ENCYCLOPEDIA on Early Childhood Development

ADHD and Treatment

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Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a common and impairing neurodevelopmental disorder that originates in childhood and tends to persist across the lifespan. ADHD is strongly heritable, affects approximately 5-8% of young persons, and occurs more commonly in males than females. As described in the Diagnostic and Statistical Manual of Mental Disorders–Fifth Edition,[1] ADHD consists of symptoms that are developmentally extreme, highly impairing and cross-situationally displayed. Such symptoms fall into two categories: (a) inattention-disorganization and (b) hyperactivity-impulsivity. Individuals who display significant symptoms of inattention-disorganization (but not hyperactivity-impulsivity) are considered to have the Inattentive Presentation; those who display significant symptoms of hyperactivity-impulsivity (but not inattention) are categorized in Hyperactive-Impulsive Presentation. The most common clinical presentation of ADHD is the Combined Presentation, in which the individual displays significant symptoms from both symptom domains. Current evidence-based interventions for ADHD consist of psychotropic medications and behaviour therapy.[2,3,4,5]

Subject

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Determining the most effective intervention strategies for ADHD is highly relevant. It is critically important to determine which components of evidence-based treatments are most effective (including evaluation strategies for making this determination), to identify how treatment strategies can optimally be combined, to determine ways in which to individualize treatments in order to achieve optimal results, to establish the best means of promoting generalization and maintenance of treatment gains, and to determine the factors that contribute to ideal treatment outcomes.

Problems

Years of intervention research have identified and honed evidence-based treatments for ADHD, including behavioural interventions and medication treatment. Yet such treatments, although evidence-based, are not curative and do not result in significant improvements for all who are treated. Additionally, effects of current evidence-based treatments are not generally long-term and tend not to generalize across settings.

Research Context

The voluminous research on risk factors, correlates, long-term outcomes and underlying processes related to ADHD has still not been fully translated into mechanism-specific interventions. Still, a number of well-controlled single-case reports and randomized, controlled clinical trials attest to the viability of behaviour therapy and medication interventions for ADHD.

Key Research Questions

A key research question involves evaluating the effectiveness of interventions for ADHD, including behavioural, medication and combined behavioural-medication interventions. Additional critical research issues focus on identifying factors that explain how and how well treatments work, and for whom.[6] Such factors may include sex, ADHD subtype, developmental level, comorbidity, parental factors, medication dosage, cognitive changes, and family discipline styles.[6,7,8,9,10]

Recent Research Results

Current evidence-based treatments for ADHD include medication and behavioural interventions. Medication treatments for ADHD typically consist of psychostimulants, although other types are often concurrently prescribed in order to address comorbid disorders. Psychostimulants used to

address ADHD symptoms include methylphenidate, dextroamphetamine, and mixed amphetamine salts, which all enhance the transmission of dopamine. Atomoxetine, a norepinephrine reuptake inhibitor, has also been found to be effective. Both dopamine and norepinephrine are neurotransmitters (messengers in the brain) that are involved in many mental processes. Whereas such medications have been shown to reduce ADHD-related symptoms and functional impairments across settings,[4] effects tend to last only as long as the medication is active within the body and brain.

As a result, and to promote active skill-building, non-medication treatments are often recommended as well. Behaviour therapy is the only consistently evidence-based intervention for childhood ADHD aside from medication. Behavioural treatments typically involve interventions with parents, teachers, and the child.[2,11] Specific components of behavioural interventions for ADHD include direct contingency management and clinical behaviour therapy. Direct contingency management consists of teachers or counselors directly rewarding target skills and employing effective consequences when problems arise. More commonly-used clinical behaviour therapy procedures involve (1) parent training on topics including behaviour management (e.g., positive parental attention, rewards for appropriate behaviour, negative consequences for misbehaviour) and (2) teacher training on topics such as use of prompts and rewards in the classroom. Across most relevant investigations, the greatest likelihood of symptom reduction occurs when medication and behavioural treatments are combined, particularly with respect to functional outcomes.[12,13,14]

Although evidence-based interventions for ADHD have been identified, few randomized controlled trials have focused on identifying specific individual factors that influence treatment outcome. Key factors emerging from the Multimodal Treatment of children with ADHD (MTA) Study included the presence of a comorbid anxiety disorder, family public assistance, ethnicity/race, severity of ADHD, parental depressive symptomatology, child IQ, attendance, medication use in the community and negative/ineffective parental discipline.[6]

Finally, cognitive enhancements of contingency-based interventions (e.g., social skills training with parent training) as well as cognitive training to ameliorate neuropsychological deficits commonly associated with ADHD (i.e., executive function deficits, which include difficulties planning, staying organized, inhibiting inappropriate responses, setting and carrying out goals) may be viable but evidence is currently limited. A critical issue with the current evidence-based behavioural interventions for ADHD – including combination treatments of medication and

behavioural interventions – is that treatment gains often are not maintained over periods of time, nor are gains generalized across settings.[3]

Research Gaps

A major issue with current evidence-based treatments for ADHD concerns generalization.[16] Specifically, individuals with ADHD tend not to translate gains obtained in one setting to other key life settings. Thus, future treatment development efforts should focus on determining components of interventions that promote long-lasting maintenance of treatment gains across settings. An additional issue involves developing treatments that can address functional impairments that often accompany ADHD (e.g., social difficulties, academic struggles, organizational skills deficits). Successful interventions in these domains may have significant long-term effects, with the potential for contributing to the elusive goal of maintaining gains. Finally, a critical gap in the literature pertains to early, preventive interventions. Such interventions, if successful, could alter the trajectory of ADHD from the start, preventing later problems. Although this approach is being used in other neurodevelopmental disorders (e.g., autism spectrum disorder), such methodology has rarely been used in the study of ADHD.[17] One key problem relates to false-positives: how many preschool-aged children at risk for ADHD will actually proceed to the full disorder?

Conclusions

ADHD is a common and impairing neurodevelopmental disorder that requires intensive intervention. Much research has focused on identifying evidence-based interventions for ADHD. Current evidence-based treatment options include behavioural interventions and medication treatment. Medication treatment provides the greatest reduction of core ADHD symptoms (inattention, hyperactivity-impulsivity) whereas evidence exists that the combination of medication and behavioural interventions results in the greatest improvement in associated impairments (e.g., parent-child relations, academic problems, anxiety). Although these treatment options are useful for decreasing core symptomatology, they do not appear to remediate core deficits related to ADHD, and they tend not to produce long-term, generalized gains. It will be essential to promote translational research linking biological and contextual risk factors to development of improved treatment strategies. Important areas for future research include identifying specific factors that influence treatment outcome, developing of interventions that produce effects that can be generalized and maintained over time, determining ways to address

the functional impairments commonly present in individuals with ADHD, and ascertainment of the potential benefits of preventive measures.

Implications for Parents, Services and Policy

Professional organizations (e.g., American Association of Child and Adolescent Psychiatry and American Academy of Pediatrics)[18,19] have published assessment and treatment guidelines for ADHD, but there is little or no enforcement of such professional guides, nor is it clear that reimbursement always or even usually covers such standards. Families need to be aware of the need for relevant health professionals to have demonstrated expertise in ADHD and its common comorbidities and impairments; policy-makers need to assure adequate assessment and treatment standards. Furthermore, large regional variation in rates of diagnosis and treatment of ADHD exists within the U.S.[20] and internationally.[21] Policy-related factors such as high-stakes achievement testing, training of professionals, insurance coverage, and advertisements for treatment (particularly medication) may all be relevant regarding this wide variation. Overall, knowledge of ADHD, reduction of stigma regarding its identification and treatment, enlightened policies that provide for evidence-based services, and proper means of assessing treatment-related gains are essential goals if youth and their families are to receive optimal services.[22]

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