies:**

The literature supports a multidisciplinary approach to managing comorbid ADHD and panic attacks. Effective strategies include cognitive-behavioral therapy (CBT) aimed at managing anxiety, as well as careful and individualized management of stimulant medications. In some cases, alternative medications or treatment strategies may be necessary to balance the benefits and risks associated with stimulant use (24, 25).

#### **Discussion**

The inclusion of a practical study offers readers

tangible insights into the complexities of managing ADHD and anxiety, illustrating the real-world implications of diagnostic and treatment challenges. The first author's lived experience with ADHD and panic attacks adds a valuable and authentic dimension to the discussion, fostering a deeper understanding of the challenges faced by individuals with these comorbid conditions. This manuscript explores the nuanced role of stimulant medications such as Ritalin, which, while effective for ADHD, may exacerbate anxiety symptoms. This discussion addresses an underexplored area, emphasizing the need for careful, individualized management. By combining personal narratives, a detailed study, and a synthesis of literature, this manuscript bridges academic research and clinical application, making it highly relevant to practitioners and researchers alike.

The interrelationship between ADHD and panic attacks presents a complex clinical challenge that warrants a nuanced understanding of both the underlying neurobiological mechanisms and the psychosocial factors that contribute to this comorbidity. ADHD is primarily characterized by impairments in attention, impulsivity, and hyperactivity, attributed mainly to dysregulation in the dopaminergic and noradrenergic systems of the brain (26). These neurotransmitter systems are critical for cognitive functions such as attention, executive control, and emotional regulation (27). When these systems are dysregulated, as in the case of ADHD, the individual may not only struggle with attention and behavior but also experience heightened emotional reactivity, leading to increased vulnerability to anxiety disorders, including panic attacks (28).

Panic attacks are thought to arise from an overactive autonomic nervous system response

to perceived threats, which may be exaggerated in individuals with chronic stress or anxiety (29, 30). The overlap between ADHD and panic attacks can be understood through several pathways. Firstly, the chronic stress associated with managing ADHD, particularly in demanding academic or occupational settings, can exacerbate anxiety levels. Individuals with ADHD often face difficulties in meeting deadlines, organizing tasks, and maintaining focus, which can lead to significant stress and a sense of overwhelm. Over time, this chronic stress may lower the threshold for panic attacks, particularly in situations where the individual feels they have little control (31). Secondly, stimulant medications, which are commonly prescribed to manage ADHD symptoms, may contribute to the development or exacerbation of anxiety and panic attacks in some individuals. While these medications, such as Ritalin, are effective in increasing dopamine and norepinephrine levels, thereby improving attention and reducing hyperactivity, they can also lead to side effects that include increased heart rate, blood pressure, and anxiety (30).

In the case presented, the student's prolonged use of Ritalin, coupled with the stress of veterinary school, likely contributed to the onset of panic attacks. The physiological arousal induced by the medication, particularly during withdrawal periods, may have triggered the autonomic responses characteristic of panic attacks. The case study highlights the importance of considering the psychological and emotional well-being of individuals with ADHD, particularly those on long-term stimulant therapy. While these medications are a cornerstone of ADHD treatment, their potential side effects, including the risk of anxiety and panic attacks, must be carefully managed. This necessitates a multidisciplinary approach

to treatment that integrates pharmacological management with psychological interventions such as CBT. CBT can be particularly effective in helping individuals develop coping strategies for managing anxiety and preventing panic attacks. Techniques such as relaxation training, cognitive restructuring, and exposure therapy can help reduce the fear of panic attacks and improve overall emotional regulation. Furthermore, the case underscores the need for personalized treatment plans that take into account the unique challenges faced by individuals with ADHD. For some, non-stimulant medications or a combination of low-dose stimulants with anxiolytics may be more appropriate to balance the management of ADHD symptoms with the prevention of anxiety and panic attacks (32). Additionally, lifestyle modifications, such as regular physical exercise, sleep hygiene, and stress management practices, can play a critical role in reducing the overall stress burden and lowering the risk of panic attacks. Monitoring patients for early symptoms of anxiety or panic is vital in clinical practice, particularly during phases of medication alteration.

## In Conclusion

This study emphasized the real-world challenges faced by individuals with comorbid ADHD and panic attacks, considering the need for personalized and careful management strategies.

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None of declare

## Author's Contribution

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### Conflict of interest

There is no conflict of interest to be declared.

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