ADHD AND TREATMENT

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Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is the most common neurodevelopmental disorder in Canada, affecting 5-9% of children and 3-5% of adults or approximately 1.8 million Canadians[1]. ADHD is characterized by persistent patterns of inattention, hyperactivity, and impulsivity however hyperactivity and impulsivity maybe less externalized in those diagnosed with inattentive ADHD. ADHD significantly impact daily functioning and development and is known to impair one's executive functions (EFs)[2].

Once believed to affect children and adolescents primarily, ADHD is now widely recognized as a lifespan disorder with symptoms persisting into adulthood[3]. Research has found that 85% of children continue to show symptoms and functional impairments into adulthood[4]. ADHD impacts all areas of a person's life. Left untreated, ADHD can lead to devastating consequences over the course of one's life. Children are at risk for accidental injuries, educational underachievement, and difficulties socializing, while adolescents are at risk for early-onset substance use, delinquency, and teenage pregnancy[4]. Many adults fail to reach their full potential, with studies showing an increased risk for substance use disorders, accidental injuries, unemployment, gambling, low quality of life, suicide, and premature death[4]. Fortunately, treatment for ADHD is highly effective, especially when administered from an early age.

ADHD and Executive Functioning

ADHD is often accompanied by impairments in executive functioning, leading to its increasing recognition as an executive function deficit disorder[1]. Often thought of as the "management system of the brain", executive functions encompass a range of higher-level skills crucial for successful functioning in daily life, including attention, planning, organization, task initiation, time management, working memory, processing speed, emotional regulation, and self-awareness[5].

Research consistently demonstrates the significance of impaired executive functions in individuals with ADHD, and it is commonly believed that many of ADHD's primary symptoms and functional implications result from these deficits[6]. While everyone may encounter challenges in these areas occasionally, those with ADHD experience numerous and significantly more debilitating problems with executive functioning, which cause persistent difficulty executing a wide array of tasks and often interfere with daily life[7]. In relation to occupational functioning, studies suggest that ADHD is more impairing than other chronic physical and psychiatric disorders, likely due to the range of executive functions affected with ADHD and the reliance of these skills in the workplace[1]. Individuals with ADHD may be impaired in one or more executive functions, and thus may experience few, many, or most symptoms of executive dysfunction.

Impact of Untreated ADHD

Research shows that as many as 86-98% of adults with ADHD show notable deficits in executive functions[6]. Executive function deficits mean that one's ability to stay focused, meet deadlines, stay organized, plan, initiate and complete a task, process and recall information, and navigate interpersonal relationships is negatively impacted, which can have serious implications in school, the workplace, home, and community.

Children and Adolescents with ADHD are at risk for a variety of long lasting educational, vocational, and social impairments that are associated with the core symptoms of the disorder. It is well documented that children diagnosed with ADHD suffer from problems in daily life functioning as well as difficulties in school. Classroom challenges mainly include disruptive behaviour and academic underperformance which often persist into middle and high school. Adolescents with ADHD have lower grades, are more likely to be suspended or expelled, fail a class, and have higher rates of absenteeism. Studies show 26% of students with ADHD have failed or repeated a grade and 32.2% do not graduate high school.

Because of the difficulties in high school, only 30% of students with ADHD go on to university with only 15% completing a four-year degree[8].

Left untreated, many of the issues children with ADHD face are brought forward to adulthood. Adult ADHD is seldom diagnosed as a standalone disorder. Approx 80% of adults with ADHD have at least one additional mental health condition. Some of the more common co-occurring conditions include anxiety disorders, depression, Substance Use (SU), Bipolar, Learning Disabilities (LD), and Autism Spectrum Disorder (ASD). Also, individuals with ADHD and co-occurring conditions often have poorer outcomes than those with ADHD alone. Studies show that individuals with ADHD alone exhibited better daily functioning when compared to those with ADHD and additional mental health conditions[8].

Adults struggle with employment and occupational functioning, relationship satisfaction, managing health and finances, and any area that requires a degree of consistent follow through. It is well documented that ADHD is associated with many work-related problems such as poor job performance, lower occupational status, less job stability, and increased absence days. A study by the World Health Organization (WHO) reported that 3.5% of the workforce in 10 countries suffered from ADHD, which resulted in 143 million days of lost production as well as an average of 8.4 excess sickness absence days per year. Adults with ADHD also have higher rates of unemployment or part-time employment and change jobs more frequency. According to a study done in the U.S, individuals with ADHD are 20% less likely be employed full or part time and earn an income of 16% less than their non-ADHD counterparts. A 2013 study found that those with ADHD were 61% more likely to have been fired, 33% more likely to be laid off, and 53% more likely to quit their job than those without ADHD. While ADHD is a serious mental health disorder it is highly treatable. Most of the negative consequences noted are associated with untreated ADHD[8].

ADHD Treatment

There are highly effective medication and psychosocial (e.g. lifestyle and parent training) treatments available for ADHD which markedly change the usual trajectory of illness and

impairment. With appropriate treatment, it is never too late to address these challenges and effect changes that can reverse negative impacts[4]. Treatment for ADHD should consist of a timely assessment and diagnosis, early intervention, and treatment tailored to individual needs. Research suggests that improved early intervention strategies and policies, including better management of ADHD symptoms through tailored treatments and support systems, could alleviate the need for extensive educational and healthcare resources, reducing the clinical and economic burden of ADHD[9].

The Canadian ADHD Practice Guidelines recommend a 'comprehensive, collaborative and multimodal treatment approach to treat symptoms and challenges associated with ADHD[8]. The multimodal treatment approach involves a combination of therapeutic approaches, including medications, behavioural therapy, social skills training and school/work-based accommodations. An international research study on the Multimodal Treatment of Children with ADHD showed combination treatment, including medication and behavioural therapy, proved superior for anxiety symptoms, academic performance, parent-child relations, and social skills compared to medication or behavioural therapy alone[10].

Medication

Whereas the goal of ADHD treatment is to alleviate symptoms and enhance functioning at home and school/work, research recommends the use of ADHD medication as a critical component in an effective ADHD treatment plan[4]. ADHD medications can reduce a range of adverse outcomes associated with the disorder. Importantly, studies have shown that early medication treatment of ADHD prior to puberty markedly diminishes the risk for substance use[4].

ADHD medication has two major classes, stimulants and non-stimulants, with stimulants considered as the first line of treatment[11]. Ninety percent of people with ADHD respond to one or both classes of stimulant medication, resulting in a high overall effectiveness rate[12].

Medications play a crucial role in ADHD treatment as they respond to symptoms such as inattention and emotional instability by enhancing focus, improving self-regulation, and

reducing impulsivity and hyperactivity. When tested in an academic setting, 78% of the adolescents showed significant benefits of stimulants on note-taking quality, quiz and worksheet scores, written language usage and productivity, teacher ratings, and homework completion[13,14]. The efficacy and tolerability of available ADHD medications can vary significantly from person to person, and hence healthcare providers may suggest different medications in order to find the optimal prescription.

However, medication alone cannot alleviate all ADHD symptoms. Thus, ADHD impairments related to organization, time management, planning, memory, and social behaviour require different treatment options, such as psycho-social interventions[15].

Psychosocial Interventions

In addition to ADHD medication, it's important that individuals engage in psychosocial interventions such as educational and skill-based programs. Research shows a positive correlation between psychosocial interventions and improved executive functioning skills (EFs)[16]. Impairments such as organization, time management, task initiation, self-regulation and social behaviour require interventions separate from medication[15].

In children and adolescents, treatments may include cognitive behaviour therapy, social and emotional skills programs, academic accommodations and physical activity. In childhood, academic accommodations are the most common response to ADHD in educational settings, as many students tend to have additional learning needs, such as working memory, organizational, time management, and emotional and self-regulation issues. Academic accommodations can include allowing extended time while taking tests, allowing tests to be taken in a quiet setting, or the use of assistive technology[17]. In addition, post-secondary accommodations can include early access to lecture notes, using prompt sheets during tests, and working with the accessibility centre to tailor accommodations.

In adults, psychosocial treatments may include ADHD coaching, workplace accommodations, cognitive behaviour therapy, physical activity, and mindfulness.

ADHD coaching has shown to be an effective form of treatment for individuals with ADHD. ADHD coaching is a tailored approach to life coaching designed to assist individuals with ADHD in developing and implementing personalized strategies and skills. It uses aspects of psychoeducation to help individuals create a comprehensive understanding of how the condition affects their lives over time as well as allows individuals to draw parallels between their cognitive, emotional, and behavioural patterns and ADHD symptoms. A review of 19 research studies on ADHD coaching showed that 89% of studies found statistically significant improvements in ADHD symptoms[18,19].

Workplace Accommodations

Workplace accommodations are a great way to support employees with ADHD in the workforce. Employers report positive returns on investment once workplace accommodations are put in place. 85% indicate that accommodations help retain valued employees, 53% note increased productivity, and 47% state eliminated costs related to training new employees[20]. Workplace accommodations are divided into two groups: Hard accommodations and soft accommodations. Hard accommodations include tangible items such as, noise cancelling headphones, stand up desks, visual aids (calendars or timers), recording devices for meetings, voice out put software (Grammarly, or Dragon) or an ADHD Coach. Soft accommodations are adjustments employers can make to help employees excel in the workplace. They can include inclusive policies regarding neurodiversity, alternative work arrangements/schedules, regular check-ins with the manager, written instructions in addition to verbal, clear guidance and expectations for tasks and projects, eliminating non-essential job tasks, and providing information in an ADHD-friendly format (video, bullet form, graphs, charts etc.).

Cognitive Behaviour Therapy (CBT)

Cognitive Behavioral Therapy (CBT) has shown to be beneficial for people with ADHD. CBT is a form of psychotherapy that modifies thought patterns to encourage behavioural and emotional responses. Its goal is to equip individuals with effective coping strategies to address various life challenges. For individuals with ADHD, working in conjunction with medication, CBT aims to target executive function impairments that result from core ADHD

symptoms[21]. Unlike ADHD coaching, CBT can also treat common comorbid disorders. Research shows adults with ADHD who received CBT also had significantly reduced symptom scores on anxiety and depression ratings[21]. In a meta-analysis, cognitive behavioural therapy (CBT) demonstrated significant effectiveness in reducing behavioural symptoms of ADHD symptoms and functional impairment symptoms such as problems in work/education, family, life skills, social skills and/or risk-related behaviours[22]. Additionally, ADHD group CBT has been shown to significantly improve on measures such as knowledge about ADHD, self-efficacy, and self-esteem. Participants' evaluations of group CBT sessions also suggest that sharing personal experiences with other adults with ADHD was an essential aspect of the intervention[23]. Hence, group CBT treatment might be an efficacious and cost-effective intervention for adults with ADHD.

Challenges & Considerations in ADHD Treatment

Access to Treatment

Early intervention is a crucial factor in lowering the risk of unfavourable long-term health, academic and social outcomes for individuals with ADHD. However, getting a timely assessment can prove to be difficult as wait times for accessing appropriate mental health services can be more than 1.5 years in some regions of Canada[24]. In 2023, over 2000 children were on provincial waiting lists to seek assessments for either autism or ADHD[25], forcing Canadians to turn to private practices where the price of ADHD testing can be anywhere from $1,000 to $3,500.

The lack of ADHD-trained physicians is a major factor contributing to long wait times in Canada. A survey conducted in BC showed that only 52% of general practitioners (GPs) reported feeling comfortable with ADHD assessment and diagnosis, while 78% expressed comfort in evaluating and diagnosing mood disorders. The ability of a GP to recognize common mental health conditions is a crucial step in early diagnosis and intervention of

ADHD. We also know that ADHD rarely occurs as a stand-alone disorder, which can make the assessment of the disorder even more complicated. Therefore, it's critical to consult a qualified physician who is well-versed in ADHD diagnosis who can conduct a thorough medical history to rule out other potential causes[26].

Similar to ADHD assessments, treatment for ADHD can be difficult to access. Both medication and psychosocial intervention can be costly and hard to find. Individual psychosocial treatment can range from $200 to $400 per session, making it challenging to access ongoing care, even for those with the benefit of private health insurance.

Inattentive ADHD

Inattentive ADHD differs in presentation from the more stereotypical hyperactive presentation most associate with ADHD. Individuals with inattentive ADHD are often characterized as being easily distracted, day dreamy, unable to complete tasks, easy going, and introverted, making them unlikely to receive an ADHD diagnosis in childhood[27]. The salient nature of internalized inattention symptoms leads to underdiagnosis in children[28]. ADHD for these individuals is usually diagnosed when significant life changes occur, such as moving away from the parental home, starting post secondary education, or beginning a new job. It is not uncommon for individuals with inattentive ADHD to be misdiagnosed with anxiety or depression before receiving an ADHD diagnosis, given the overlapping symptoms. This is most common in females as they present most often with inattentive ADHD[29].

Gender Bias

Females tend to exhibit more inattentive symptoms of ADHD, which are often less noticeable than overt hyperactive behaviours[29]. This tendency contributes to the underdiagnosis of ADHD in females, as their symptoms are frequently overlooked, misinterpreted and/or misdiagnosed. An Ontario research study showed that boys are diagnosed three times more than females between the age of 6-15yrs, but after the age of 15yr, females were diagnosed three times more than boys[30].

Misdiagnosis of women with ADHD is also very common. A survey conducted by CADDAC on *Canadian women with ADHD* revealed 46% of respondents initially received an incorrect diagnosis before their ADHD was identified. Many participants described a pattern of being diagnosed with, and unsuccessfully treated for anxiety and depression for extended periods—often years or decades—before their underlying ADHD was recognized and addressed. This had a significant impact on treatment, as 60% of women reported that their ADHD treatment was postponed by 20 years or more due to misdiagnosis[31].

Racial Factors

Racialized children and individuals have a more challenging time getting an ADHD diagnosis. Research suggests this is due to the biases or misconceptions teachers and/or clinicians carry, affecting how racialized children's behaviour is interpreted. For example, the behaviour of Black students is frequently misinterpreted as confrontational, leading to inaccurate behavioural assessments. This misinterpretation is compounded by a persistent social stigma associated with behavioural issues among Black individuals[32]. Studies have shown that non-white children, from kindergarten to the end of grade eight, are less likely to be given an ADHD diagnosis when compared to white children, even though they are not less likely to show ADHD-related behaviours[33,34].

Recommendations

Although we know that there are effective treatments for ADHD, there are currently many barriers for an individual or family being able to effectively manage ADHD or support their child or loved one with ADHD. Lack of public information, the scarcity of trained clinicians, and insufficient support in our schools/workplaces are all obstacles for those impacted by ADHD every day. We believe collaboration between Government, educational institutions, professional associations, mental health and addiction facilities, individuals and their families will be the catalyst to effect successful outcomes. Together we can improve the

lives of Canadians affected by ADHD. We are calling on government at all levels in Canada to invest in the below areas:

1. Empower families and individuals with resources and knowledge to better recognize and understand ADHD and to access care by investing in ADHD programs across Canada
2. Educate medical and mental health practitioners in an evidence-based approach to ADHD assessment, diagnosis and treatment across the lifespan.
3. Ensure ADHD education is a curriculum requirement for all teacher training programs in Canada

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