

Future Directions for Research and Management of ADHD

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Abstract

Clinicians have been aware of the problems of overactivity and inattention for over 200 years and many advances have been made in this time. However, ADHD remains a very common and challenging condition that does not always respond well to treatment. Some of the areas of research that might prove fruitful in terms of future management include pharmacogenetics, better definition of ADHD subtypes, ADHD across the age range from preschool children to the elderly, the role of health psychology, ADHD in the presence of other conditions such as autism, bulimia or personality disorder, intervention strategies using computers and a focus on emotional dysregulation. The aim of research into these and other areas will be to provide better management of people of all ages with ADHD in the future.

Introduction

While the disorder has not always been called ADHD, the history of the clinical syndrome of inattention and overactivity dates back over 200 years beginning with Melchior Adam Weickhard in Germany in 1770 (1) and in the U.S. by Alexander Crichton in 1798 (2). In the last 200 years since these early descriptions, much has been learned about ADHD, leading to important advances in the diagnosis and management of this common psychiatric disorder. Despite this progress, there is still much we do not know about this condition. The purpose of this paper is to outline several potential areas of clinical and research endeavour that may hold merit for improving the lives of individuals with ADHD.

Pharmacogenetics

One of the more recent advances has been the tremendous explosion of technology permitting improvements in our understanding of genetic mechanisms in ADHD. In the light of the finding that 60-80% of the ADHD behavioural phenotype variance is due to genetic factors (3), the field of pharmacogenetics represents an opportunity to improve medication response rates by using individual candidate genes and genetic polymorphism information to predict individual response. For example, knowing that an individual has a specific gene variant which affects receptor or transporter activity or metabolizing enzymes might help to inform prescribing practice to minimize adverse effects and improve outcomes. This is currently a long way from being standard clinical practice, yet a clear future direction for ADHD research is investigating candidate genes, gene-gene interactions and effect modifications by environmental stimuli. All of these may be related to medication response rates and may even result in the development of new medications. The potential clinical utility of this research is strong and eventually prescribing physicians may have treatment efficacy and adverse effect prediction algorithms based on individual genotyping to guide prescribing practice.

The validity of the DSM-IV ADHD subtypes

Another future direction for research which may hold merit is investigating the validity of ADHD subtypes. Classifying ADHD is clinically and scientifically important, with ongoing discussion on how best to reflect this in DSM-V (to be published in 2013). DSM-IV includes three subtypes: primarily inattentive, primarily hyperactive / impulsive and combined (4). Conversely, Europeans using the International Statistical Classification of Diseases, 10th Revision (ICD-10) do not distinguish subtypes. Previous research, much of it inconclusive, has focused on differentiating the Inattentive and Combined subtypes, with mixed success (5-7). For example, existing family data provide only weak evidence of discriminant validity between the DSM-IV Inattentive and Combined subtypes (8). The subtypes are also unstable over development and are cross-contaminated, in part due to age effects. Molecular genetics may hold more promise for determining whether the subtypes are distinct (as outlined in the DSM-IV) or are better represented as a continuum trait (like hypertension). One approach to subtyping having some merit is distinguishing individuals with sluggish cognitive tempo (SCT) from those with ADHD. SCT is characterized by slow processing of information, staring, daydreaming, mental foggy or confusion, lethargy, and hypoactivity. Recent evidence suggests that SCT is a distinct disorder from ADHD yet may overlap with it in up to half of all cases (9).

ADHD in the age 'extremes' (preschool, elderly)

Although ADHD was long considered to be only relevant to children (10), in the past 30 years longitudinal evidence has accumulated, suggesting that ADHD often persists into adulthood (11-13). Much of what we know about ADHD in adulthood relates to young adults. There is less information on middle-aged adults and far less data on ADHD in old age / geriatric populations. Given our aging population, far more research should focus on ADHD in the context of middle and old age. Are treatments as effective? What types of psychiatric comorbidity are there? What is the relationship between ADHD and cognitive decline? These are all questions that currently remain unanswered. Similarly, because of increased recognition and awareness, more preschool children are being diagnosed with ADHD and treated with stimulants, for example the Preschool ADHD Treatment Study (PATS) (14). While there is some evidence that standard child pharmacological (15) and psychosocial interventions (16) are effective, far less is known about treatment outcomes in the preschool population compared with what is known about older children.

Health Psychology

Traditional research and clinical domains of health psychology such as quality of life, treatment adherence, obesity, cardiovascular disease, stress, etc. have not received much research attention in relationship to ADHD, although evidence shows that ADHD contributes to these and other health risks (11). These domains all go well beyond simple ADHD symptoms and speak to the need to focus not only on symptom reduction but also functional improvement. For example, it might be anticipated that ADHD symptom reduction would be strongly associated with quality of life improvement. However, this is not always the case (17). Furthermore, if stimulant medications are effective at reducing ADHD symptoms, it might be anticipated that treatment adherence would be high. This too is not always the case (18). Inadequate adherence to treatment is not unique to ADHD; poor treatment adherence has been documented for a variety of serious medical diseases and mental health disorders, such as HIV and schizophrenia (19, 20). Individuals with ADHD may experience forgetfulness and disorganization as part of their condition. These symptoms may make it difficult for an individual to adhere to their medication as prescribed (21). Further strategies to improve treatment adherence are greatly needed.

ADHD in the context of autism spectrum disorders, bulimia, borderline personality disorder

While much is known about ADHD that is comorbid with anxiety, mood disorder, substance misuse and disruptive behavioural disorders, far less is known about ADHD in the context of other disorders which can be characterized by impulsivity, for example autism spectrum disorder (22), bulimia (23) and borderline personality disorder (24). Is ADHD a risk factor for developing bulimia as recent evidence (25) suggests, or for a subtype of borderline personality disorder (26)? How does comorbid ADHD affect treatment outcome in these subgroups?

Computerized remediation interventions

Many parents of children with ADHD anecdotally report that their child is “addicted” to video games and/or the computer. Recent evidence supports these reports (27). It is consequently not surprising that some researchers have assessed the utility of computerized interventions towards reducing ADHD symptoms (28, 29). However, far more research is needed before any firm conclusions can be reached about whether computerized interventions might represent a viable treatment option. In particular, research assessing the efficacy of computerized interventions for teaching academic skills is a particular area of research need.

Emotional dysregulation

Much previous research has focused on the cognitive aspects of ADHD. A clear research need is to focus more on the emotional aspects of ADHD, specifically emotional dysregulation. A few studies have directly assessed emotional dysregulation (30, 31) in ADHD but these have been largely descriptive and have focused exclusively on boys. More recent studies do suggest that impulsive emotion and poor emotional self-regulation are closely linked to ADHD symptoms and are specifically predictive of various impairments beyond ADHD symptoms alone (32). More research addressing emotional dysregulation across the lifespan, in females with ADHD and how best to intervene is clearly needed.

Conclusions

While much has been learned about ADHD over the past 200 years, there is still a great deal that we do not yet fully understand. A number of areas of investigation that might prove fruitful in terms of guiding the future management of this challenging condition over the lifespan have been discussed but these only serve to underline the fact that there are still many uncertainties about ADHD and a great need for further research.

GP Comment.

What have I learned from this paper?

Potential future advances that might improve the management of ADHD include the following.

1. Genotyping to guide the prescription of medication for ADHD and subtypes.
2. Gaining a greater understanding of the subtypes of ADHD and what the implications of these might be.
3. The recognition that ADHD might affect not only school-age children, teenagers and young adults but also pre-school children and the elderly.
4. Developments in non-medical strategies to improve the life of people with ADHD

5. Development of a greater understanding of the relationships between ADHD and comorbidities, including autism spectrum disorder.
6. Because some children with ADHD are very attracted to computer games, exploring the possibility of using these therapeutically.
7. The development of improved strategies for managing the disinhibition and emotional dysregulation that are often a very troublesome aspect of ADHD.

As a general practitioner, it is interesting for me to know what the future advances in the understanding and management of ADHD might be but I wonder whether further research on behavioural strategies and social manipulation might be just as valuable in bringing benefit to the lives of the patients with ADHD and their families as the “high-tech” advances. Perhaps one of the more feasible suggested advances might be the use of computers to teach and reinforce self-regulation strategies.

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