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Pharmacotherapy for Parents with Attention-Deficit Hyperactivity Disorder (ADHD)

Impact on Maternal ADHD and Parenting

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Abstract

Given the high heritability of the disorder, attention-deficit hyperactivity disorder (ADHD) is common among parents of children with ADHD. Parental ADHD is associated with maladaptive parenting, negative parent-child interaction patterns and a diminished response to behavioural parent training. We describe our previous research demonstrating that stimulant medications for mothers with ADHD are associated with reductions in maternal ADHD symptoms. Although limited beneficial effects on self-reported parenting were also found in our study, the impact of ADHD medications on functional outcomes related to parenting and family interactions may not be sufficient for many families. Many questions remain with regard to how best to treat multiplex ADHD families in which a parent and child have ADHD. In particular, future studies are needed: (1) to evaluate how best to sequence pharmacotherapy, psychosocial treatment for adult ADHD and behavioural parenting interventions; (2) to determine the best approach to maintaining treatment effects over the long term for both parents and children; and (3) to identify individual predictors of treatment response.

Although attention-deficit hyperactivity disorder (ADHD) was once viewed exclusively as a childhood disorder, it is now well understood that ADHD typically persists into adulthood.[1,2] While the DSM-IV[3] criteria for ADHD have been widely criticized for their lack of developmental sensitivity and are currently being revised to be more relevant for all age groups,[4,5] it is clear that impairments in social and academic/occupational functioning persist or worsen in adulthood.[6] Furthermore, adding to the challenge of assessing and treating adults with ADHD is the high rate of psychiatric co-morbidity present in adulthood, especially with mood and substance use disorders,[7] which may compound impairments in family interactions. Despite the persistence of ADHD and high rates of psychiatric co-morbidity, the adult treatment literature is quite limited in considering functional impairments and co-occurring problems associated with adult ADHD. Researchers and clinicians alike have long theorized that the attention problems, impulsivity in decision making and affective lability associated with adult ADHD may negatively impact key family relationships, including marital functioning, parenting and parent-child interactions;[8,9] yet, empirical

research on this topic has only emerged in recent years and very limited research is available examining treatment effects on these functional domains.

1. Attention-Deficit/Hyperactivity Disorder (ADHD) Runs in Families and is Associated with Impaired Family Interactions

Examining the effects of pharmacotherapy of adult ADHD on family functioning is a critically important area of inquiry for a number of reasons. Forty years ago, Cantwell[10] reported that 10% of parents whose children were clinically referred for hyperactivity were hyperactive children themselves. Recent heritability estimates for ADHD exceed 0.75,[11] making it quite likely that more than one individual within a family will have ADHD. In fact, existing family studies suggest both that parents with ADHD are more likely to have children who are also diagnosed with ADHD[12] and that parents of children with ADHD are more likely to have ADHD themselves.[10,13,14] Recent estimates suggest that approximately 17% of parents of children with ADHD met criteria for ADHD in childhood. Although only a subset of these parents will continue to meet full diagnostic criteria for ADHD in adulthood, existing evidence suggests that the vast majority of individuals with childhood ADHD remain impaired into adulthood.[1,15]

Second, both parental psychopathology and parenting behaviour have been identified as important environmental risk or protective factors in developmental outcomes for children with ADHD.[16,17] ADHD in both parents and children likely contribute to the reciprocal negative interactions within these families, which may in turn negatively impact the child's developmental course. Indeed, Biederman et al.[18] reported that the presence of parental ADHD was associated with higher levels of family conflict and lower family cohesion. Likewise, Arnold et al.[19] found that paternal involvement was characterized by negative, critical, over-reactive and authoritarian discipline among fathers with elevated ADHD symptoms. Core ADHD symptoms (inattention, hyperactivity and impulsivity) may compromise an adult with ADHD's ability to effectively parent in many ways. Inattentive symptoms may be associated with a lesser degree of involvement or difficulty monitoring the child's activities. Children with ADHD require parents to actively structure the environment, provide frequent prompts and be able to proactively anticipate problems; thus, poor parental planning and organization may be particularly impairing when the child has ADHD as well. Parents with ADHD may also experience difficulty implementing consistent rules and consequences in response to child misbehaviour. Impulsivity, for example, may make it difficult for parents to inhibit their negative responses in favour of more adaptive responses and may contribute to emotionally reactive parenting, making parents more likely to use inconsistent, harsh discipline or physical punishment.

Finally, inconsistent parenting may result from a parent with ADHD forgetting to follow through with consequences, failing to attend to the child's appropriate or positive behaviour, or impulsively applying a consequence that is either inappropriate for the situation or inconsistent with previous discipline. Adult ADHD can also contribute to marital dysfunction, further exacerbating ineffective parenting and child behaviour problems.[8,20,21] For all of these reasons, as well as the cumulative stress of living with persistent ADHD and co-morbid disorders, we theorize that treating parental ADHD may positively impact a variety of domains, including parenting, marital and family interactions.

Although adult ADHD occurs in both mothers and fathers, with few exceptions (see Fabiano[22]), initial efforts to examine this empirically have focused on mothers because of the key role they play in parenting. For example, in a recent study, mothers with ADHD reported less consistency in their parenting and less monitoring or knowledge of their children's activities, and generated solutions to child behaviour problems of lesser quality on an analogue child-rearing task relative to a comparison group of mothers without ADHD.[23] More recently, we utilized a multi-method approach to examine associations between continuous maternal ADHD symptoms and parenting in families of 6- to 10-year-old children with ADHD.[24]

Mothers' ADHD symptoms were inversely related to their reports of involvement, positive parenting and consistent discipline. During observed parent-child interactions, maternal ADHD symptoms were inversely associated with positive parenting, and positively associated with negative parenting and 'rapid-fire' commands before giving the child an opportunity to comply. Thus, several observational studies suggest that core symptoms of adult ADHD are associated with maladaptive parenting behaviour.

2. Parental ADHD Negatively Impacts Evidence-Based Treatments for Children

Evidence-based treatments for childhood ADHD, including stimulant and non-stimulant medications, behaviour therapy and the combination of pharmacotherapy and behavioural therapy (i.e. multi-modal treatment), rely on parents to obtain and consistently deliver the treatment.[25] Administration of child stimulant medications requires parents to schedule and keep monthly appointments with the prescribing physician, to obtain refills in advance of the prescription running out and to remember to administer medication daily or multiple times per day. Moreover, both access to healthcare providers who practice evidence-based behavioural therapies as well as limitations in the availability of ADHD medications and restrictions in pharmaceutical benefit plans represent significant barriers for families with ADHD.

In addition to clinic attendance and compliance with homework assignments, behavioural parent training requires parents to monitor child behaviours, modify environmental antecedents and consequences, and maintain consistency in both expectations of and responses to child behaviour. It is therefore no surprise that ADHD in parents is associated with an attenuated response to behavioural parent training programmes for children with ADHD.[26-28] In the National Institute of Mental Health (NIMH)-funded Multimodal Treatment Study of Children with ADHD (MTA), the combination of child stimulant treatment plus behaviour modification was associated with the most dramatic improvements in parenting and family interaction.[29] However, maternal psychopathology moderated response to both pharmacological and behavioural treatments,[30] and higher parental inattention predicted less child improvement at 3-year follow-up.[31] Furthermore, in a recent study, ADHD mothers' observed failure to inhibit their negative responses to child misbehaviour mediated poorer child behavioural treatment outcomes.[26] Thus, examination of relations between treatment of parental ADHD and parenting behaviour has important clinical implications for both children and adults with the disorder.

3. Pharmacotherapy for Adult ADHD

Similar to the child ADHD treatment literature, pharmacological treatment for adult ADHD includes both stimulant medications (e.g. methylphenidate, amphetamine formulations)[6,32] and non-stimulants, such as atomoxetine.[33] The short-term efficacy of stimulants and atomoxetine in adults has been well established through randomized controlled trials and meta-analyses and these medications are approved by the US FDA for use in treating adult ADHD.[34] As suggested by Wilens et al.,[35] the relatively lower average response rate of 60% and increased variability (response rates of 25–78%) in adults relative to children may be due to poor selection criteria, limited outcome measures (i.e. exclusively self-report), higher placebo response rates in adults and use of lower paediatric dosages for all age groups.

Although the main emphasis of adult ADHD treatment studies to date has been on demonstrating reductions in core ADHD symptoms and global response, ultimately effectiveness is related to reductions in functional impairment in key life areas. Although it is assumed that ADHD symptoms and impairment are closely linked, as reported by Gordon et al.,[36] there are only moderate associations between symptom and impairment measures in children. As yet, there is relatively little evidence for this in adult populations.[35]

However, some recent studies provide preliminary evidence that adults with ADHD treated with stimulant medications also display improvements in broader areas of functioning and quality-of-life

measures. For example, Medori and colleagues[37] reported improvement on the Sheehan Disability Scale (SDS),[38] measuring impairment in work, social and home life, when participants received active dosages of osmotic-controlled release oral delivery system (OROS) methylphenidate compared with placebo.[37] Similarly, Wender et al.[39] reported improved social functioning as well as improvements in mood lability and temper control in adults treated for 1 year with OROS methylphenidate. These studies conducted with adults in heterogeneous samples (with respect to age and gender) suggest that improvements in life functioning can occur as a result of stimulant medication. Evidence for improvements in impairment has also been documented for atomoxetine, as measured by the SDS.[40]

3.1 Effects of Pharmacotherapy on Parenting and Parent-Child Interactions

Previously, it has been demonstrated that stimulant treatment of children with ADHD has an acute beneficial effect on parent-child interactions.[41,42] Specifically, parents were observed to be less controlling (i.e. issuing fewer commands) and more positive with their children who were receiving methylphenidate compared with placebo. Theoretically, a positive response to pharmacotherapy in ADHD parents could also improve family interaction and have beneficial effects on other family members.

Parents with ADHD represent an important population for study, since family dysfunction, adversity and impairments in parenting have been well documented in families with ADHD,[29,43,44] and are robust predictors of developmental and treatment outcomes for children with ADHD.[16,45] Presently, relative little is known about the effects of stimulant treatment on parents, or about the relationship between symptom change and improvement in parenting and family functioning.

We conducted the first group study examining stimulant treatment for mothers with ADHD. In this small pilot study, we examined the impact of increasing doses of OROS methylphenidate in 23 mothers of children with ADHD who also had ADHD, and evaluated effects on maternal ADHD symptoms and parenting.[46] Higher doses of OROS methylphenidate (72–90 mg) were associated with improvements from baseline in self- and other-reported maternal ADHD symptoms. In addition, we found improvements in mothers' self-reported parenting (but not maternal parenting as reported by their spouses). On increasing doses of OROS methylphenidate, mothers reported on the Alabama Parenting Questionnaire (APQ)[46,47] that they were more actively involved with their children, more consistent in their discipline and less likely to use physical punishment.[46] Thus, linear dose effects were found on both maternal ADHD symptoms and self-reported parenting, with greatest effects on both domains found at the highest doses.

In our pilot study, parent-child interactions at baseline and when mothers were taking an optimal stimulant dose were observed during a 20-minute analogue observation session. In contrast to self-report measures of parenting, no significant differences in observed parenting behaviours were detected.[48] Although observational measures of parenting are regarded as superior to questionnaire measures, we cannot rule out the possibility that maternal and/or child behaviour may have been influenced by the artificial nature of the laboratory tasks. Also, it may be that longer assessment periods are needed to assess treatment effects. It should be noted that there were several additional methodological limitations. There was not an untreated comparison group and all mothers received the 5-week medication titration. Moreover, 60% of children were receiving pharmacological treatment for their ADHD during the study, which may have reduced variability in parenting and child misbehaviour, making it more difficult to detect effects of maternal stimulant medication on parenting outcomes. Finally, the observations took place after school into the early evening. It is therefore possible that maternal medication effects wore off prior to the child's bedtime, which is particularly challenging for parents of children with ADHD given the organizational demands. Despite these limitations, current evidence does *not* suggest that medication alone is adequate to fully address the maladaptive parenting and ne-

gative parent-child interactions found in these families. Multi-modal approaches are likely needed.

4. Conclusions and Future Directions

ADHD is highly heritable[11] and therefore quite common in parents and children within the same family. Impaired parent-child interactions are characteristic of families with adults and children with the disorder, and are a negative prognostic indicator for children with ADHD.[16] In studies of children with ADHD, stimulant medication alone and in combination with behavioural therapy is associated with improved family functioning; however, effects on family functioning are strongest for multi-modal (i.e. behavioural and pharmacological) treatment.[29,44] Unfortunately, the presence of parental ADHD is associated with an attenuated response to behavioural treatments,[26,28,31] highlighting the need to screen (and, if necessary, treat) parents of youth with ADHD for adult ADHD. Thus, the presence of a child with ADHD should increase the clinician's suspicion of parental ADHD, which may be more subtle if not previously identified.

Adult treatment studies reviewed herein indicate that pharmacotherapy for maternal ADHD is likely to reduce core symptoms of inattention, hyperactivity and impulsivity,[46] which we expect would allow the mother to derive increased benefit from a skills-based parenting intervention. That is, mothers who respond to pharmacotherapy would presumably be more likely to consistently attend behaviour therapy and other clinic appointments, concentrate more fully during therapy sessions, and more consistently implement behavioural parenting skills at home, which involves inhibiting automatic (often negative) responses to child behaviour. However, this needs to be empirically tested.

Our pilot study of mothers with ADHD suggested that treating mothers with OROS methylphenidate in addition to reducing ADHD symptoms may have an impact on some aspects of parenting, namely an increase in parental involvement and consistency and a reduction in the use of physical punishment.[46] The effect was most pronounced at higher dose levels, similar to methylphenidate effects on maternal ADHD symptoms. It is unclear if the increased benefit of higher doses is a direct effect of the higher dose level or the result of longer duration of action. For many parents with ADHD, stimulant treatment may need to extend into the early evening when multi-tasking and excessive demands on parents are heightened (e.g. at homework, dinner and bed times), and may require twice-daily dosing or agents of longer duration than those used for children.

Stimulant medication is a promising treatment for parents with ADHD, as it appears to be well tolerated, and is also widely available.[35] Although effective and well tolerated in short-term studies, there is a need for longer-term safety studies with adults. In addition, although stimulant medications are considered the first-line treatment for adult ADHD, many adults cannot or choose not to take medication and, among those who do, residual symptoms are common.

In recent years, there have been a number of studies (including two well conducted, randomized controlled trials[49,50]) of structured, skills-based psychosocial treatments for adult ADHD, that have largely aimed to teach compensatory skills,[51] at least in part to address residual symptoms following pharmacological treatment.[32,52] These cognitive-behavioural therapy (CBT) models emphasize the acquisition, repeated practice and reinforcement of skills such as time management, behavioural activation, organization and planning to reduce the impairment associated with ADHD symptoms and associated executive functioning deficits. In addition, these interventions use traditional CBT techniques to target dysfunctional thoughts, which may contribute to procrastination, avoidance and attentional shifts.[52] Certainly, provision of these compensatory skills could have an impact on parenting difficulties experienced by adults with ADHD, as well as the ability of adults with ADHD to benefit from behavioural parenting interventions. These questions await empirical investigation.

In developing a treatment plan for parents with ADHD, further questions remain regarding stimulant dose response effects, optimal duration of stimulant treatment for parents, differences

between methylphenidate and amphetamine formulations, and non-stimulants, and approaches to treating families in which both parents have ADHD or parents have psychiatric co-morbidity (e.g. with mood or substance use disorders). It may be that for many families with a mother with ADHD and a child with ADHD or at risk for ADHD, pharmacotherapy of maternal ADHD may be necessary but not sufficient. Given the importance of parenting and the likelihood that medication alone will not reverse long-standing negative interaction patterns, we expect that for many families a combination of maternal stimulant medication and/or CBT for mothers and a behavioural parenting intervention will be needed to address parenting skills deficits. Parenting interventions would likely need to be modified for parents with ADHD, perhaps by incorporating some elements of CBT for adult ADHD.

Although the sequencing of adult ADHD treatment and behavioural parent training has never been examined empirically, we theorize that maternal medication should precede participation in behaviour therapy due to the adverse effects of parental ADHD on behavioural treatment response described above. Integration of compensatory skills taught in CBT for adult ADHD with behavioural parent training may also be an effective approach to enhance parent training outcomes. We know from the adult treatment studies reviewed herein that maternal stimulant medication is likely to reduce inattention, hyperactivity and impulsivity, which we expect would allow the mother to benefit more fully from a skills-based parenting intervention. That is, mothers with ADHD who are treated with stimulants would be hypothesized to be more likely to consistently attend behaviour therapy, concentrate more fully during therapy sessions and to more consistently implement behavioural parenting skills at home, which will involve inhibiting automatic (often negative) responses to child behaviour. Similarly, the executive skills taught in CBT programmes for adult ADHD have tremendous potential to improve parenting and behavioural parenting intervention response. As yet, no study has examined the effect of combining and/or sequencing treatments such as pharmacotherapy, CBT for adult ADHD and behavioural parent training for mothers and children within a family, and tested whether it is better to treat the child or parent first. It is for these reasons that randomized controlled trials are needed to examine whether treatment of adult ADHD results in improvements in parenting and family functioning, and whether these improvements can be sustained over the long term. Moreover, investigations of treatment algorithms and predictors of response for use in real-world clinical practice are needed to elucidate the optimal sequencing of treatments for individual families.

The majority of studies reviewed herein (and the only study of treating mothers) have focused on mothers of children who have already been diagnosed with ADHD.[46] Thus, we know very little about how adult ADHD treatment may impact fathers, or families in which both parents have ADHD. Furthermore, it is unclear if treatment of parents with ADHD will have an effect on non-disordered children or those with subclinical ADHD. It is possible that adult ADHD will have a more profound impact on parenting and family functioning when the child poses greater challenges in terms of need for organization and structure, and presents with disruptive behaviour, which is more likely to elicit negative parenting responses. On the other hand, perhaps treating adult ADHD among mothers of very young children may impact the persistence of ADHD or delay the onset of co-occurring disruptive behaviour disorders and possibly even the need for pharmacological treatment for the child. For instance, recent research suggests that remission of maternal depression after antidepressant treatment was associated with increased remission of a variety of internalizing and externalizing disorders in children, and children of mothers whose depression remitted were less likely to develop new psychiatric diagnoses than children of mothers who remained depressed.[53] Although the onset of ADHD may not be directly influenced by environmental factors, longitudinal research suggests that parental psychopathology impacts the persistence of ADHD.[45] In addition, our own research suggests that maternal psychopathology and early parenting predict the longi-

tudinal course of conduct problems among young children with ADHD.[16,54] Thus, future studies should target adults with ADHD who have young children, regardless of whether their children have been diagnosed with or treated for ADHD. It remains to be determined whether this recruitment approach would be fruitful, as clinical lore suggests that parents often first consider whether they themselves have ADHD at the time of the child's evaluation. Parents may also be less receptive to initiating treatment for themselves first. However, treating the parent as early in the child's life as possible is warranted given the importance of parenting for child developmental outcomes.

The most pressing question is to determine optimal treatment strategies utilizing pharmacotherapy and behavioural/CBT to help the parent and the child in families in which a parent has ADHD. Surprisingly, despite the high prevalence of parental ADHD, the wide variability in child ADHD treatment response and limited evidence for maintenance of treatment effects in children with ADHD,[55] there are almost no empirical data on broader, family-based, multi-modal treatment approaches to multiplex ADHD families in which both the child and the parent have ADHD. Future studies of such families have the potential to inform when and how best to intervene.

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