



# Sex Differences in ADHD: Review and Priorities for Future Research

Dara E. Babinski<sup>1</sup>

Accepted: 26 January 2024 / Published online: 7 February 2024

© The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2024

## Abstract

**Purpose of review** In childhood, attention-deficit/hyperactivity disorder (ADHD) is diagnosed three to 16 times more frequently in males compared to females, yet in adulthood, nearly equivalent numbers of males and females are diagnosed with ADHD. Relatively few studies have prioritized examination of sex differences in ADHD even though sex differences may have critical implications for the identification and treatment of ADHD in females and males. This review highlights current research on sex differences in ADHD across the lifespan that has emerged from cross-sectional and prospective longitudinal studies of youth, adult-ascertained samples, and registry studies.

**Recent findings** Accumulating research suggests that both males and females with ADHD experience widespread impairment across the lifespan. Some evidence of sex differences emerged, although effects have generally been modest in size.

**Summary** Continued research that includes females and males with ADHD is needed to clarify the nature of sex differences in ADHD. Research that focuses on equitable identification of ADHD in males and females, disentangles the effects of sex and gender, probes underlying mechanisms of sex differences, and addresses the clinical impact of sex differences in ADHD must be prioritized.

**Keywords** Attention-deficit/hyperactivity disorder · ADHD · Sex · Sex differences

## Introduction

Attention-deficit/hyperactivity disorder (ADHD) is one of the most common childhood disorders, which is characterized by developmentally inappropriate levels of inattention and/or hyperactivity/impulsivity and widespread impairment in academic and social domains [1]. At least 11% of children in the United States are diagnosed with ADHD [2], and although estimates vary considerably (i.e., 3:1–16:1 male to female prevalence ratios; [3, 4]), the majority of youth diagnosed with ADHD are male. Male youth with ADHD are more likely than female youth to display hyperactive and impulsive behavior that may expedite referral and diagnosis [5, 6], and as a result, extant research on ADHD has historically been based on samples comprised predominantly or exclusively of male youth. Relatively little is known about females with ADHD and whether there are sex differences

in the etiology and course of the disorder. Sex differences in ADHD may have critical implications for the identification and treatment of ADHD in females and males. Accumulating research using various methodologies, including child-ascertained studies, prospective longitudinal studies, adult-ascertained studies, and registry studies, has explored sex differences in ADHD. This review highlights current research on sex<sup>1</sup> differences in ADHD in order to direct future research on this topic.

## Cross-Sectional Studies of Youth Diagnosed with ADHD in Childhood

Some of the earliest studies of sex differences in ADHD have emerged from childhood-ascertained samples of youth with ADHD. These studies have generally included very few females and have often been underpowered to detect significant sex effects. However, several meta-analytic reviews

✉ Dara E. Babinski  
dbabinski@pennstatehealth.psu.edu

<sup>1</sup> Department of Psychiatry and Behavioral Health, Penn State College of Medicine, 22 Northeast Drive, Hershey, PA 17033, USA

<sup>1</sup> Sex, rather than gender, is discussed as the differences between females and males with ADHD are posited to reflect a sex difference [4, 43]. While these terms are often used interchangeably, sex refers to biological differences between males and females whereas gender represents the social, cultural, and psychological traits of males and females [47].

have integrated cross-sectional findings across these studies [5–7] and helped to advance understanding of sex differences in childhood ADHD. With the exception of males displaying more hyperactive/impulsive behavior and aggression relative to females, meta-analytic findings of childhood ADHD have shown relatively few sex differences in symptom severity or impairment based on parent and teacher ratings. Overall, meta-analytic findings show that male and female youth with ADHD demonstrate profound impairment across academic, cognitive, behavioral, and social domains. Interestingly, some evidence also has emerged showing female youth experience greater impairment relative to male youth in other domains, including higher levels of inattention, lower intellectual functioning, and greater family adversity [5]. However, somewhat inconsistent findings have emerged in other areas of interest, including internalizing symptoms. A small effect showing greater internalizing symptoms among female versus male youth with ADHD emerged in one meta-analysis [6], although in the earlier meta-analysis [5], male youth from community samples demonstrated higher levels of internalizing symptoms relative to females within community samples; a sex effect did not emerge among clinic-referred youth.

Referral status has emerged as a moderator of sex differences in meta-analyses [5, 6]. A pattern emerged showing that ADHD was associated with less severe impairment in females relative to males within community samples, although in clinic-referred samples, females with ADHD demonstrated similar, if not more severe, impairment relative to males. This pattern of effects is consistent with the gender paradox, which posits that neurodevelopmental disorders, such as ADHD, while identified less frequently among females than males, are associated with greater dysfunction in females relative to males [8]. The relatively greater dysfunction reported among females with ADHD relative to males with the disorder in clinic-referred samples also calls attention to potential issues in the identification and diagnosis of ADHD in female youth. There is evidence that females with ADHD must demonstrate a relatively more severe pattern of symptoms and impairment compared to their male counterparts in order to be referred for diagnosis [9]. Parents and teachers, the primary informants for diagnosis of ADHD, have been shown to be less likely to identify ADHD symptoms in female youth compared to males, even when females and males present with the same ADHD symptoms [10, 11]. These sex-specific reporting issues may reflect limited familiarity with the female ADHD phenotype among parents and teachers, but also raise questions about whether current diagnostic criteria for ADHD are sufficiently sensitive to detect ADHD in females [9, 12].

According to the DSM-5-TR [1], diagnosis of ADHD requires that symptoms have emerged prior to the age of 12, a noted shift from previous editions of the DSM,

which had required symptoms to have emerged by age 7. It is likely this diagnostic change has contributed to the increasing numbers of female youth identified and treated with ADHD in recent years [13], as symptoms of ADHD may become more obvious among females during social and educational transitions that occur later in childhood [14]. Recent studies of female youth diagnosed with DSM-5 ADHD may reflect a more heterogeneous presentation of female ADHD compared to samples of female youth with ADHD included in past meta-analyses from more than 20 years ago. Thus, continued study of sex differences in DSM-5 diagnosed youth is needed to clarify the nature of sex differences in childhood ADHD.

### Prospective Longitudinal Studies of Youth Diagnosed with ADHD in Childhood

Sex differences have also been studied in several prospective longitudinal studies following youth diagnosed with childhood ADHD into adolescence and adulthood. Initial prospective longitudinal studies of ADHD have included both female and male youth [15–17] and similar to cross-sectional studies, show ongoing ADHD symptoms and widespread impairment that persist across the lifespan for both males and females. ADHD is a chronic disorder that persists into adulthood for the majority of individuals [18]. Additionally, new age-specific problems have been identified among female and male youth as they age into adolescence, including risky driving, intimate relationship problems, and financial dependence [19]. While there is some evidence that externalizing problems and substance use problems may be more relevant to males than females, these effects were not consistently reported [15, 20]. Similarly, there is also evidence that females diagnosed with ADHD in childhood demonstrate significantly greater internalizing problems and suicidality relative to males with ADHD and females without ADHD [16]. However, these effects have not always emerged [15] and may be affected by other clinical factors such as pubertal status [21]. Importantly, individuals in these studies had been diagnosed with ADHD in the 1980s and 1990s and very few females were included in these studies, limiting statistical power to detect sex differences.

Prospective longitudinal studies exclusively focused on females with and without childhood ADHD have also raised questions about potential sex differences in ADHD. These studies show that most females with childhood ADHD demonstrate profound impairment into adolescence and adulthood relative to females without childhood ADHD and have identified a number of areas of impairment that have not emerged as consistently from earlier prospective studies that have included mostly males with ADHD [22, 23]. These impairments include very high rates of depression and self-harm, earlier engagement in sexual behavior, and

intimate partner violence [23]. Additionally, higher rates of academic underachievement, unplanned pregnancy, and employment problems were identified among females with childhood ADHD compared to females without ADHD, and while these concerns have been identified in predominantly male samples, these problems may have differential consequences for females with ADHD compared to males with the disorder. Thus, continued study including males is needed to clarify the effects of sex on the longitudinal course of ADHD.

### Adult-Ascertained Studies of Women with ADHD

In adulthood, nearly equivalent numbers of females and males are identified with ADHD [24], offering additional opportunities to examine sex differences in the disorder. There has been an influx of popular books highlighting personal accounts of women with ADHD, which have raised questions about potentially unique difficulties associated with the disorder in females. However, empirical research on sex differences in adulthood is quite limited. Recent narrative reviews exploring sex differences in adults with ADHD suggest females with ADHD may have higher lifetime prevalence rates of anxiety, depression, somatic symptoms, and bulimia compared to males with ADHD; substance use disorder and antisocial behavior may be more often reported among males with ADHD compared to females with the disorder [20, 25]. There is also some evidence that females with ADHD may be more likely to have a childhood history of sexual abuse, higher rates of psychiatric admissions [20], and report more functional impairment [25]. However, these sex differences have primarily emerged using self-report rating scales, and have not clearly emerged using objective ratings, raising questions about the robustness of these effects. It may be that the self-reported differences reported between males and females reflect gender rather than sex differences [20, 25]. Regardless of ADHD status, women are more likely than men to disclose distress and seek treatment [26], behavior that is differentially socialized in females relative to males [27].

Recent accounts of parents with ADHD also raise questions about potential sex and/or gender differences in family functioning among mothers and fathers with ADHD. ADHD is highly heritable and it is estimated that at least 25–50% of youth with ADHD have a parent with the disorder [28]. Parents may first identify their own ADHD after learning about the disorder as their child is diagnosed, and this may be a particularly important opportunity for identification of adult females with ADHD, as mothers are more likely than fathers to be seek out diagnosis and treatment for their child [29] and more likely to seek treatment for themselves [26]. The majority of research on parental ADHD has focused on mothers with ADHD, while few studies have included samples sizes sufficient to test differences between mothers

and fathers. Maternal ADHD has been associated with ineffective parenting and negative child outcomes such as conduct problems [28]. Among youth offspring of women with ADHD, there is reduced efficacy of evidence-based treatments for youth with ADHD [30]. Although negative family outcomes have also been associated with paternal ADHD [28], there is some evidence that the effects of parental ADHD may be moderated by parental role. Mothers are more likely to shoulder the majority of parenting responsibilities within their household. Thus, the burden of parenting may be substantially greater for mothers with ADHD compared to fathers with ADHD. The effect of paternal ADHD on family functioning may be similar when fathers are actively involved in daily caregiving, but may be minimal when not involved [30]. Although these caregiving effects may be attributable to gender rather than sex, the underlying biological changes that occur in the transition to parenthood have received relatively little study among women with ADHD and may elucidate opportunities for treatment [31].

### Registry Studies Including Males and Females with ADHD

Large registry studies of population-based health care registries and insurance claims databases have also identified sex differences in ADHD, including higher rates of psychiatric burden and early mortality among females with ADHD relative to males [13, 32–34]. These studies are well powered to detect sex differences in ADHD and offer notable external validity as individuals with ADHD are included who do not necessarily self-select into traditional clinic- or community-based research studies. Additionally, these large registry studies allow for study of sex differences across development. For example, a recent study using a Swedish population registry that included 37,591 females identified with a diagnosis of ADHD showed that females were diagnosed approximately four years later than males with the disorder [34]. Females with ADHD had higher rates of psychiatric comorbidity, pharmacological treatment, and health care utilization when compared with males with ADHD and females without ADHD, and these effects were identified prior to being diagnosed with ADHD as well as after being diagnosed with ADHD. As another exemplar, a recent report from the Centers for Disease Control and Prevention using insurance claims data showed that stimulant prescription use rose exponentially from 2020 to 2021, particularly among women [13]. These data may suggest improved access to care for females with ADHD, although insurance claims data lack important diagnostic and contextual detail raising questions about whether the women who received treatment for ADHD actually had a valid diagnosis of ADHD.

## Conclusion

This review integrates studies of sex differences in ADHD that have emerged across child- and adult-ascertained studies, prospective longitudinal, and large-scale registry studies. Despite marked variation in the methods used in these studies, converging findings highlight profound and widespread impairment associated with ADHD in females and males challenging the historical notion that ADHD is a male disorder. Some evidence of sex differences emerged, although effects have generally been modest in size. Several clinical research priorities to advance sex differences research in ADHD are described below.

### Priority #1: Research on Identification of ADHD in Females

Research focused on early detection of ADHD in females must be prioritized. Although nearly equivalent numbers of males and females are diagnosed with ADHD by adulthood [24], males are identified at least three to 16 times more frequently than females in childhood [3, 4]. ADHD is a disorder purported to emerge prior to the age of 12 years old [1]. Thus, opportunities for early intervention may be disproportionately missed for females. The consequences of later diagnosis are not well understood. However, emerging research on the adult functioning of females with ADHD suggest profound social dysfunction, low self-esteem, and depression [35]. These co-occurring problems may emerge as a result of missed opportunities to address ADHD earlier in development. These co-occurring issues may also co-occur with ADHD in females across development, complicating diagnosis of ADHD.

The sudden uptick in stimulant use for adult females [13, 36] in 2020–2021 during the height of the COVID-19 pandemic has also raised questions about accurate assessment of ADHD in females. During that time, digital startups prescribing stimulants online emerged prominently, and it is unknown whether evidence-based practices were used to diagnose ADHD [37]. A rise in relatable social media content emerging from the neurodiversity movement may have also led females to self-identify with ADHD and subsequently advocate for diagnosis and treatment. Yet misinformation about ADHD is rampant online [38], which may propagate misdiagnosis.

### Priority #2: Disentangling the Effects of Sex and Gender

When sex differences in ADHD have emerged, they have been relatively modest in size, and have often emerged in

social and affective domains. Notably, evidence of social and affective dysfunction in female with ADHD has emerged across child- and adult-ascertained samples [6, 25], prospective longitudinal work [16, 23, 39], and registry studies [13, 32, 34]. However, it is possible social and affective distress among females in child focused studies reflect potentially distinct processes from adult focused studies. For example, higher rates of suicidal behavior among females with childhood ADHD relative to males with the disorder may reflect a biological (i.e., sex-based) difference [40]. On the other hand, high rates of depression in adult-ascertained samples of women with ADHD may reflect gender-based social norms that emphasize seeking treatment in females rather than males [26, 27] or demoralization related to being misunderstood and/or misdiagnosed for years. It is critical that this work address unique female developmental milestones, including pubertal development, pregnancy, and menopause, which have largely been unstudied among females with ADHD. Some emerging work suggests these developmental milestones may impact the expression of ADHD symptoms and related impairment in females [21, 41].

### Priority #3: Mechanisms Underlying Sex Differences

The majority of studies reviewed examined sex differences in symptoms and psychosocial impairment measured using self-report questionnaires, collected from parents, teachers, and individuals with ADHD themselves. However, self-report methodology is limited in advancing understanding of mechanisms underlying potential sex differences in ADHD. Neurocognitive, genetic, brain imagining, and hormonal mechanisms have been proposed to as potential mechanisms underlying sex differences in ADHD. To date, there has been a lack of consistent findings in studies examining sex differences in neurocognitive, genetic, brain imaging, and hormonal mechanisms [42]. However, this work has the potential to advance sex differences research in ADHD. For example, Arnett and colleagues [43] found that sex differences in the prevalence of ADHD can be explained by differences in the mean and variance of cognitive performance between female and male youth. More research examining sex differences across levels of analysis may help to further clarify the nature of sex differences in ADHD.

### Priority #4: Clinical Translation of Sex Differences Research

It is important that studies examining sex differences in ADHD inform interventions for females and males with ADHD. To date, studies that have examined potential sex differences in response to evidence-based treatment for ADHD have not identified meaningful differences [44, 45]. However, accumulating research showing higher rates of

psychiatric comorbidity and treatment utilization among females with ADHD, yet lower rates of treatment for ADHD [13, 34], suggest additional research is needed to enhance existing interventions for females with ADHD [46]. Participatory research may hold particular promise in ensuring that sex differences research is clinically meaningful. Participatory research seeks to actively involve stakeholders in research planning and design to ensure that research is aligned with and reflects the values, priorities, and interests of those being studied.

**Acknowledgements** This work was supported by R21-MH125052 and R21-MH124027.

**Author Contributions** DEB completed all aspects of this manuscript.

**Data Availability** Not applicable as this is a review.

## Declarations

**Competing Interests** DEB has received research support from Super-nus Pharmaceuticals, Inc. unrelated to this work.

## References

- American Psychiatric Association, Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR). 2022.
- Visser SN, et al. Trends in the parent-report of health care provider-diagnosed and medicated attention-deficit/hyperactivity disorder: United States, 2003–2011. *J Am Acad Child Adolesc Psychiatry*. 2014;53(1):34–46.e2. <https://doi.org/10.1016/j.jaac.2013.09.001>.
- Nøvik TS, et al. Influence of gender on attention-deficit/hyperactivity disorder in Europe – ADORE. *Eur Child Adolesc Psychiatry*. 2006; 15 SUPPL. 1. <https://doi.org/10.1007/s00787-006-1003-z>.
- Hartung CM, Lefler EK. Sex and gender in psychopathology: DSM-5 and beyond. *Psychol Bull*. 2019;145(4):390–409. <https://doi.org/10.1037/bul0000183>.
- Gaub M, Carlson CL. Gender differences in ADHD: A meta-analysis and critical review. *J Am Acad Child Adolesc Psychiatry*. 1997;36(8):1136–9. <https://doi.org/10.1097/00004583-199708000-00023>.
- Gershon J. Gender Differences in ADHD Meta-Analytic Review of Gender differences in ADHD. *J. Atten Disord*. pp. 143–154, 2013. <https://doi.org/10.1177/108705470200500302>.
- LoyerCarbonneau M, Demers M, Bigras M, Guay MC. Meta-Analysis of Sex Differences in ADHD Symptoms and Associated Cognitive Deficits. *J Atten Disord*. 2021;25(12):1640–56. <https://doi.org/10.1177/1087054720923736>.
- Eme RF. Selective Female Affliction in the Developmental Disorders of Childhood: A Literature Review. *J Clin Child Psychol*. 1992;21(4):354–64.
- Waschbusch DA, King S. Should sex-specific norms be used to assess attention-deficit/hyperactivity disorder or oppositional defiant disorder? *J Consult Clin Psychol*. 2006;74(1):179–85. <https://doi.org/10.1037/0022-006X.74.1.179>.
- Bruchmüller K, Margraf J, Schneider S. Is ADHD diagnosed in accord with diagnostic criteria? Overdiagnosis and influence of client gender on diagnosis. *J Consult Clin Psychol*. 2012;80(1):128–38. <https://doi.org/10.1037/a0026582>.
- Ohan JL, Visser TAW. Why is there a gender gap in children presenting for attention deficit/hyperactivity disorder services? *J Clin Child Adolesc Psychol*. 2009;38(5):650–60. <https://doi.org/10.1080/15374410903103627>.
- Babinski D, Shroff DM, Cao VT, Waschbusch DA. Sex-Specific Norms for Diagnosing Attention-Deficit/Hyperactivity Disorder in Childhood: A Receiver Operating Characteristic (ROC) Analysis. *Evidence-Based Pract Child Adolesc Ment Heal*. 2021;6(2):290–301. <https://doi.org/10.1080/23794925.2021.1875343>.
- Danielson ML, et al. Trends in Stimulant Prescription Fills Among Commercially Insured Children and Adults – United States, 2016–2021. *MMWR Morb Mortal Wkly Rep*. 2023;72(13):327–32. <https://doi.org/10.15585/mmwr.mm7213a1>.
- Young S, et al. Females with ADHD: An expert consensus statement taking a lifespan approach providing guidance for the identification and treatment of attention-deficit/hyperactivity disorder in girls and women. *BMC Psychiatry*. 2020;20(1):1–27. <https://doi.org/10.1186/s12888-020-02707-9>.
- Babinski DE, et al. Women with childhood ADHD: Comparisons by diagnostic group and gender. *J Psychopathol Behav Assess*. 2011;33(4):420–9. <https://doi.org/10.1007/s10862-011-9247-4>.
- Chronis-Tuscano A, et al. Very early predictors of adolescent depression and suicide attempts in children with attention-deficit/hyperactivity disorder. *Arch Gen Psychiatry*. 2010;67(10):1044–51. <https://doi.org/10.1001/archgenpsychiatry.2010.127>.
- Lee SS, Lahey BB, Owens EB, Hinshaw SP. Few preschool boys and girls with ADHD are well-adjusted during adolescence. *J Abnorm Child Psychol*. 2008;36(3):373–83. <https://doi.org/10.1007/s10802-007-9184-6>.
- Sibley MH, et al. When diagnosing ADHD in young adults emphasize informant reports, DSM items, and impairment. *J Consult Clin Psychol*. 2012;80(6):1052–61. <https://doi.org/10.1037/a0029098>.
- Barkley RA. Attention-deficit/hyperactivity disorder: A handbook for diagnosis and treatment. 4th ed. New York: Guilford Press; 2015.
- Rucklidge JJ. Gender Differences in Attention-Deficit/Hyperactivity Disorder. *Psychiatr Clin North Am*. 2010;33(2):357–73. <https://doi.org/10.1016/j.psc.2010.01.006>.
- Babinski DE, Waschbusch DA, Waxmonsky JG. Sex and Pubertal Status Moderate the Association between ADHD and Depression Symptoms: An Examination From Preadolescence Through Late Adolescence. *J Clin Psychiatry*. 2019;80(3):19404. <https://doi.org/10.4088/JCP.18m12548>.
- Biederman J, et al. Clinical correlates of ADHD in females: Findings from a Large Group of Girls Ascertained from Pediatric and Psychiatric Referral Sources. *J Am Acad Child Adolesc Psychiatry*. 1999;38:966–75.
- Hinshaw SP, Nguyen PT, O’Grady SM, Rosenthal EA. Annual Research Review: Attention-deficit/hyperactivity disorder in girls and women: underrepresentation, longitudinal processes, and key directions. *J Child Psychol Psychiatry Allied Discip*. 2022;63(4):484–96. <https://doi.org/10.1111/jcpp.13480>.
- Kessler RC, 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):716–23. <https://doi.org/10.1176/appi.ajp.163.4.716>.
- Williamson D, Johnston C. Gender differences in adults with attention-deficit/hyperactivity disorder: A narrative review. *Clin Psychol Rev*. 2015;40:15–27. <https://doi.org/10.1016/j.cpr.2015.05.005>.
- Saunders EFH, et al. Gender differences in transdiagnostic domains and function of adults measured by DSM-5 assessment scales at the first clinical visit: a cohort study. *BMC Psychiatry*. 2023;23(1):709. <https://doi.org/10.1186/s12888-023-05207-8>.
- Garside RB, Klimes-Dougan B. Socialization of discrete negative emotions: Gender difference and links with psychological

- distress. *Sex Roles*. 2022;47:115–28. <https://doi.org/10.1023/A:1021090904785>.
28. Johnston C, Mash EJ, Miller N, Ninowski JE. Parenting in adults with attention-deficit/hyperactivity disorder (ADHD). *Clin Psychol Rev*. 2012;32(4):215–28. <https://doi.org/10.1016/j.cpr.2012.01.007>.
  29. Fabiano GA. Father Participation in Behavioral Parent Training for ADHD: Review and Recommendations for Increasing Inclusion and Engagement. *J Fam Psychol*. 2007;21(4):683–93. <https://doi.org/10.1037/0893-3200.21.4.683>.
  30. Chronis-Tuscano A, Wang CH, Woods KE, Strickland J, Stein MA. Parent ADHD and Evidence-Based Treatment for Their Children: Review and Directions for Future Research. *J Abnorm Child Psychol*. 2017;45(3):501–17. <https://doi.org/10.1007/s10802-016-0238-5>.
  31. Hantsoo L, Kornfield S, Anguera MC, Epperson CN. Inflammation: A Proposed Intermediary Between Maternal Stress and Offspring Neuropsychiatric Risk. *Biol Psychiatry*. 2019;85(2):97–106. <https://doi.org/10.1016/j.biopsych.2018.08.018>.
  32. Babinski DE, Neely KA, Ba DM, Liu G. Depression and suicidal behavior in young adult men and women with ADHD: Evidence from claims data. *J Clin Psychiatry*. 2020;81(6):19m13130. <https://doi.org/10.4088/JCP.19m13130>.
  33. Dalsgaard S, Ostergaard SD, Leckman JF, Mortensen PB, Pedersen MG. Mortality in children, adolescents, and adults with attention deficit hyperactivity disorder: A nationwide cohort study. *Lancet*. 2015;385(9983):2190–6. [https://doi.org/10.1016/S0140-6736\(14\)61684-6](https://doi.org/10.1016/S0140-6736(14)61684-6).
  34. Skoglund C, et al. Time After Time: Failure to Identify and Support Females With ADHD – A Swedish population register study. *J Child Psychol Psychiatry*. 2023. <https://doi.org/10.1111/jcpp.13920>.
  35. Babinski DE, Libsack EJ. A Participatory Research Approach to Improve Clinical Care for Women with ADHD. Penn State College of Medicine: Manuscript submitted for publication; 2024.
  36. Sibley MH, Faraone SV, Nigg JT, Surman CBH. Sudden Increases in U.S. Stimulant Prescribing: Alarming or Not? *J Atten Disord*. 2023;27(6):571–4. <https://doi.org/10.1177/10870547231164155>.
  37. Sibley MH, Mitchell JT, Becker SP. Method of adult diagnosis influences estimated persistence of childhood ADHD : a systematic review of longitudinal studies. *Lancet Psychiatry*. 2020;3(12):1157–65. [https://doi.org/10.1016/S2215-0366\(16\)30190-0](https://doi.org/10.1016/S2215-0366(16)30190-0).
  38. Yeung A, Ng E, Abi-Jaoude E. TikTok and Attention-Deficit/Hyperactivity Disorder: A Cross-Sectional Study of Social Media Content Quality. *Can J Psychiatry*. 2022;67(12):899–906. <https://doi.org/10.1177/07067437221082854>.
  39. Biederman J, et al. New Insights Into the Comorbidity Between ADHD and Major Depression in Adolescent and Young Adult Females. *J Am Acad Child Adolesc Psychiatry*. 2008;47(4):426–34. <https://doi.org/10.1097/CHI.0b013e31816429d3>.
  40. Beauchaine TP, Hinshaw SP, Bridge JA. Nonsuicidal Self-Injury and Suicidal Behaviors in Girls: The Case for Targeted Prevention in Preadolescence. *Clin Psychol Sci*. 2019;7(4):643–67. <https://doi.org/10.1177/2167702618818474>.
  41. Camara B, Padoin C, Bolea B. Relationship between sex hormones, reproductive stages and ADHD: a systematic review. *Arch Womens Ment Health*. 2022;25(1):1–8. <https://doi.org/10.1007/s00737-021-01181-w>.
  42. Greven JK, Richards CU, Buitelaar JS. Sex differences in ADHD. In: Banaschewski T, Coghill D, Zuddas A, editors. *Oxford textbook of attention deficit hyperactivity disorder*. Oxford: Oxford Academic; 2018. p. 154–60.
  43. Arnett AB, Pennington BF, Willcutt EG, Defries JC, Olson RK. Sex differences in ADHD symptom severity. *J Child Psychol Psychiatry Allied Discip*. 2015;56(6):632–9. <https://doi.org/10.1111/jcpp.12337>.
  44. Pelham WE, Walker JL, Sturges J, Hoza J. Comparative Effects of Methylphenidate on ADD Girls and ADD Boys. *J Am Acad Child Adolesc Psychiatry*. 1989;28(5):773–6. <https://doi.org/10.1097/00004583-198909000-00021>.
  45. Mikami AY, Cox DJ, Davis MT, Wilson HK, Merkel RL, Burket R. Sex differences in effectiveness of extended-release stimulant medication among adolescents with attention-deficit/hyperactivity disorder. *J Clin Psychol Med Settings*. 2009;16(3):233–42. <https://doi.org/10.1007/s10880-009-9165-8>.
  46. Babinski DE, Mills Huffnagle S, Bansal PS, Breaux RP, Waschbusch DA. Behavioral Treatment for the Social-Emotional Difficulties of Preadolescent and Adolescent Girls with ADHD. *Evidence-Based Pract Child Adolesc Ment Heal*. 2020;5(2):1–16. <https://doi.org/10.1080/23794925.2020.1759470>.
  47. Potter AS, et al. Measurement of Gender and Sexuality in the Adolescent Brain Cognitive Development (ABCD) Study. *Dev Cogn Neurosci*. 2022;53:101057. <https://doi.org/10.1016/j.dcn.2022.101057>.

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.