Neuropsychiatric and Social Consequences of Attention Deficit Hyperactivity Disorder in Females

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Funding: No specific funding was received for this work.

Potential competing interests: No potential competing interests to declare.

Abstract

Attention-deficit/hyperactivity disorder (ADHD) has been under-recognised and under-diagnosed in females until recently. As a result, females often navigate years of symptoms without appropriate support, sometimes contributing to adverse outcomes for them and for those who are close to them. This perspective explores the relationship between ADHD and early life trauma and examines the consequences of this combination for females in their later lives with regards to mental and physical health, along with social function. We discuss the increased risks of self-harm and of criminal behaviour associated with female ADHD and offer some suggestions as to how these risks can be mitigated in the future.

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Keywords: ADHD, Neurodivergence; Female; Conflict; Personality.

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder marked by an ongoing pattern of inattention and/or hyperactivity-impulsivity that interferes with function and/ or development. ADHD affects between 5-10 % of children, but its prevalence falls to 3% in adults [1]. There is a marked male preponderance in adolescence, but the gender ratio is more even in adults [2][3]. Furthermore, under-diagnosis in females is well-recognised and relates to their more subtle presentation with less overt hyperactivity, reduced fidgeting, and lower pressure of speech, leading to a later age at diagnosis in general among females. However, anxiety and emotional lability are more common among young females than males with ADHD [4][5][6]. ADHD females often feel they are trying harder but with less initial success than others. They describe feeling that they constantly switch between channels without having control of the remote. They may perceive themselves as being weird or odd-ball, and they often fear, and may ultimately experience, both alienation and abandonment by others. Impulsivity and self-harm [7] are common features and they may also fulfil criteria for emotional instability disorder [8] with a high risk of other significant mental health difficulties[9]. Indeed, the diagnosis of ADHD in females may be delayed [10][11] because of inter-personal conflict with anger, argument, and mood changes [12][13]. If these features do attract a diagnosis of personality disorder, this may in turn delay accurate diagnosis and the availability of appropriate supportive treatment [14].

Puberty is a very challenging time for ADHD females, and they may struggle to understand complex social and emotional interactions or to resolve interpersonal conflict. ADHD females more often report feeling bullied [15] and victimised [16]. Teenage girls with ADHD diagnoses describe difficulty making and maintaining friendships and they may feel rejected [17] with connectivity issues among both friends and family[18] persisting into adulthood [19]. Internalisation of feelings and dysfunctional coping [20] can precipitate self-harming behaviours [21], substance abuse and eating disorders, most commonly either binge eating with bulimia or avoidant restrictive food intake disorder (ARFID) [22]. Throughout puberty and early adulthood, risk taking behaviour is increased and is likely related to hyperactivity and impulsivity [23]. ADHD females are often sexually active earlier and report more sexual partners than their peers, making them vulnerable to increased risks of teenage pregnancy and sexually acquired disease. Unsatisfactory romantic experiences are common [24] among ADHD females and can further reduce self-esteem[23]. Psychosexual concerns are frequently expressed by ADHD females, which along with features arising from difficulties coping, often combine to produce a general sense of negativity and pessimism [25].

Some ADHD females might compensate in early adult life through maladaptive coping strategies such as acting out or behaving in ways that are perceived as socially inappropriate [26]. Over-compensating or camouflaging their challenges may allow them to superficially maintain friendships, keep focus and disguise distress. However, such behaviour hides and internalises their difficulties and they may rely on alcohol or drugs to facilitate social contact. They may feel forced to

choose between avoiding people and problems on one hand, or risking forming difficult friendships and dangerous liaisons with individuals who may facilitate unsafe practices or encourage criminal activity on the other [26]. This may put them at risk of exploitation and can embed the concept of vulnerability and victimhood in their psyche. Such a sequence of adverse outcomes appears to be more likely if ADHD females also report prior experience of early childhood trauma [27], especially emotional invalidation from parents [28]. If ADHD does increase the risk of evolving behaviours and presentation which could subsequently be identified as a personality disorder in females [29], it seems plausible that prompt identification of those at greatest risk might reduce the later development of these complications [30].

Such difficulties often extend into adult life and may impede personal and professional progress by causing educational, familial, financial and criminal problems [31][32]. Lifetime hazard ratios (HR) are much greater in ADHD females for being diagnosed with anti-social disorders (HR 7.2), mood disorders (HR 6.3), eating disorders (HR 3.5), developmental disorders (HR 3.2), addiction (HR 2.7) and anxiety (HR 2.3) when compared to neurotypical females [33]. There is also an increase in oppositional defiance [34], conduct disorder [35] and criminal activity [36] among ADHD females, who are at greater risk of committing crimes compared with their peers due to ADHD characteristics such as impulsivity [37][38]. One study showed that convictions in ADHD females were eighteen times greater than that among the general population [39]. Indeed, the prevalence of ADHD in female prison populations is estimated at 25% and this is likely to be an underestimate because of delayed or missed diagnoses [33]. Differentiating ADHD from personality disorders may be difficult given the high rates of overlapping features and diagnoses between these conditions [40] but this is especially important for females in the criminal justice setting. We need to better understand the influence of ADHD on female behaviour in this setting to ensure more effective and appropriate support and outcomes for all concerned.

ADHD also produces several specific positive traits, including considerable capacity for innovation and creativity[41]. ADHD females can often think out of the box and come up with a range of new ideas to solve old problems. Hyperfocus facilitates fulfilment of this potential, and they may excel in both arts and sciences [42]. ADHD females can have a prodigious capacity for work and may achieve great insights into specialised topics when ‘switched on’. However, they can be so driven by hyperfocus that they forget to eat regularly, sleep patterns may become erratic [43], and focus on completing tasks may become difficult because they run so many different projects that executive functioning becomes a challenge [44]. ADHD females commonly rely on extensive lists and the establishment of fixed, and sometimes punitive, alternating regimes of work and exercise. Distraction by a special interest or obsession from focussing on priorities can be an issue.

The structure and function of the brain differs between ADHD and neurotypical females[45]. Neurological differences extend to the peripheral and autonomic nervous systems [46]. Some of the imbalance in central neuronal activity appears to be driven by low dopamine levels [47] and a need to seek physical or cerebral stimulation to drive them back up via adrenaline release. There is evidence that the normal circadian cortisol rhythm is not directly impaired in adults [48], but it is reduced in children [49]. Sleep impairment is common and may contribute to tiredness[50]. Fatigue may result if illness, stress or lifestyle changes make demands on the hypothalamic pituitary adrenal (HPA) axis that it cannot meet, resulting in an impaired adrenal flight or fight response. This can evolve from initial impulsivity, through anxiety, ultimately resulting in fatigue, brain fog and chronic pain [51].

Fibromyalgia is a common complication of ADHD in females[52][53] and is partially mediated by joint hypermobility [54]. Many ADHD females also report migraine and irritable bowel syndrome as comorbid chronic pain syndromes. Some experience body dysmorphia while gender dysphoria is a frequent accompaniment, often associated with higher levels of chronic pain. The autonomic nervous system can produce a wide range of vascular, cardiac, respiratory, gastrointestinal, urinary and sexual problems [55]. Cardiovascular features include vasospasm, with migraine and Raynaud's phenomenon, while postural orthostatic tachycardia syndrome (POTS) is common, as is bronchospasm triggered by cold or chemicals. Gastrointestinal features include irritable bowel syndrome, while urinary frequency, dysuria and dyspareunia are all frequently reported [56]. In addition, mast cell activation (MCA) is regularly triggered at low thresholds by a myriad of stimuli. Skin rashes such as eczema, urticaria or hives are common, but MCA may also contribute to a wide range of internal organ dysfunction. Its role in mediating both physical and psychological symptomatology in AHDH in females is presently a subject of increasing interest [57].

Problems with cognition are often reported by ADHD females[58]. These include executive dysfunction as well as impairments in other cognitive domains such as difficulties with face recognition, slower reaction times and inconsistent responses to similar scenarios [59]. There is evidence that ADHD in females may be associated with impairment in intellectual functioning in some cases [60]. Memory also appears to function differently in ADHD females[61]. Short term recall may be described as patchy while recollection of past events is often preserved if not heightened [61]. Balance and coordination are often impaired and ADHD females may describe taking longer to learn to ride a bicycle and to use a keyboard.

Hypersensitivity appears to be a common theme in female ADHD and applies to a range of both physical and emotional experiences. ADHD females may find it difficult to tolerate other people's failings, whilst being extremely sensitive to perceived criticism of themselves, often experiencing rejection sensitive dysphoria [62]. Indeed, finding the correct emotional thermostat does not appear to come naturally to many ADHD women. They may phone if they misplace keys or are given a free coffee but may forget to share the outcome of important exams or crucial interviews. Camouflaging these issues to fit in with the neurotypical majority offers a superficial short-term solution for some but typically increases anxiety [63]. Many young people with ADHD find their condition persistently and adversely affects their psychosocial function [64] and this is more likely among females[65][66]. Those exposed to conflict early in life appear to be at greater risk [21][67]. Feeling inadequate or ashamed with low self-esteem may drive a desire to try even harder for acceptance by others but seeking positive reinforcement and validation can lead to emotional instability and risky behaviour [23]. There is potential for vulnerability to serious self-harm [68] or addiction [69] if rejection is received or perceived, or if they believe they are becoming a burden to others [21][33].

ADHD females typically feel intense emotions but often struggle to understand and verbalise them. They be unable to contain and communicate their feelings accurately, despite often having otherwise excellent linguistic skills. Many have features of alexithymia [70] and may find it difficult to understand how others feel. This may lead friends and family to interpret their difficulties with expressing empathy as disinterest or disengagement. This is often not the case, but the ADHD female may find that fear of abandonment can lead to difficulty in making and maintaining healthy

relationships [17][18][19][20][21]. If emotions become internalised, this process may be associated with self-harm[68]. However, some females with ADHD try to develop a 'protective shell' and can subsequently be perceived as negative, manipulative and narcissistic [70]. Alternatively, they may externalise their feelings and project them onto others in the form of argument, anger and aggression [71]. In the absence of insight, this can lead to major issues, both for these women and for those that support them. There is a dearth of research into the factors that precipitate such dysfunctional outcomes which may be a consequence of disordered resilience [72] through lack of appropriate support and understanding.

The struggle for acceptance in a largely neurotypical world is exhausting and many ADHD females stop trying to camouflage and drop their mask. Seeking external professional help is strongly advised to avoid burnout or conflict with the consequential adverse effects for the ADHD female and their prospects. The combination of early life trauma and ADHD appears to predict adverse outcomes with a high risk of conflict in adult life [73]. It is important to note that almost all the associations outlined above in relation to female ADHD are also true for autistic females or autistic individuals who are often undiagnosed into adulthood. The rates of co-occurrence of ADHD and autism are reported to be as high as 86% [74], with some researchers suggesting that there is a combined phenotype [75] or even that there is no biological or construct validity for autism to be considered as distinct from ADHD and other neurodevelopmental presentations [76][77]. The concept of neurodiversity is at the forefront of current psychological and psychiatric research, encompassing ADHD, autism, and other neurodevelopmental differences (e.g., dyslexia, dyspraxia, etc) [78] all of which have been shown to be both extremely heterogeneous and to commonly overlap, co-occur, or share genetic risk [79]. It is important, therefore, that research, support and understanding for ADHD in females is embedded within this broader conceptualisation and awareness of the overlaps with similar neurodevelopmental differences, and that such presentations are not assumed to be mutually exclusive.

In terms of intervention and support, talking therapies such as Cognitive, Analytical or Behavioural therapy (CBT) are often helpful and mindfulness has been shown to be beneficial, especially for females [80] while stimulants can improve concentration and facilitate the completion of tasks [81]. Some evidence already exists to guide successful therapeutic interventions and reduce adverse psychosocial outcomes. ADHD females are less likely to receive treatment with stimulants than are ADHD males [82], and treatment is usually commenced later in life[83]. Early diagnosis and therapy are likely to improve long-term outcomes across all domains. A reduction in serious mental health difficulties has been recorded in females treated with stimulants for ADHD [84], while stimulants have also been reported to improve outcomes across both occupational and educational [85] endpoints.

However, adherence to therapy can be a major issue[86] and this appears to be especially true for ADHD females[87]. A recent systematic review of the role of CBT recognises this and offers detailed guidance [88]. Female offenders have a high rate of ADHD [89], and this is most marked among those convicted of serious offences[90]. These issues often commence relatively early in life and may be associated with a failure to recognise and accept responsibility for repeated offences of a similar nature. This appears to relate to difficulties in social judgement and emotional adjustment, along with stubborn adherence to a conviction that their actions are somehow justified, in the absence of corroborative evidence [91].

In addition to reducing risks of criminal conviction, ADHD females may find that CBT improves executive dysfunction and reduces both self-harm in children [24] and actions which harm others in adults[92]. Specific individualised therapy may be needed to address more complex issues [93]. It is essential to reinforce strengths and achievements rather than focus exclusively on difficulties and challenges during therapy.

Further research is needed to understand the factors increase the risk of poor outcomes for some ADHD females. Comparing female with male attitudes, understanding sexual behaviours as well as vulnerabilities to victimisation, assault and bullying may help to clarify these issues. Appreciating the subtle features of female ADHD, the greater tendency towards internalisation and masking and the influence of trauma in early life are all important elements that require further exploration. Ultimately therapeutic intervention must improve outcomes for ADHD females, along with those who care for them and for society in general. Further data to guide specific intervention among those ADHD females with a conflict-orientated approach would be especially welcome.

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All authors have either direct lived experience of being neurodivergent or have extensive experience of working with and supporting neurodivergent females across the age spectrum

The authors have no conflicts of interest and no funding disclosures

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