

Review of the Psychosocial Consequences of Attention Deficit Hyperactivity Disorder (ADHD) in Females

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ABSTRACT

Introduction: Attention-deficit/hyperactivity disorder (ADHD) is under-recognised and under-diagnosed in females. As a result, females often navigate years of symptoms without appropriate support, sometimes contributing to adverse outcomes for them and for those who try to support them. This review describes the experience of females with ADHD and explores and explains the main challenges they face.

Methods: We distilled the most common themes expressed in the available literature on ADHD in females and used these to develop topic headings for a literature review. We then explored therapeutic options and identified future priorities for clinical research and development.

Results: The commonest issues identified and explored related to the following topics: emotional development, friendships and relationships, handling conflict, self-harm and suicidality, creativity and hyperfocus, hypersensitivity, cognition and coordination, physical, psychological, and psychiatric comorbidity, and the effects of masking. We specifically considered the implications for serious self-harm, conflict, and criminal conviction among ADHD females, and explored how these risks may be mitigated with treatment.

Discussion: Females with ADHD are both under-diagnosed and under-supported, despite the serious psychosocial consequences of this condition. Given that many of these carry potentially serious complications, recognition of these issues and the provision of appropriate support and intervention is of paramount importance if those who care for them professionally and/or personally are to respond effectively. Treatment mitigates adverse outcomes for many females with ADHD.

Keywords: ADHD, conflict, females, hypersensitivity.

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1. 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, depression and

emotional lability are more common among young females than males with ADHD [4]–[6]. Impulsivity and self-harm [7] are frequent features, and they may fulfil the criteria for emotionally unstable personality disorder [8] with a high risk of other mental health difficulties [5]. Indeed, the diagnosis of ADHD in females may be delayed [9], [10] if interpersonal conflict, anger, argument, or mood changes attract other diagnoses initially [11], [12]. A label of personality disorder may delay the correct diagnosis and access to supportive treatment at a crucial stage of their development [13]. This article explores the challenges and differences experienced by females with ADHD, through a detailed review of the literature. We consider the implications for increased rates of self-harm, suicidality, conflict,

and criminal conviction among ADHD females, offering some suggestions as to how these risks may be mitigated by greater insight and awareness amongst those to whom they may turn for support.

2. METHODS

We identified the most common themes by reviewing all the available academic literature on female ADHD published between January 2010 and October 2023. We searched between these dates using the following index words: female; ADHD; women; attention deficit hyperactivity disorder; girls; social; psychiatric; psychological; suicide; self-harm; psychosocial; comorbidity. We employed the following search engines: Medline, Embase, PsycINFO and Pubmed. We excluded all papers that were off-topic, unavailable in English or did not present results in a manner which allowed us to identify themes. We recorded our results using a simple scoring system in which we allocated one point to each theme mentioned in every paper which we included within our analysis. We used the top ten themes to develop our topic headings for the focused literature review. Finally, we explored therapeutic options and identified future priorities for clinical research and development. Our intention is to improve insight into and enhance understanding of, the way females with ADHD feel and behave, and the issues that this causes them. Recognition of these issues is of paramount importance if those who care for them professionally and/or personally are to respond effectively and appropriately.

3. RESULTS

Our search initially identified 21,123 papers. Of these, 18,745 were not on the topic of ADHD in females, 1,782 were not available in English, and 373 did not present their results in a manner which allowed extraction of the main themes. The remaining 223 papers were then assessed, and the top 10 themes were identified based on points awarded. We referenced papers from which these ten topics were drawn. The more general points are listed in the next paragraph, while the specific themes are discussed in detail below, under their specific topic headings.

Females with ADHD were generally perceived as being less successful than their neurotypical peers. Their own perception was that they had to try harder to succeed. A common concept was that they regularly changed direction in their focus and found it difficult to concentrate or complete tasks. Self-image was often poor, they felt different to others, whom they perceived saw them as weird. They felt emotions strongly but found consistent communication of their feelings to be challenging. Generally, females were better than their male peers with ADHD in disguising the difficulties they faced. They used masking to hide their lack of emotional intuition but found it exhausting to maintain this indefinitely. Often women and girls with ADHD found it hard to tolerate other people's failings, despite being extremely sensitive to perceived criticism of themselves.

3.1. Emotional Development

ADHD females typically feel intense emotions but often struggle to understand and verbalise them. Many have features of alexithymia [14] which reflects issues with understanding and sharing emotions [15]. This may lead friends and family to interpret their difficulties with expressing empathy as disinterest or disengagement. This is rarely the case, but the ADHD female may find that fear of abandonment causes difficulty in making or maintaining healthy relationships [16]–[22]. Alexithymia is strongly associated both with the lack of reciprocal relationships and the presence of manipulative behaviour and even sadism [23]. The perceived reduction in empathy appears to be a function of alexithymia which applies to both cognitive and emotional empathy [24]. A reduction in interoceptive awareness has also been attributed to alexithymia and it is not surprising that if one struggles to understand one's own physical and emotional experiences, this has an adverse effect on overall well-being as well as on relationships with others [25].

If emotions become internalised, this process may be associated with self-harm [26], [27]. However, some females with ADHD develop a 'protective shell' and can subsequently be perceived as negative, manipulative, or narcissistic [14], [15]. Alternatively, they may externalise their feelings and project them onto others in the form of argument, anger, and aggression [28]. In the absence of insight, this can lead to serious issues, both for these women and for those who support them. There is a dearth of research into the factors that precipitate such dysfunctional outcomes which may be a consequence of disordered resilience [29] through lack of appropriate external support and understanding. This is a key area, and it is essential to diagnose ADHD in girls early so that intervention can help mitigate unwanted consequences. Increasing awareness of possible presenting features of ADHD in women and girls among teachers, parents and the police might aid in this aim.

3.2. Friendships and Relationships

Puberty is a particularly challenging time for ADHD girls, and they may struggle to understand complex social and emotional interactions and to resolve interpersonal conflicts. Teenage ADHD girls more often report feeling bullied [16] and victimised [17] compared to peers. Teenagers with ADHD describe difficulty making and maintaining friendships and they may feel rejected [18] with connectivity issues among both friends and family [19] persisting into adulthood [20]. Internalisation of feelings and dysfunctional coping [22], [23] can precipitate a variety of self-harming behaviours [26], substance abuse and eating disorders, most commonly avoidant restrictive food intake disorder (ARFID) [30]. ARFID may manifest at, or soon after, the menarche. Indeed, throughout puberty and early adulthood, both involuntary and conscious risk-taking behaviours are increased. The former may relate to the need for consistency and control in adolescence, while the latter may reflect increasing hyperactivity and impulsivity [28]. 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 [29]. Unsatisfactory romantic experiences are common [31] among ADHD girls and can further reduce self-esteem [32], sometimes leading to prolonged periods of celibacy, even catalysing alterations in their sexual orientation. Psychosexual concerns are frequently expressed by ADHD women, which along with features arising from difficulties coping, often combine to produce a sense of negativity and pessimism [29], [31], [32].

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 [28]. Over-compensating or camouflaging their interpersonal difficulties may allow them to maintain superficial friendships, keep focus and disguise distress. However, such behaviour hides and internalises these challenges and they can start to 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 [28], [29]. 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 is more likely if ADHD females also report prior experience of early childhood trauma [33], especially emotional invalidation from parents [32]. If ADHD in females does increase the risk of evolving behaviours which could subsequently be diagnosed as a personality disorder [29], [34], it seems plausible that early identification of those at greatest risk might reduce the later development of these complications with appropriate support [34].

3.3. Conflict and Crime

Difficulties resulting from maladaptive behaviours often extend into adult life and may impede personal and professional progress if educational, familial, financial, or criminal problems develop [20], [35], [36]. 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 [37]. There is also an increase in oppositional defiance [8], conduct disorder [38] and criminal activity [39] among ADHD females, who are at greater risk of committing crimes compared with their peers due to ADHD characteristics such as impulsivity [40], [41]. A Danish study reported that ADHD was associated with a more than two-fold increase in criminal convictions [42]. A meta-analysis found a prevalence of ADHD among all prisoners of about 20% [43], and these data were subsequently confirmed [44]. Among young adults in Iceland who had been interviewed by the police, those with ADHD were twice as likely to provide false evidence [45]. One study showed that convictions in ADHD females were eighteen times greater than that among the general population [38]. Indeed, the prevalence of ADHD in female prison populations is estimated at 25% and this could be an underestimate because of delayed or missed diagnoses [37].

Girls with behaviour disorders often have ADHD which increases their chances of aggression, offending and rule-breaking in adolescence and early adulthood [46]. Adverse childhood experiences and abuse cultivate a climate of mistrust of others in a social setting, while a lack of security within family relationships precipitates hypersensitivity and the anticipation of rejection by others [47]. Resulting rejection sensitive dysphoria (RSD) triggers hostility and violence in some ADHD females, thereby self-fulfilling their fear of isolation and alienation [48]. Girls and women with ADHD who exhibit anger rumination may retaliate after minor provocation, sometimes venting their fury at innocent targets [49]. Interestingly, girls who witness their mother's frequent aggression against their father, may exhibit similar subsequent behaviour towards men themselves [50]. These issues often commence early in life and might relate to their failure to recognise and accept responsibility for repeated similar actions. They may be convinced that their actions are justified, even in the absence of corroborative evidence [36]. Differentiating ADHD from personality disorders may be difficult, given the high rates of overlapping features and diagnoses between these conditions, but this is especially important for females in the criminal justice setting [51]. However, the high levels of social skills exhibited by some females with ADHD produce less overt conduct problems in early life, which can contribute towards their diagnosis being delayed or missed. This can increase their risk of receiving a subsequent diagnosis of secondary personality disorder. Healthcare professionals 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.

3.4. Suicide and Substance Abuse

A Danish study reported a four-fold increased risk in attempted suicide among those with ADHD, rising to ten-fold in those with comorbid autism [52]. A meta-analysis reported that people with ADHD attempted suicide at twice the rate of their peers, exhibited three times as much suicidal ideation and completed suicide over six times more frequently than neurotypical people [53]. Similar data was reported in a large study of young people from Taiwan which reported that those with ADHD were four times more likely to attempt suicide, and over six times more likely to repeat these attempts [54].

Environmental factors, especially adverse childhood experiences, may be associated with a variety of undesirable outcomes including self-harm and addiction [21] among females with ADHD [20]. Young people with ADHD exhibit higher rates of dependency on nicotine, alcohol, and other drugs [55]. The risk of alcohol dependency among young people with ADHD was quantified at twice the rate of normal in one large meta-analysis [56], while a huge Swedish study revealed a three-fold increased risk of drug dependency associated with ADHD [57]. These figures are especially worrying for young women with ADHD, and it is important to acknowledge that the usual male predominance for suicide and drug dependency does not apply to those with ADHD. Overall, girls and women with ADHD are up to ten times more likely to suffer serious self-harm than their neurotypical peers.

3.5. Positive Aspects and Special Abilities

ADHD also produces several specific positive traits, including a considerable capacity for innovation and creativity [58]. Many young women with ADHD achieve excellent results at school and beyond. ADHD females often exhibit a prodigious capacity for learning, studying, and working. ADHD women and girls can often think out of the box and produce a range of innovative ideas to solve old problems. Their ability to hyperfocus on special interests facilitates the development of expertise in areas which also increase their ability to relate to others with similar interests. Hyperfocus facilitates the fulfilment of their potential to excel in more than one area. They can sometimes contribute equally to advancements in both arts and sciences [59]. They can achieve great insights into specialised topics when ‘switched on’. They frequently possess higher degrees, often hold PhDs and can make a huge contribution to both academic life and to solving problems that neurotypicals often struggle with. Their creativity can lead to new inventions in science, art, literature, and music. Many female innovators over the centuries are likely to have had ADHD.

Distraction by a special interest or obsession from focusing on more immediate priorities can be problematic for females with ADHD. They can be so driven by hyperfocus that they can forget to eat regularly, and may manifest erratic sleep patterns [60], and difficulty in focusing on completing tasks. They may run so many different projects that executive functioning becomes a challenge [61]. This can lead to trouble in the timely completion of projects to which they have already committed if they become distracted by other issues in the interim.

Their ability to channel the excess energy generated by physical hyperactivity often allows them to participate, and even excel, in sporting activities which can help to camouflage or mitigate the social difficulties that they encounter. Females with ADHD often rely on the establishment of fixed, and sometimes punitive, alternating regimes of work and exercise. Regular and regulated physical activity can help to reduce their anxiety, while the need to control their actions and interactions with others is often a powerful motivating factor in maintaining a fixed daily routine. Team participation can be an effective means of building trust and friendships, and females with ADHD can be very effective leaders.

3.6. Comorbid Physical Health Conditions

ADHD is highly inheritable in both males and females with recent genetic studies revealing aspects of the biological basis of ADHD [62]. The structure and function of the brain differ slightly between ADHD and neurotypical females [63]. Neurological differences extend to the peripheral and autonomic nervous systems [64]. Some of the imbalance in central neuronal activity appears to be driven by low dopamine levels [65] 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 [66], but it is reduced in children [67]. Sleep impairment is common and may contribute to tiredness [60]. 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, resulting in fatigue, brain fog and chronic pain [68].

The considerable physical comorbidity associated with autism has recently been highlighted in a large control study from Cambridge [69] and significant overlap with ADHD is evident, especially among females with rheumatic disease [70]. Auto-immune diseases affecting the musculoskeletal and endocrine systems are more common among women and girls with ADHD [71]. Thyroid disease [72] and type 1 diabetes [73] are associated with ADHD, with poorer glycaemic control and more complications [74]. Obesity is also associated with ADHD [75] as are type 2 diabetes and multiple other metabolic complications [76]. Admission to hospital with infection in a large Danish study was associated with a two-fold increase in ADHD which was reduced by prompt antibiotic therapy [77]. It has been suggested that shigella infection in early childhood may increase the risk of developing ADHD by altering the gut microbiome [78] and that prompt antibiotic therapy may reduce this risk [79]. Females with ADHD may be more susceptible to both acute COVID-19 infection [80] and its persistence, with symptoms suggestive of long Covid more frequently reported by those with ADHD [81].

Fibromyalgia is commonly associated with ADHD and autism in females [82], [83] and is partially mediated by joint hypermobility [84]. Many ADHD females also report migraine and irritable bowel syndrome as comorbid chronic pain syndromes [85]. Some experience body dysmorphias, while many describe gender dysphoria as a frequent accompaniment, both often being associated with higher levels of chronic pain. Dysfunction of the autonomic nervous system can produce a wide range of vascular, cardiac, respiratory, gastrointestinal, urinary, and sexual problems [86]. Cardiovascular features may 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 [87]. In addition, mast cell activation (MCA) is regularly triggered at low thresholds by a myriad of stimuli. Skin rashes such as eczema, psoriasis, urticaria or hives are common [88], but MCA may also contribute to a wide range of internal organ dysfunction. Its role in mediating both physical and psychological symptomatology in ADHD in females is a subject of increasing interest [89]. We have published a detailed description of the physical and mental comorbidities associated with ADHD and autism in females [90].

3.7. Hypersensitivity

Hypersensitivity is a common theme in female ADHD and applies to a range of both physical and emotional experiences [91], often precipitating RSD [19]. Trouble regulating emotions may lead to a disproportionate fear of rejection and an overinterpretation of others’ intentions. High levels of impulsivity and reduced interoception may exacerbate this tendency and together increase the risk of

an adverse outcome. Camouflaging these issues to fit in with the neurotypical majority offers a superficial short-term solution for some but invariably increases anxiety [92]. Many young people with ADHD report that their hypersensitivity persistently and adversely affects their psychosocial function [93] and this is more likely among females [94]. Those exposed to conflict early in life appear to be at greater risk [95]. 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 [96].

There is potential for vulnerability to serious self-harm [21]–[23] or addiction [97] if rejection is received or perceived, or if they believe they are becoming a burden to others [22], [37]. Hypersensitivity appears to be associated with difficulties in social judgement and emotional adjustment, along with stubborn adherence to the assumption that their instincts are leading them in the right direction, even when there is evidence to the contrary. Indeed, this can engender misinterpretation of others' actions, thereby precipitating potential conflict. Interestingly, ADHD females also exhibit a high rate of justice sensitivity, and they may assume the role of a protector of victims [98]. This tendency is associated with RSD where a heightened sense of perceived injustice may produce an aggressive approach to the organisation or individual considered responsible and may ultimately lead to the assumption of a victim mentality themselves [99]. Such a process can become deeply ingrained and may present as an obsessive-compulsive disorder in some cases.

3.8. Cognition and Coordination

Problems with cognition are often reported by ADHD females [100]. These include executive dysfunction as well as impairments in other cognitive domains such as difficulties with facial recognition, slower reaction times and inconsistent responses to similar scenarios [100]. There is evidence that ADHD in females may be associated with impairment in intellectual functioning in some cases [101]. Memory also appears to function differently in ADHD females [102], with many relying extensively on lists or reminders, even for basic tasks. Short-term recall and working memory are frequently impaired, leading to loss of direction and even disorientation. When combined with alexithymia, this can contribute to a failure to accurately recall other people's actions or understand their motives [103]. Such scenarios can contribute to conflict through misrepresentation [37], [38].

Balance and coordination are often impaired, as is spatial awareness, due to co-existing dyspraxia or developmental coordination disorder which is comorbid with ADHD in 50% of cases [104]. This may account for their reported difficulties in learning to balance on a bicycle or playing ball games, which may contribute to their social isolation and feelings of being different to other girls. Although they often wish to belong to a team, their difficulty in catching or throwing a ball may make it harder to get selected. Failure to do so can reinforce their negative self-image and often leads to their adoption of solo sporting activities such as swimming, climbing, or running. This

is especially true for those females whose tendency towards hyperactivity dominates over inattention. However, many women with ADHD have become elite athletes and often excel at individual events, where their ability to hyperfocus and their competitive resolve can prove advantageous [105].

Driving may also provide significant challenges for women with ADHD. It can be a challenge to maintain focus while avoiding hyperstimulation, and they are at higher risk of speeding and accidents [106], especially if they demonstrate impulsivity and anger management issues which may precipitate road rage [107]. This can impact professional and personal connectivity for the significant minority of women with ADHD who won't or don't drive, although stimulant medication has been shown to facilitate safer driving in many [108].

3.9. Masking and its Consequences

Many females with ADHD feel tremendous empathy but this is often directed towards plants, animals or global concerns rather than other people specifically. The struggle for acceptance in a neurotypical world is exhausting and many ADHD women and girls eventually stop trying to camouflage and drop their masks. Seeking external professional help is strongly advised to avoid burnout or conflict with the consequential adverse effects for ADHD females and their personal and professional prospects [94]. The combination of early life trauma and ADHD predicts adverse outcomes with a substantial risk of conflict in adult life [109], and the risk may be highest among those women with alexithymia [23]–[25]. It is important to note that all the associations outlined above in relation to female ADHD are also true for autistic females who may go undiagnosed into adulthood [29], [110]. The potential for conflict may be even greater among those autistic females with ADHD, where impulsivity generated by their ADHD may contrast with the need for routine demanded by their autism. Maintaining control of their actions and interactions in this setting adds to their stress, making masking increasingly difficult. The resulting internal conflict between their ADHD impulses and autistic tendencies may manifest as self-harm, while external expression of the conflict may contribute to relationship difficulties and precipitate actions which others deem unacceptable [95], [109].

3.10. Psychosis and Delusions

Most individuals with psychosis display traits of ADHD and/or autism, while 35% of neurodivergent people experience psychosis [111]. Psychosis is more likely to occur in females with a combination of ADHD and autism than in those with either condition alone [112]. The presence of ADHD in adolescence carries a relative risk (RR) of 4.7 for the development of psychosis as an adult [113] and an RR of 4.3 for the later development of schizophrenia [114]. This tends to onset between the ages of 25 and 35 years of age in women with ADHD. Core features include loss of contact with reality, usually featuring hallucinations, delusions, or paranoid ideation. The risk of schizophrenia specifically may be enhanced by cannabinoids used for pain control or recreation, and by stimulant drugs used

to treat ADHD. The development of all psychoses in the context of prior ADHD and autism strongly relates to a history of childhood trauma and/or interpersonal conflict. This includes bullying, as well as other forms of sexual and physical abuse. Such events are more often reported by females. The relationship between ADHD and psychosis as mediated by trauma is especially evident among those born female who identify as either non-binary or trans males [115]. Common delusions include unfounded beliefs that they are being watched, discussed, stalked, contacted or threatened.

4. DISCUSSION

The rates of co-occurrence of ADHD and autism are reported to range up to 86% [116], with some researchers suggesting that there is a combined phenotype [117], [118] or even that there is no biological or construct validity for autism to be considered as distinct from ADHD and other neurodevelopmental presentations [119], [120]. The concept of neurodivergence is at the forefront of current psychological and psychiatric research, encompassing ADHD, autism, and other neurodevelopmental differences (e.g., dyslexia, dyspraxia, etc) [121], all of which have been shown to be both extremely heterogeneous and to commonly overlap, co-occur, or share the genetic risk [121]. It is important, therefore, that research, support and understanding of 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.

Females with ADHD experience a wide range of challenges in their daily lives, and this may affect every aspect of their behaviour and decision-making. The stress engendered by these experiences can precipitate self-harm and damage relationships with others. This can have serious adverse implications both for those affected and those who wish to help them. Understanding the reasons for the social and emotional difficulties they face is the first step towards supporting them safely and effectively, and towards improving their prospects at both a personal and professional level. ADHD often presents differently in girls compared to boys, with internalisation of symptoms and greater inattention [4]. Resulting anxiety and depression are more common in females as is aggression [122] which is more covert than in males [123]. Whether this is independent of ADHD or a consequence of it, these features may contribute towards a delay in diagnosis and treatment of ADHD in women and girls [124], producing lower self-esteem [125] and greater impairment in social function with higher rates of conduct disorder [126] and oppositional defiance [122]. The presence of psychosocial adversity and psychiatric comorbidity in girls are known to predict the persistence of ADHD into adulthood [127].

4.1. Intervention and Support

Cognitive Behavioural Therapy (CBT) and psychotherapy such as Acceptance and Commitment Therapy (ACT) are often helpful, especially for females [128] while stimulants can improve concentration and facilitate the

completion of tasks [129]. Some evidence already exists to guide successful therapeutic interventions and reduce adverse psychosocial outcomes. However, adherence to therapy can be a major issue [130] and this is true for ADHD females [131]. A recent systematic review of the role of CBT recognises this and offers detailed guidance in this area [37]. A large survey found that three times more girls than boys received antidepressants before being offered treatment for ADHD [132]. Although girls with ADHD were more impaired, they were offered ADHD treatment less often than boys [133], emphasising gender bias. Overall, ADHD women are less likely to receive treatment with stimulants than ADHD men [134], and treatment is usually commenced later in women [135]. This gender bias needs to be recognised and reversed as a matter of urgency.

Dopamine production appears reduced among all adults with ADHD [136], but this may be influenced by endocrine dysfunction specifically in females [137]. Oestrogen may affect the response to stimulants prescribed for ADHD [125], although generally, stimulants are as effective in females as in males with ADHD [138]. Indeed, there is evidence that girls respond better than boys to ADHD medication over time [139]. Early diagnosis and therapy are likely to improve long-term outcomes across all domains [29], [105]. A reduction in serious mental health difficulties has been recorded in females treated early with stimulants for ADHD [140], while stimulants also improve outcomes across occupational endpoints [135]. Stimulants have also been shown to improve outcomes in terms of academic attainment for students [141]. Importantly, earlier intervention with stimulants may reduce the potential for the subsequent development of secondary personality problems, which is hugely relevant to the aim of reducing the adverse effects of ADHD on personal and professional aims and achievements for females [36].

Given the high rates of ADHD among female offenders [142], especially in those convicted of serious offences [143], can early targeted intervention help? It seems as if it can. Stimulant therapy for ADHD is linked to a reduction in rates of criminality from an early age [134], [144]. Medication alone may not prove tolerable or effective in all individuals, but the use of CBT in combination (and even in isolation) may reduce the risks of criminal conviction among ADHD girls and women. Both therapeutic approaches can improve executive dysfunction, lower self-harm in children [145] and reduce actions which harm others in adults [144]. Specific individualised therapy may be needed to address more complex issues [146]. Current recommendations for the treatment and support of ADHD in female offenders are offered in a consensus report [143]. It remains essential to reinforce strengths and achievements rather than focus exclusively on difficulties or challenges during therapy.

4.2. Future Research Directions

The aim of this article is to offer insight into the major challenges identified by girls and women with ADHD. Further research is needed to understand the factors that increase the risk of poor outcomes for some ADHD females. Our cohort highlights the fact that ADHD is not

necessarily a barrier to achieving academic success, but greater efforts need to be made by schools and academic institutions to identify and accommodate the special needs of girls with ADHD.

Understanding the differences between males and females with ADHD regarding cortisol and dopamine neurotransmission requires further research. In particular, the influence of oestrogen on the efficacy and dose of stimulant medication for ADHD needs to be better understood to facilitate a consistent clinical response in females.

Insights are needed into the factors that precipitate self-harm and suicide in young women with ADHD [147]. The association between ADHD, addiction, and obsession [148] requires greater exploration. Both suicide and drug dependency are much more prevalent among males in the neurotypical population, but this gender difference is not apparent among those with ADHD. The reasons for this require exploration and explanation to protect females with ADHD from the increased risks to which they are exposed.

A detailed understanding of what drives disinhibition related to sexual behaviours among girls with ADHD is essential to address the increased risks of early pregnancy and sexually acquired infection. Associated with this is the requirement to better understand the factors associated with their increased vulnerability to victimisation, assault, and bullying. The role of sex education at school and its applicability and relevance to girls with ADHD should be carefully reviewed by the education authority and relevant teachers.

Appreciating the subtle features of female ADHD, their greater tendency towards internalisation and masking, and the influence of trauma in early life are all essential elements that need to be highlighted to parents, teachers, and other caregivers. Ultimately, we must address and remove barriers to earlier diagnosis of ADHD in girls to allow prompt therapeutic intervention to improve outcomes for the girls themselves, 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 and might be more readily achieved by working in tandem with social and, where necessary, probation services.

5. CONCLUSIONS

Women and girls with ADHD have gone under the radar until recently because of their suppressed symptomatology and masking. This has led to a later diagnosis and less support than that offered to men and boys, which has contributed to the high burden of comorbid disorders and developments experienced by females. The themes which emerged from our review were difficulty with emotional development, conflict in friendships and relationships, tendencies towards self-harm and suicidality, hypersensitivity to criticism, development of conduct disorders and the effects of masking. However, there were also distinct advantages which included extreme creativity and hyperfocus in both art and science, facilitating significant contributions to society. However, a lack of consistency and control can challenge positive outcomes. We reviewed

the evidence base for treatment and concluded that both pharmacological and behavioural therapy might reduce adverse consequences in females with ADHD, who should be actively identified early, offered support and treatment to mitigate unwanted outcomes and the positive aspects of their condition emphasised.

COMMUNITY INVOLVEMENT STATEMENT

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 study was designed and developed at the request of females with ADHD known to the authors who asked us to undertake it to highlight their issues and the need for improved recognition, intervention, and support of the condition.

CONFLICT OF INTEREST

Authors declare that they do not have any conflict of interest.

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