



Current Advances in Female ADHD:
A Comprehensive Overview

By Alan Cross

ADHD Heroines and the Hormonal Frontier, a light hearted tale to begin.

In a world where superheroes wear lab coats and wield research papers as their weapons, a new chapter unfolds in the epic saga of female empowerment: "The ADHD Chronicles: Unveiling the Cosmic Powers Within." Just imagine a world where the extraordinary powers of females with ADHD remain shrouded in mystery, their true potential totally unrecognized, underestimated and misunderstood. Well my friends, In this tale, hormonal fluctuations play the role of the elusive cloak, masking symptoms and confounding diagnosis. But fear not, for our heroines refuse to be confined by labels and stereotypes.

As our heroines journey through the labyrinth of adulthood, they encounter the formidable challenges of perimenopause and menopause. Like phoenixes rising from the ashes, they discover that hormonal changes can awaken dormant adversaries, such as 'adult-onset' ADHD. But armed with knowledge learned from the oracle Tik Tok, they harness their inner strength to conquer cognitive obstacles and rewrite their destinies.

In the quest for balance, our heroines navigate the treacherous terrain of treatment options. With wisdom as their compass, they embark on a quest to decipher the ancient scrolls of hormonal influences. Armed with the power of understanding, they forge alliances with healers and practitioners, crafting personalized strategies to reclaim their vitality.

In the annals of history, females with ADHD have long been relegated to the shadows of neglect. But the winds of change are stirring, beckoning researchers to illuminate the path ahead. Through the looking glass of curiosity, they embark on a quest to unravel the mysteries of hormonal alchemy and its impact on the female psyche. Behold the power of knowledge, a beacon of light illuminating the darkness of misunderstanding. Through the art of psychoeducation, our heroines wield the sword of awareness, vanquishing ignorance and paving the way for recognition and acceptance.

Meanwhile, In the laboratory of possibility, women scientists embark on a daring expedition to unlock the secrets of hormone replacement therapy. With each discovery, they inch closer to a future where cognitive and emotional liberation knows no bounds. One truth remains resolute: the resilience and tenacity of the human spirit. In a world fraught with challenges, the journey towards understanding and acceptance is filled with peril. But, with courage as our compass, and unity as our shield, we stand on the precipice of a new dawn—one where diversity is celebrated, and every voice is heard.

Current Advances in Female ADHD : A Comprehensive Overview

Abstract

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by persistent patterns of inattention, hyperactivity, and impulsivity. Historically, ADHD has been regarded as a predominantly male disorder, with females often being underrepresented in research and clinical settings. However, recent studies have shed light on the unique presentation of ADHD in females, highlighting the importance of recognizing and addressing gender-specific symptoms and challenges. This comprehensive review delves into the latest research on female ADHD, examining the epidemiology, clinical characteristics, neuropsychological profiles, comorbidities, and treatment considerations specific to females. By elucidating the complexities of female ADHD, this review aims to enhance awareness, diagnosis, and management of ADHD in girls and women.

Introduction

ADHD is one of the most common neurodevelopmental disorders affecting children and adults worldwide. Characterized by core symptoms of inattention, hyperactivity, and impulsivity, ADHD has traditionally been studied and described through a predominantly male lens. However, growing evidence suggests that females with ADHD may present with distinctive symptomatology, developmental trajectories, and comorbidities compared to males. In recent years, there has been a surge in research focusing on female ADHD, aiming to unravel the unique characteristics and challenges faced by girls and women with this disorder. This review synthesizes the latest findings on female ADHD, encompassing epidemiological trends, clinical phenotypes, neuropsychological profiles, comorbid conditions, and treatment outcomes in females.

Epidemiology of Female ADHD

Historically, ADHD has been more commonly diagnosed in males, leading to a significant gender disparity in research and clinical practice. However, emerging research suggests a more balanced gender distribution of ADHD than previously assumed. While the overall prevalence of ADHD may be higher in males, females are increasingly being recognized as a substantial portion of individuals affected by the disorder. Recent epidemiological studies have highlighted the need to consider gender-specific factors in the identification and diagnosis of ADHD in females.

One of the key challenges in estimating the prevalence of female ADHD lies in the variability of symptom expression and diagnostic criteria across different age groups. Early research often overlooked the inattentive presentation of ADHD, which may be more prevalent in females, leading to underdiagnosis and misdiagnosis in girls and women. Studies have shown that while males are more likely to exhibit hyperactive-impulsive behaviours, females with ADHD tend to present with internalizing symptoms such as inattention, disorganization, and emotional dysregulation.

A recent meta-analysis by Quinn and Madhoo (2014) examined gender differences in ADHD prevalence across various age groups. The analysis revealed that the male-to-female ratio of ADHD diagnosis decreases with age, with a more equal distribution in adulthood. Moreover, the study highlighted that females with ADHD are more likely to experience internalizing symptoms, leading to higher rates of anxiety, depression, and eating disorders compared to their male counterparts.

In addition to the traditional symptom domains of ADHD, research has also identified gender-specific risk factors and protective factors that may influence the manifestation of ADHD in females. For instance, studies have suggested that hormonal fluctuations, puberty, and social expectations can impact the expression of ADHD symptoms in girls and women. Understanding these sex-specific factors is crucial for improving the early detection and tailored management of female ADHD.

Clinical Characteristics of Female ADHD

The clinical presentation of ADHD in females is characterized by a diverse array of symptoms that may differ from the classic hyperactive-impulsive presentation commonly associated with the disorder. Research has uncovered several unique features of female ADHD that warrant special attention in clinical practice and research settings.

1. Inattentive Symptoms:

Females with ADHD are more likely to exhibit predominantly inattentive symptoms, such as forgetfulness, distractibility, and difficulties in organization and time management. These symptoms, often internalized and less overt than hyperactivity, may lead to academic underachievement, low self-esteem, and emotional dysregulation in girls and women with ADHD.

2. Cognitive Profiles:

Neuropsychological studies have revealed distinct cognitive profiles in females with ADHD, including deficits in executive functions, working memory, and processing

speed. Girls with ADHD may demonstrate compensatory strategies to cope with their cognitive challenges, masking their difficulties and leading to late or missed diagnoses

3. Emotional Dysregulation:

Emotional dysregulation is a prominent feature of female ADHD, characterized by mood swings, irritability, emotional lability, and sensitivity to rejection. Research has shown that females with ADHD are at increased risk of developing mood disorders, anxiety disorders, and self-harming behaviours due to difficulties in regulating their emotions.

4. Social Challenges:

Females with ADHD often face unique social challenges related to peer relationships, social skills, and self-perception. Research indicates that girls with ADHD may be more prone to rejection by peers, social isolation, and internalizing behaviour, contributing to the development of comorbid emotional and behavioral disorders.

By delineating the nuanced clinical characteristics of female ADHD, clinicians can enhance their diagnostic acumen and provide tailored interventions to address the specific needs of girls and women with ADHD.

Neuropsychological Profiles in Female ADHD:

Neuroimaging and neuropsychological studies have provided valuable insights into the underlying brain mechanisms and cognitive deficits associated with ADHD in females. While the neurobiological underpinnings of ADHD are complex and multifaceted, recent research has highlighted several key findings pertaining to the neuropsychological profiles of females with ADHD.

1. Structural Brain Differences:

Neuroimaging studies have identified structural brain differences in females with ADHD, particularly in regions implicated in attention, executive functions, and emotional processing. Differences in cortical thickness, white matter integrity, and brain volume have been observed in girls and women with ADHD compared to neurotypical individuals, suggesting aberrant neurodevelopmental trajectories in the disorder.

2. Functional Brain Connectivity:

Disruptions in functional brain connectivity have been documented in females with ADHD, leading to impairments in cognitive control, response inhibition, and reward processing. Altered connectivity patterns in the default mode network, executive control

network, and salience network have been linked to the core symptoms of ADHD in females, highlighting the neurofunctional basis of the disorder.

3. Neuropsychological Deficits:

Girls and women with ADHD exhibit a range of neuropsychological deficits, including impairments in inhibitory control, sustained attention, working memory, and cognitive flexibility. These deficits contribute to difficulties in academic performance, social interactions, and emotional regulation in females with ADHD.

4. Compensatory Mechanisms:

Despite these cognitive challenges, research suggests that females with ADHD may employ compensatory strategies to manage their symptoms and cognitive deficits. From utilizing external aids to developing internal coping mechanisms, girls and women with ADHD demonstrate adaptive strategies to navigate daily tasks and challenges.

By elucidating the neuropsychological underpinnings of female ADHD, researchers can enhance their understanding of the heterogeneous nature of the disorder and pave the way for personalized interventions targeting cognitive deficits and brain dysfunction in females.

Comorbid Conditions in Female ADHD:

ADHD rarely occurs in isolation and is frequently associated with a range of comorbid psychiatric and developmental conditions that can further complicate the diagnosis and management of the disorder. In females with ADHD, the prevalence of comorbidities is substantially high, underscoring the need for comprehensive assessment and integrated treatment approaches to address the complex presentation of these individuals.

1. Mood Disorders:

Females with ADHD are at increased risk of developing mood disorders, such as depression and bipolar disorder. The interplay between ADHD symptoms and mood dysregulation can contribute to emotional instability, irritability, and poor self-esteem in girls and women with ADHD. Research has shown that early identification and treatment of mood disorders are essential for improving the overall outcomes and quality of life in females with ADHD.

2. Anxiety Disorders:

Anxiety disorders are commonly co-occurring with ADHD in females, leading to heightened levels of worry, fear, and avoidance behaviours. Girls with ADHD may

experience social anxiety, generalized anxiety, or panic attacks in addition to their core ADHD symptoms, necessitating targeted interventions to address both conditions concurrently.

3. Eating Disorders:

Eating disorders, such as anorexia nervosa, bulimia nervosa, and binge eating disorder, have been found to be more prevalent in females with ADHD compared to the general population. The complex interplay between impulsivity, emotional dysregulation, and distorted body image may contribute to the development and maintenance of eating disorders in girls and women with ADHD.

4. Substance Use Disorders:

Females with ADHD are at an increased risk of engaging in substance use and misuse behaviours, including alcohol, nicotine, and illicit drugs. The self-medication hypothesis posits that individuals with ADHD may use substances to alleviate their symptoms or cope with emotional distress, highlighting the importance of early intervention and substance abuse prevention in females with ADHD.

5. Learning Disabilities:

Learning disabilities, such as dyslexia, dyscalculia, and auditory processing disorder, are frequently comorbid with ADHD in females. The presence of comorbid learning disabilities can exacerbate academic difficulties, impair cognitive functioning, and hinder the educational attainment of girls and women with ADHD. Comprehensive psychoeducational assessments are essential for identifying and addressing learning challenges in females with ADHD.

6. Sensory Processing Issues:

Sensory processing issues, including sensory sensitivities, sensory seeking behaviours, and sensory overload, are commonly reported in females with ADHD. Difficulties in regulating sensory input can impact attention, arousal levels, and emotional responses in girls and women with ADHD, highlighting the need for sensory-based interventions in the management of female ADHD.

By recognizing and addressing the complex web of comorbid conditions in females with ADHD, clinicians can provide more holistic and targeted interventions to improve the overall functioning and well-being of these individuals.

Treatment Considerations for Female ADHD:

Effective management of female ADHD requires a multimodal treatment approach that combines pharmacological, psychological, educational, and psychosocial interventions tailored to the specific needs and challenges of girls and women with the disorder. Recent research has advanced our understanding of evidence-based treatments for female ADHD, emphasizing the importance of personalized care and holistic support for optimal outcomes.

1. Pharmacological Interventions:

Stimulant medications, such as methylphenidate and amphetamines, are among the first-line treatments for ADHD in females. Recent studies have shown that stimulant medications are effective in reducing ADHD symptoms, improving cognitive functioning, and enhancing executive control in girls and women with the disorder. Non-stimulant medications, such as atomoxetine and guanfacine, have also been found to be beneficial in addressing ADHD symptoms in females with comorbid conditions or intolerances to stimulants.

2. Psychological Therapies:

Cognitive-behavioral therapy (CBT), behavioral interventions, and psychoeducation can play a crucial role in the treatment of female ADHD. CBT strategies targeting executive functions, emotional regulation, organizational skills, and social skills have been shown to reduce ADHD symptoms and improve adaptive functioning in girls and women with the disorder. Parent training programs and family therapy can also be beneficial in enhancing familial support and communication in the management of female ADHD.

3. Educational Support:

Educational accommodations, such as individualized education plans (IEPs), classroom modifications, and academic accommodations, are essential for addressing the learning challenges of girls with ADHD. Early intervention programs focusing on literacy, numeracy, and study skills can help improve academic performance and self-confidence in females with ADHD. Collaborative approaches involving teachers, parents, and healthcare providers are crucial for implementing effective educational support for girls and women with ADHD.

5. Mindfulness and Self-Regulation Techniques:

Mindfulness-based interventions, relaxation techniques, and self-regulation strategies can be valuable adjuncts to traditional ADHD treatments in females. Mindfulness practices have been shown to enhance attentional control, emotional awareness, and

self-compassion in girls and women with ADHD, promoting resilience and well-being in the face of everyday challenges.

6. Parenting Strategies:

Parenting interventions focusing on positive reinforcement, clear communication, consistent routines, and effective discipline can significantly impact the outcomes of female ADHD. Parent-child interaction therapy (PCIT), parent management training (PMT), and behaviour management techniques have been shown to reduce disruptive behaviours, enhance parental efficacy, and strengthen parent-child relationships in families affected by ADHD.

By integrating these evidence-based treatments and strategies into a comprehensive care plan, clinicians can optimize the outcomes and quality of life of girls and women with ADHD, empowering them to thrive academically, socially, and emotionally.

Where are we in 2024?

“Female ADHD isn’t just a watered-down version of male ADHD. In fact, research suggests that ADHD may be even more challenging for women than for men.” — Lotta Borg Skoglund, M.D., Ph.D.

Much of our understanding of ADHD comes from studies involving men and boys. However, our knowledge about ADHD in women is relatively scant, though the existing research is concerning.

Women with ADHD experience higher levels of psychological distress, anxiety, depression, insomnia, and eating disorders compared to men with the condition. They are more prone to low self-esteem, self-harm, difficulties in social relationships, and emotional instability than their male counterparts. For many women, ADHD symptoms worsen significantly due to hormonal fluctuations each month. Additionally, women with ADHD face increased risks of unintended pregnancy and sexual assault.

Arguably, women experience more severe ADHD symptoms and face more serious consequences than men with the condition. Yet, societal expectations based on gender and medical biases often lead them to conceal their symptoms. Many women avoid seeking help due to overwhelming shame stemming from perceived failures. Even if they do seek evaluation, women often feel compelled to provide extensive evidence of symptoms for healthcare professionals to take them seriously and consider an ADHD diagnosis.

Consequently, untreated ADHD in women leads to accumulating negative outcomes. A 2021 study revealed that girls with ADHD had more psychiatric care visits before diagnosis, were more frequently prescribed non-ADHD medications (such as antidepressants) both before and after diagnosis, and received referrals for evaluation and diagnosis at older ages compared to boys. As a result, they remained undiagnosed and untreated for longer periods.

What accounts for this gender disparity? Uneven medical research, in part, reinforces gender stereotypes and overlooks crucial aspects of ADHD in women that could enhance treatment.

“Untreated or inadequately managed ADHD in women can result in adverse long-term consequences, including academic underperformance, unemployment, relationship difficulties, inappropriate treatment, and higher risks of substance abuse and mental health disorders,” Dawn K. Brown, M.D. “Further research into these areas is essential. By conducting thorough investigations into the gender-specific manifestations and impacts of ADHD, healthcare professionals, policymakers, and advocates can foster greater awareness, comprehension, and tailored support for women with ADHD.”

Concerning ADHD, approximately 80% of participants in crucial early studies were male, with 29% exclusively studying boys. As a result, the symptom criteria in the DSM-5 fail to encompass many key characteristics specific to ADHD in women, such as

- decreased self-esteem
- greater difficulty in peer relationships
- increased likelihood of anxiety and other mood disorders

Andrea Chronis-Tuscano, Ph.D., noted in a 2022 review, “Our understanding and clinical approach to ADHD were predominantly shaped by studies on elementary school-aged boys.”

The diagnostic criteria do not reflect the lived experiences of women with ADHD due to their significant absence from research studies. Consequently, these patients often go undiagnosed and believe that something is inherently wrong with them that cannot be explained or treated.

“For decades, girls and women with ADHD have missed out on crucial interventions to manage their symptoms,” says Julia Schechter, Ph.D., of the Duke Centre for Girls and Women with ADHD. “A primary reason for overlooking or misidentifying girls and women with ADHD is the exclusion of these populations from ADHD research studies. Consequently, researchers have predominantly conceptualised ADHD based on the male presentation, leading many clinicians who assess and treat ADHD to be unaware of the different symptom presentations that girls and women may exhibit.”

Girls and women with untreated or undertreated ADHD, or those misdiagnosed with other conditions, face increased risks of depression, anxiety, intimate partner victimisation, and engaging in risky sexual behaviours resulting in teenage and unplanned pregnancies. They are twice as likely to engage in self-harm and significantly more likely to attempt suicide.

“Research specifically focused on girls and women with ADHD is not only a matter of fairness,” Schechter emphasises, “but a life-or-death issue for some girls and women.”

Prioritising Gender Equity in Research More broadly, governmental and research agencies are beginning to acknowledge the serious ramifications of gender bias in health research. In late 2023, First Lady Jill Biden, Ed.D., established the White House Initiative on Women’s Health Research and promptly announced \$100 million in funding for women’s health research to be conducted by the Advanced Research Projects Agency for Health (ARPA-H).

“Research on women’s health has historically been underfunded, with many medical studies focusing on men and excluding women. Consequently, much of the information regarding medicine dosages, treatments, and medical school textbooks is based on men and may not apply to women,” President Joe Biden remarked while announcing the funding. “There are significant gaps in research on diseases and conditions that exclusively or disproportionately affect women, or affect women and men differently.”

The White House Initiative is overseen by Carolyn Mazure, Ph.D., the Norma Weinberg Spungen and Joan Lebson Bildner Professor in Women’s Health Research at Yale University, who will coordinate the Initiative on behalf of the Office of the First Lady and the Gender Policy Council.

Crucial Research on Women with ADHD The significant gaps in research have resulted in tangible risks and obstacles for numerous women with ADHD. While more gender-specific studies are undoubtedly necessary, determining the most pressing research priorities with the potential to benefit patients the most is challenging. From puberty to menopause, and from PMDD to age-related cognitive decline, the research needs are extensive.

“What we require are studies that follow a substantial cohort of women throughout their lives... and that have women self-report their symptoms or experiences at the time they occur, rather than relying on retrospective accounts, which are subject to biased memory and recall,” - Mary V. Solanto, Ph.D., Director of the ADHD Centre in the Division of Child and Adolescent Psychiatry at Mount Sinai School of Medicine in New York City.

Online Resources for Female ADHD

ADDJourneys.com	Provides tips, wisdom, video and audio events, a blog, and tele-classes for living productively with ADHD. Offers a community of women for support and understanding.
The Queens of Distraction	Online group coaching platform offering support and strategies for ADHD challenges like household tasks. Run by Terry Matlen, MSW, ACSW, author of "Survival Tips for Women with ADHD."
Kaleidoscope Society	Community founded by Margaux Joffe for women with ADHD, sharing personal stories, expert advice, and peer support. Offers inspirational profiles and videos.
ADDA Support Group	Provides 90-minute virtual peer support groups for women ages 50 and above with ADHD. Offers a safe space for advice, support, and encouragement.
ADHD in Marriage: Women with ADHD	Founded by Melissa Orlov, offering coaching for couples affected by ADHD. Includes a forum for women with ADHD to discuss personal relationships and related challenges.
ADDiva	Run by ADHD coach Linda Roggli, focusing on coaching midlife women with ADHD. Also hosts the ADHD Women's Palooza, a week-long event with experts on ADHD.
The Child Mind Institute	Dedicated to helping children and families with mental health and learning disabilities. Provides research, articles, and guidance for parents of girls with ADHD.
CHADD - Women and Girls	National non-profit serving individuals affected by ADHD. Offers a page dedicated to issues faced by females with ADHD, including treatment options and medication management.
Centre for ADHD Awareness, Canada	Offers a resource centre for ADHD in girls, outlining symptom differences between genders and providing a reading list.
Facebook Groups: Moms Living with ADD/ADHD	Support group for overwhelmed, frustrated, or confused mothers with ADHD.
Facebook Groups: The ADHD Mama	Provides helpful and encouraging videos illustrating life with ADHD as a woman.
Facebook Groups: ADHD coach Terry Matlen	Runs two groups, "Moms with ADHD" and "Women with ADD ADHD," offering support and community.

Menopause, Hormones & ADHD:

Insights & Research Needs

Menopause and ADHD Connection:

Menopause and ADHD share a complex relationship marked by cognitive impairment and emotional dysregulation.

Scientific research on this intersection is lacking, posing a significant medical gap.

Understanding Eostrogen:

Eostrogen, pivotal in girls' and women's sexual and reproductive development, influences key neurotransmitters like dopamine, acetylcholine, and serotonin.

Higher Eostrogen levels correlate with improved executive function and attention, while low or fluctuating levels are linked to cognitive deficits and neuropsychiatric disorders.

Hormonal Fluctuations Across Lifespan:

Pre-menopause: Steady Eostrogen levels in reproductive years impact ADHD symptoms, with fluctuations affecting cognitive function and emotional states.

Peri-menopause: Hormonal irregularities begin, impacting attention, mood, and cognitive abilities.

Menopause: Declining Eostrogen levels halt menstrual cycles, leading to various physical and cognitive symptoms, mirroring ADHD characteristics.

Menopause Symptoms:

Physical symptoms include hot flashes, sleep disturbances, and mood swings, while cognitive symptoms encompass impaired attention, memory, and executive function.

Menopause and ADHD Interaction:

Anecdotal evidence suggests a worsening of ADHD symptoms during menopause.

Some patients exhibit new ADHD symptoms during this phase, indicating a potential overlap in clinical presentation.

Potential Treatments and Interventions:

Pharmacological interventions include hormone replacement therapy (HRT), stimulants, and SSRIs to alleviate symptoms.

Non-pharmacological interventions such as psychotherapy, mindfulness practices, and lifestyle changes may also help manage symptoms.

Summary:

Eostrogen loss during menopause affects neurotransmitters crucial for cognitive function and emotional regulation.

While research gaps persist, understanding the impact of menopause on women with ADHD can guide tailored treatments and interventions.

ADHD in Females Across the Lifespan and the Role of Oestrogen

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The Neurohaven Summary

by Alan Cross

ADHD, a condition commonly associated with young boys, has historically been underdiagnosed in girls. While boys have been diagnosed at rates two to three times higher than girls, this gap narrows in adulthood, suggesting a potential oversight in diagnosing ADHD in females. This raises questions about the role of Oestrogen in ADHD across different stages of life.

Early diagnosis criteria for ADHD were heavily influenced by clinic populations, which were predominantly boys displaying hyperactive behaviour. However, this criterion overlooked many girls who exhibited similar behaviours, but in smaller numbers. Additionally, hyperactivity tended to diminish as boys matured, leading to the assumption that ADHD resolved itself at puberty. Diagnostic criteria allowed for inattention without hyperactivity, but knowledge of ADHD in girls remained limited, primarily focusing on the combined type.

Girls with ADHD often present with subtler symptoms, which can make diagnosis challenging. They may also mask their symptoms more effectively than boys, contributing to underestimation of their struggles. Parents and teachers are more likely to refer boys for evaluation, especially when symptoms manifest as hyperactivity, which is more common in boys. This bias towards hyperactivity affects referral rates and awareness, further impeding diagnosis in girls.

Girls are typically diagnosed five years later than boys, leading to delayed intervention and potentially more severe comorbidities, such as anxiety and depression. The "female protective theory" suggests that higher thresholds are required for females to meet diagnostic criteria. However, due to under identification, many girls with ADHD may go unrecognized.

Early studies of ADHD focused on clinic-based samples, which skewed towards more severely impaired, mostly male subjects. While studies have found similar levels of impairment between genders, differences in symptom presentation exist.

Understanding ADHD in females requires a shift in diagnostic awareness, recognizing the diverse ways symptoms manifest across genders. Early intervention is crucial, as delayed diagnosis can lead to more severe outcomes. Additionally, further research into the role of Oestrogen in ADHD could provide valuable insights into its presentation and treatment across the lifespan.

Core Differences:

While historically overlooked, recent studies have highlighted differences in ADHD presentation between genders. Girls with ADHD are more prone to internalizing disorders, such as anxiety and depression, compared to boys with ADHD or typically developing girls. Conversely, boys with ADHD are more likely to exhibit externalizing behaviours compared to girls with ADHD or typical boys.

Hormonal Mediation:

Hormonal fluctuations, particularly those of Oestrogen, may play a significant role in the expression and diagnosis of ADHD in females. Studies have noted associations between hormonal fluctuations throughout the menstrual cycle and changes in ADHD symptomatology.

Basic Science of Oestrogen:

Oestrogen exists in various forms in the body, primarily produced by the ovaries but also by other brain regions. Oestrogens exert their effects by binding with Oestrogen receptors (ERs) distributed throughout the body, including the central nervous system. These receptors vary in their actions, ranging from immediate to long-term effects.

Fluctuations in Oestrogen Levels:

Oestrogen levels fluctuate over reproductive stages and the menstrual cycle, affecting neurotransmitter functioning, including dopamine synthesis and release. These fluctuations have pleomorphic biological actions, impacting neurological functions such as neuroprotection, anti-inflammatory actions, and neurotransmitter functioning.

Neurological Impacts:

Oestrogens are implicated in neurotransmitter functioning, particularly dopamine, which is relevant to ADHD. Women with ADHD experience more functional impairment and different long-term outcomes than control women or men with ADHD. They also face greater sensory dysregulation and an increased risk of developing eating disorders, childhood abuse histories, and self-harm or suicidal behaviours.

Complexities of Oestrogen:

Understanding the differences in ADHD prevalence, impairment, and outcome severity between genders requires consideration of the complexities of Oestrogen's actions. Oestrogen prolongs neurotransmission by reducing dopamine transporters, which may contribute to ADHD symptoms and related behaviours.

These insights highlight the intricate relationship between Oestrogen, ADHD symptomatology, and gender differences, emphasizing the need for further research to better understand and address the unique challenges faced by females with ADHD across the lifespan.

Cognition, Mood, and Psychopathology:

Oestrogen's Impact on Neural Functioning:

Oestrogen's broad distribution in the central nervous system and its influence on key neurotransmitters suggest its association with higher-order neural functioning. Low Oestrogen levels, such as those following oophorectomy or during natural menopause, have been linked to impaired cognition, including verbal memory decline. Additionally, low Oestrogen levels have been implicated in the aetiology of dementia in women, with postmenopausal hormone therapy showing potential protective effects.

Mood Disturbances Across Reproductive Lifespan:

Hormonal transitions across the reproductive lifespan predispose women to mood disturbances. These include cycle-dependent increases in symptoms of negative mood, premenstrual dysphoric disorder (PMDD), postpartum depression, and major depressive disorder (MDD). Oestrogen fluctuations during the perimenopausal transition are also associated with new-onset major depression.

Gender Differences in Psychiatric Illnesses:

Notable gender differences exist in the rates and symptom expression of psychiatric illnesses. Men have higher rates of schizophrenia and aggression, while women have a higher incidence of negative symptoms such as apathy and anhedonia. Women tend to present bipolar disorder later in life but have faster cycling of mania and depression. MDD prevalence is higher in women, and low Oestrogen levels are associated with MDD and increased risk of suicide.

Fluctuations in Oestrogen and ADHD Presentations:

Fluctuations in ovarian hormones across the menstrual cycle affect various behaviours in females with ADHD. Studies indicate that these hormonal fluctuations may predict changes in emotion-motivated eating, impulsivity, and risk for substance use disorder (SUD). Women with ADHD, particularly those with high trait impulsivity, may experience exacerbated ADHD symptoms and comorbidities during low Oestrogen/high progesterone states.

Effects of Oestrogen Receptors on ADHD Symptoms:

Recent studies suggest that symptom expression in ADHD is influenced by G protein-coupled Oestrogen receptor levels, rather than Oestrogen levels alone, irrespective of sex. This indicates that the type of Oestrogen receptor plays a role in moderating the impact of Oestrogen on ADHD symptoms.

Common Themes:

- Girls with ADHD are particularly vulnerable to mood-based comorbidities and substance abuse during adulthood.
- Fluctuating ovarian hormone levels and types of Oestrogen receptors influence the severity of ADHD symptoms and comorbidities across the lifespan.
- Impulsive women with ADHD appear to be particularly sensitive to the effects of cycling ovarian hormones.

These findings underscore the complex interplay between Oestrogen, hormonal fluctuations, and ADHD symptomatology, emphasizing the need for tailored interventions that consider hormonal profiles and menstrual cycle phases in females with ADHD.

Implications from the research paper:

1. **Under-recognition and Misdiagnosis:** Females with ADHD often exhibit different presentations and associated problems compared to males, leading to under-recognition and under-treatment. Hormonal fluctuations, particularly Oestrogen, may moderate these presentations and treatment responses. This suggests that pre-pubertal females and those who reach puberty may be misdiagnosed or under-identified due to differences in hormonal status.
2. **Diagnosis in Adulthood:** Hormonal changes during perimenopause and menopause may contribute to a phenomenon known as 'adult-onset' ADHD. Oestrogen fluctuations during these periods can lead to cognitive changes, including core ADHD symptoms such as impaired working memory and executive dysfunction. Thus, understanding hormonal influences is crucial for accurate diagnosis and treatment planning in adulthood.
3. **Treatment Considerations:** Oestrogen fluctuations have implications for treatment approaches. Understanding the effect size of hormonal observations and practical methods of measuring hormone levels is essential. Clinicians should consider hormonal status and menstrual cycle phase when females exhibit fluctuating symptoms or poor responses to stimulants. Oestrogen replacement therapy or birth control may be viable options in some cases.
4. **Need for Research:** Historically, females with ADHD have been the focus of relatively few studies, with the majority focusing on girls. More research is needed to clarify the impact of cycling ovarian hormones on ADHD symptoms and related impairments in post-pubescent females. This includes exploring how impulsivity mediates the impact of hormonal fluctuations and investigating the neuroprotective actions of Oestrogen in women with ADHD.
5. **Psychoeducation and Assessment Tools:** Psychoeducation can help address the complexity of female presentations of ADHD and facilitate identification. Revising assessment tools to accommodate internalizing symptoms and common comorbidities may improve recognition rates among females of all ages.
6. **Exploration of Treatment Potential:** Further research is needed to explore the treatment potential of hormone replacement therapy in enhancing cognitive and mood deficits in women with ADHD, from perimenopause throughout the climacteric period. Additionally, studies could investigate how other hormones interact with Oestrogen and progesterone, such as testosterone, thyroxine, and cortisol, to better understand their collective impact on ADHD in females.

Final Thoughts towards 2025

The latest research in female ADHD has revealed a nuanced and multidimensional understanding of the disorder, emphasizing the importance of recognizing and addressing the unique needs and challenges of girls and women with ADHD. From epidemiological trends and clinical characteristics to neuropsychological profiles, comorbid conditions, and treatment considerations, advancements in female ADHD research have shed light on the complexities of the disorder and the heterogeneity of its presentation in females.

Moving forward, continued research efforts are needed to further elucidate the sex-specific factors contributing to the development, course, and outcomes of ADHD in females. By fostering interdisciplinary collaborations, conducting longitudinal studies, and integrating gender-sensitive approaches into clinical practice, we can enhance the early detection, accurate diagnosis, and tailored management of female ADHD, ultimately promoting the well-being and success of girls and women affected by the disorder.

As we strive to advance our knowledge and practice in female ADHD, it is paramount to advocate for gender-inclusive research, destigmatize mental health conditions in females, and foster a supportive and empowering environment for individuals with ADHD. By championing awareness, empathy, and evidence-based interventions, we can create a more equitable and inclusive society that embraces and supports the diverse needs and strengths of females with ADHD.