

Characteristics of ADHD in Struggling Residents and Fellows

Karen M. Warburton , MD
Joanna S. Yost, PhD
Stephanie D. Bajo, PsyD

James R. Martindale, PhD, MEd
Andrew S. Parsons, MD, MPH
Michael S. Ryan, MD, MEHP

ABSTRACT

Background Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental condition that often results in poor academic performance. Little is known about how ADHD manifests in residents and fellows.

Objective To describe the prevalence and phenotype of ADHD among residents and fellows referred to a centralized remediation program.

Methods We conducted a retrospective review of data obtained from referrals to a single-center centralized graduate medical education remediation program from 2017 to 2023. Data included demographic variables, ADHD and mental health history, and training performance characteristics. ADHD was determined by self-report, clinical diagnosis by mental health provider, or neuropsychological testing.

Results A total of 173 trainees were referred in the study period. The prevalence of ADHD was 20% (35 of 173). ADHD was most commonly diagnosed in childhood (57%, 20 of 35); however, 26% (9 of 35) were diagnosed during or after medical school. Only 37% (13 of 35) were on medication, and 69% (24 of 35) disclosed at least one concomitant mental health diagnosis. Performance deficits were common in professionalism (69%, 24 of 35), organization/efficiency (O/E; 63%, 22 of 35), and medical knowledge (46%, 16 of 35). Repeated errors in patient care were made by 34% (12 of 35); 29% (10 of 35) failed at least one board examination, and 20% (7 of 35) required extension of residency or fellowship training. When compared to referrals without ADHD, residents and fellows with ADHD were more likely to struggle with O/E, failure to engage, and repeated errors.

Conclusions One in 5 trainees referred to a GME remediation program had ADHD, and most were not being treated for ADHD when referred. The deficits identified suggest an ADHD phenotype in GME which may be considered for struggling residents and fellows.

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental condition characterized by inattention, impulsivity, and/or hyperactivity that leads to functional impairments.^{1,2} The estimated worldwide prevalence of adult ADHD is 3.1%.³ While ADHD is well-described in K-12 education⁴ and, to a lesser degree, in medical school,⁵⁻⁹ little is known about the graduate medical education (GME) population. Untreated ADHD may affect the well-being and clinical performance of medical trainees.

In the general population, ADHD is more common in males versus females (1.6:1).^{1,10} Females and adults are more likely to present with predominately inattentive symptoms.^{2,3,11} In a survey of 3199 adults with ADHD, 86% reported no notable symptoms during childhood.¹⁰ Most patients with ADHD have at least one concomitant mental health diagnosis.^{2,10,11} The prevalence of ADHD in medical students ranges from

0.9 to 24%,⁵⁻⁸ and most are not diagnosed until adulthood.^{5,9} Medical students with any disability have lower United States Medical Licensing Examination scores and are less likely to graduate on time.¹² Evidence-based treatments for ADHD include medication and/or behavior therapy.

Two surveys of emergency medicine residency program directors report the prevalence of ADHD among their residents as 0.06%¹³ and 4%.¹⁴ These studies, relying on learner self-report, may underestimate the true prevalence of ADHD in this population due to apprehension about reporting to regulatory agencies.¹⁵ One study of psychiatry residents suggests those with ADHD may struggle with clinical decision-making, accurate completion of daily work, task prioritization, and effective interpersonal communication.¹⁶

In comparison to those in grades K through 12 or medical school programs, residents and fellows are assessed primarily on their clinical performance, yet little is known about how ADHD influences clinical training. This represents a significant gap in our understanding of the ramifications of ADHD on residency and fellowship performance.

DOI: <http://dx.doi.org/10.4300/JGME-D-24-00449.1>

Editor's Note: The online supplementary data contains a visual abstract.

The purpose of this study was to identify the prevalence and performance characteristics of ADHD among residents and fellows referred to a centralized remediation program.

Methods

We conducted a retrospective analysis of data obtained from a centralized GME remediation program at the University of Virginia Health System (UVA) from 2017 to 2023. UVA trains approximately 850 residents and fellows in 100 programs.

At UVA, residents and fellows with performance concerns are referred to a centralized remediation program known as COACH (Committee on Achieving Competence through Help).¹⁷ Following written informed consent, a physician remediation specialist identifies performance deficits and creates an individualized remediation plan.¹⁷⁻¹⁹ Performance deficits are characterized as medical knowledge/test-taking, clinical reasoning, organization/efficiency (O/E), professionalism, and technical skill. Professionalism concerns are further classified into 4 behavioral themes: failure to engage, dishonest behavior, disrespectful behavior, and poor self-awareness.²⁰ Trainees who self-report a history, or symptoms, of ADHD are referred for additional evaluation and/or treatment by a mental health professional.

Analysis

We conducted a retrospective review to describe learner and performance characteristics for referrals with ADHD. Inclusion criteria were residents and fellows referred to COACH between 2017 and 2023 who disclosed a diagnosis of ADHD or were diagnosed with ADHD following referral. We report the frequencies of demographic variables and training performance characteristics. Using chi-square tests, we explored the association between performance characteristics of referred learners with and without ADHD.

The project was approved by the UVA Institutional Review Board.

Results

During the study period, 173 residents and fellows were referred to COACH with performance concerns. Of these, 20% (35 of 173) disclosed a diagnosis of, or were diagnosed (clinical diagnosis by mental health professional or neuropsychological testing), with ADHD. Although ADHD was most commonly diagnosed in childhood (57%, 20 of 35), 26% (9 of 35) were diagnosed during or after medical school. The majority with ADHD were not on medication for

ADHD symptoms and reported at least one concomitant mental health diagnosis—most commonly anxiety and/or depression—for which they were receiving treatment. Descriptions of the 35 residents and fellows with ADHD are found in the TABLE.

The most common performance deficits among residents and fellows with ADHD were professionalism (69%, 24 of 35) and O/E (63%, 22 of 35). Thirty-four percent (12 of 35) with ADHD struggled with repeated errors or inaccuracies in patient care. Approximately one-third (12 of 35, 34%) required formal remediation, and 20% (7 of 35) required extension of training. When compared to referrals without ADHD, residents and fellows with ADHD were more likely to struggle with O/E (63% vs 31%, $P=.001$) and repeated errors (34% vs 12%, $P=.002$). While the frequency of professionalism difficulties was similar in ADHD and non-ADHD referrals, the phenotype of unprofessional behaviors was different between these groups (FIGURE). The professionalism lapses demonstrated by most learners with ADHD were classified as failure to engage,²⁰ including missing deadlines, not taking ownership, and arriving late (63% vs 30% in the non-ADHD referrals, $P<.001$).

Discussion

The prevalence of ADHD among residents and fellows referred to our program is considerably higher than that of the general adult population and higher than most studies reporting prevalence among medical learners. Residents and fellows with ADHD struggled across multiple competencies, most commonly professionalism.

To our knowledge, this is the first study to describe phenotypic characteristics of ADHD in struggling residents and fellows. Our study is consistent with evidence that medical learners are diagnosed later in life and that ADHD symptoms are often under-identified in individuals with high IQ and higher education.²¹ Most performance issues in our cohort reflect the inattentive symptoms of ADHD, which are known to be the most important predictors of impairment in adults.²² These differences provide evidence for the existence of a unique, previously undescribed phenotype of trainees with ADHD.

The relatively higher prevalence of ADHD in our cohort may be explained by the fact that our remediation program focuses specifically on areas of impairment directly impacted by the hallmark features of ADHD. These include self-management strategies, environmental modifications, organizational skills, and long-term planning. Further, we have created a program that allows participants to engage with minimal concern about confidentiality, which likely has increased

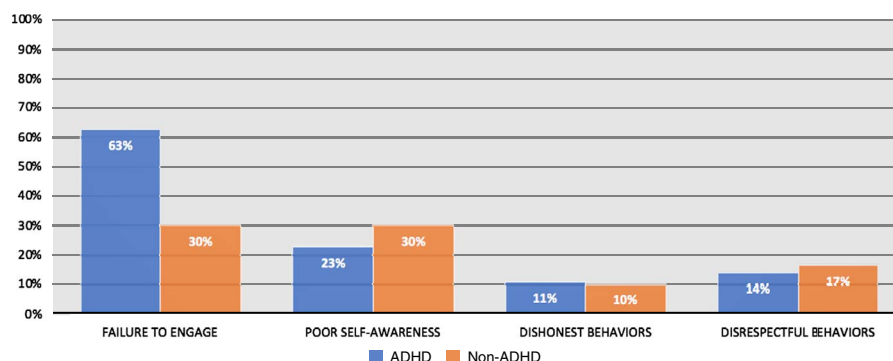
TABLE

Descriptive Characteristics of COACH Learners With ADHD, N=35

Characteristics	n (%)
Sex at birth	
Male	18 (51)
Female	17 (49)
Level of training	
Resident	29 (83)
Fellow	6 (17)
Representation in medicine	
Underrepresented	7 (20)
Proportionally represented	28 (80)
Time of ADHD diagnosis	
Childhood	20 (57)
College	6 (17)
Medical school	2 (6)
By the COACH program	7 (20)
ADHD medication status	
On medication prior to COACH	13 (37)
COACH-initiated medication	16 (46)
No medication	6 (17)
Concomitant mental health diagnoses	
Anxiety disorder	19 (54)
Depressive disorder	13 (37)
Addictive disorder	4 (11)
Other ^a	11 (31)
Medical specialty	
Procedural	10 (29)
Non-procedural	25 (71)
Referral source	
Program director	22 (63)
Self-referred	13 (37)
Area of performance deficit	
Professionalism	24 (69)
Organization and efficiency	22 (63)
Medical knowledge or test-taking	16 (46)
Clinical reasoning	14 (40)
Technical skill	3 (9)
Board failure	
Failed >1 board examination in medical training	10 (29)
Remediation measures	
Formal remediation plan	12 (34)
Extension of training	7 (20)
Interventions provided by COACH	
Initiation of medication	16 (46)
Extended time for testing	7 (20)
Evidence-based psychotherapy	15 (43)

^a Includes post-traumatic stress disorder, substance use disorder, eating disorder, personality disorder, and adjustment disorder.

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; COACH, Committee on Achieving Competence through Help.



FIGURE

Area of Professionalism Concerns for Learners With and Without ADHD

Note: Examples of failure to engage include absence or tardiness for scheduled activities, failure to meet deadlines or complete requests (administrative or clinical), cutting corners, lack of ownership, and inappropriate delegation.

participation and more accurate reporting of symptoms without fear of negative outcomes. In fact, 38% (65 of 173) of our cohort self-referred to COACH, which offers evidence that COACH is perceived positively. Although most self-referrals initially identified symptoms of other mental health disorders as their primary reason for seeking help, these learners ultimately disclosed either a previous diagnosis or symptoms of ADHD as significant and impairing their lives.

The current study is limited by small sample size and being conducted at a single center, which may limit generalizability. Given the reliance on self-report for the majority of learners identified with ADHD, it is likely that the prevalence of ADHD in our sample is an underestimate of the true prevalence of ADHD among struggling residents and fellows. In addition, our study could not account for trainees who may have ADHD with symptoms that are managed and not affecting performance.

Future studies should explore earlier diagnosis and treatment of ADHD in medical learners, as well as the most effective treatment strategies and subsequent performance outcomes for ADHD and concomitant mental health issues. Of particular interest are the effects of untreated symptoms of ADHD on professionalism, widely viewed as the most challenging competency to remediate.

Conclusions

ADHD is a form of neurodiversity that is likely underrecognized and undertreated in struggling residents and fellows and affects clinical performance. In this retrospective review of a population of residents and fellows referred for remediation, ADHD was more prevalent than in the adult population, newly diagnosed in one-fifth of those with ADHD, and associated with organization issues, errors, and failure to engage.

References

1. Neurodevelopmental disorders. In: *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. American Psychiatric Association; 2022.
2. Williams OC, Prasad S, McCrary A, et al. Adult attention deficit hyperactivity disorder: a comprehensive review. *Ann Med Surg (Lond)*. 2023;85(5):1802-1810. doi:10.1097/MS9.0000000000000631
3. Ayano G, Tsegay L, Gizachew Y, et al. Prevalence of attention deficit hyperactivity disorder in adults: umbrella review of evidence generated across the globe. *Psychiatry Res*. 2023;328:115449. doi:10.1016/j.psychres.2023.115449
4. Peterson BS, Trampush J, Maglione M, et al. Treatments for ADHD in children and adolescents: a systematic review. *Pediatrics*. 2024;153(4):e2024065787. doi:10.1542/peds.2024-065787
5. Tuttle JP, Scheurich NE, Ranseen J. Prevalence of ADHD diagnosis and nonmedical prescription stimulant use in medical students. *Acad Psychiatry*. 2010;34(3):220-223. doi:10.1176/appi.ap.34.3.220
6. Meeks LM, Herzer KR. Prevalence of self-disclosed disability among medical students in US allopathic medical schools. *JAMA*. 2016;316(21):2271-2272. doi:10.1001/jama.2016.10544
7. Meeks LM, Case B, Herzer K, Plegue M, Swenor BK. Change in prevalence of disabilities and accommodation practices among US medical schools, 2016 vs 2019. *JAMA*. 2019;322(20):2022-2024. doi:10.1001/jama.2019.15372
8. Im DS, Tamarelli CM. Attention deficit hyperactivity disorder in medical learners and physicians and a potentially helpful educational tool. *Adv Med Educ Pract*. 2023;14:435-442. doi:10.2147/AMEP.S398196
9. Godfrey-Harris M, Shaw SCK. The experiences of medical students with ADHD: a phenomenological study. *PLoS One*. 2023;18(8):e0290513. doi:10.1371/journal.pone.0290513

10. Kessler RC, Adler L, Barkley R, et al. The prevalence and correlates of adult ADHD in the United States: results from the national comorbidity survey replication. *Am J Psychiatry*. 2006;163(4):716-723. doi:10.1176/ajp.2006.163.4.716
11. Volkow ND, Swanson JM. Clinical practice: adult attention deficit-hyperactivity disorder. *N Engl J Med*. 2013;369(20):1935-1944. doi:10.1056/NEJMc1212625
12. Meeks LM, Plegue M, Swenor BK, et al. The performance and trajectory of medical students with disabilities: results from a multisite, multicohort study. *Acad Med*. 2022;97(3):389-397. doi:10.1097/ACM.00000000000004510
13. Takakuwa KM, Ernst AA, Weiss SJ. Residents with disabilities: a national survey of directors of emergency medicine residency programs. *South Med J*. 2002;95(4):436-440.
14. Sapp RW, Sebok-Syer SS, Gisoni MA, Rotoli JM, Backster A, Poffenberger CM. The prevalence of disability health training and residents with disabilities in emergency medicine residency programs. *AEM Educ Train*. 2020;5(2):e10511. doi:10.1002/aet2.10511
15. Brower KJ. Professional stigma of mental health issues: physicians are both the cause and solution. *Acad Med*. 2021;96(5):635-640. doi:10.1097/ACM.0000000000003998
16. Elliott HW, Arnold EM, Brenes GA, Silvia L, Rosenquist PB. Attention deficit hyperactivity disorder accommodations for psychiatry residents. *Acad Psychiatry*. 2007;31(4):290-296. doi:10.1176/appi.ap.31.4.290
17. Warburton KM, Shahane AA. Mental health conditions among struggling GME learners: results from a single center remediation program. *J Grad Med Educ*. 2020;12(6):773-777. doi:10.4300/JGME-D-20-00007.1
18. Guerrasio J, Garrity MJ, Aagaard EM. Learner deficits and academic outcomes of medical students, residents, fellows, and attending physicians referred to a remediation program, 2006-2012. *Acad Med*. 2014;89(2):352-358. doi:10.1097/ACM.000000000000122
19. Warburton KM, Goren E, Dine CJ. Comprehensive assessment of struggling learners referred to a graduate medical education remediation program. *J Grad Med Educ*. 2017;9(6):763-767. doi:10.4300/JGME-D-17-00175.1
20. Mak-van der Vossen M, van Mook W, van der Burgt S, et al. Descriptors for unprofessional behaviours of medical students: a systematic review and categorization. *BMC Med Educ*. 2017;17(1):164. doi:10.1186/s12909-017-0997-x
21. Barkley RA, Fischer M, Smallish L, Fletcher KE. Young adult outcome of hyperactive children: adaptive functioning in major life activities. *J Am Acad Child Adolesc Psychiatry*. 2006;45(2):192-202. doi:10.1097/01.chi.0000189134.97436.e2
22. Matte B, Anselmi L, Salum GA, et al. ADHD in DSM-5: a field trial in a large, representative sample of 18- to 19-year-old adults. *Psychol Med*. 2015;45(2):361-373. doi:10.1017/S0033291714001470



Karen M. Warburton, MD, is Associate Professor of Medicine, Department of Medicine, University of Virginia Health, Charlottesville, Virginia, USA; **Joanna S. Yost, PhD**, is Assistant Professor, Department of Psychiatry and Neurobehavioral Sciences, University of Virginia Health, Charlottesville, Virginia, USA; **Stephanie D. Bajo, PsyD**, is Assistant Professor, Department of Psychiatry and Neurobehavioral Sciences, University of Virginia Health, Charlottesville, Virginia, USA; **James R. Martindale, PhD, MEd**, is Associate Professor of Medical Education, University of Virginia School of Medicine, Charlottesville, Virginia, USA; **Andrew S. Parsons, MD, MPH**, is Associate Professor of Medicine, Department of Medicine, University of Virginia Health, Charlottesville, Virginia, USA; and **Michael S. Ryan, MD, MEHP**, is Professor of Pediatrics, Department of Pediatrics, University of Virginia Health, Charlottesville, Virginia, USA.

Funding: The authors report no external funding source for this study.

Conflict of interest: The authors declare they have no competing interests.

This study was presented as a poster at the University of Virginia School of Medicine's Excellence in Education Week Poster Session, March 1, 2024, Charlottesville, Virginia, USA, and the Association for Medical Education in Europe Annual Meeting, August 24-28, 2024, Basel, Switzerland.

The authors would like to thank Diane Farineau, MS, Director of the Graduate Medical Education Office, University of Virginia Health, Charlottesville, Virginia, USA.

Corresponding author: Karen M. Warburton, MD, University of Virginia Health, Charlottesville, Virginia, USA, kmw2g@uvahealth.org

Received May 30, 2024; revision received August 14, 2024; accepted August 16, 2024.