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ADHD: Culture, Treatment Strategies and their Relevance to Preschool Children

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### Abstract

In recent decades a growing number of individuals in preschool, middle childhood and adolescence have been diagnosed with ADHD. Accompanying increasing rates of diagnoses is an increase in the use of stimulant medication in preschool populations, a practice not approved by the Food and Drug Administration. This paper reviews the current literature pertaining the social and developmental consequences of ADHD, its effect on the child and family, treatment strategies with and without the use of stimulants, and cultural and diagnostic trends which may be contributing to the rising number of diagnoses. A review of the literature suggests that there is a dire need for further empirical research into the use of stimulant medications in preschoolers, and a number of cultural factors unique to the United States have contributed to increasing rates of ADHD diagnosis.

## ADHD: Culture, Treatment Strategies and their Relevance to Preschool Children

**Epidemiology**

Attention deficit hyperactivity disorder (ADHD) is a behavioral disorder, characterized by inattention, impulsivity, and over-reactivity. The Diagnostic and Statistical Manual of Mental Disorders defines it as follows: “Attention-Deficit/Hyperactivity Disorder is a persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequently displayed and more severe than is typically observed in individuals at a comparable level of development (DSM-IV-TR). Estimates of the prevalence of ADHD vary, although clinical studies to clinical surveys ADHD is the most common attention disorder, present in approximately three to seven percent of children globally, all though rates of diagnoses and treatment vary between countries (DuPaul & Stoner, 2003). Actual rates of ADHD diagnoses depend heavily on data gathered from worldwide usage rates of medications designed to treat ADHD like methylphenidate (Ritalin, Concerta etc.) and mixed amphetamine salts (Adderall etc.) (Singh 2008).

ADHD is diagnosed during childhood but symptoms of the disorder can persist through adolescence into adulthood (Kratovich et al. 2004;). In fact, the DSM-IV-TR requires that an onset of symptoms occur prior to age seven in order to make a diagnosis (American Psychiatric Association; DSM-IV-TR). Individuals who are diagnosed with the disorder typically have a variety of symptoms which may interfere with daily social interaction or tasks that require sustained focus and attention to detail (Anastopoulos et al., 2010). The DSM-IV-TR lists three subtypes of disorders which are combined under the general heading of ADHD: combined type (ADHD-CT), predominantly inattentive type (ADHD-IA), and predominantly hyperactive-

impulsive type (ADHD-HI) (DuPaul & Stoner, 2003; Wilens, 2009). Symptoms vary according to specific subtype. For reference, the following criteria for diagnosis of ADHD is listed below as it appears in the DSM-IV-TR:

### **Diagnostic Criteria for Attention-Deficit/Hyperactivity Disorder**

A. Either (1) or (2):

(1) six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

1. often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
2. often has difficulty sustaining attention in tasks or play activities
3. often does not seem to listen when spoken to directly
4. often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
5. often has difficulty organizing tasks and activities
6. often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
7. often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
8. is often easily distracted by extraneous stimuli
9. is often forgetful in daily activities

(2) six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

1. often fidgets with hands or feet or squirms in seat
2. often leaves seat in classroom or in other situations in which remaining seated is expected

3. often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults,, may be limited to subjective feelings of restlessness)
4. often has difficulty playing or engaging in leisure activities quietly
5. is often “on the go” or often acts as if “driven by a motor”
6. often talks excessively
7. *Impulsivity*
8. often blurts out answers before questions have been completed
9. often has difficulty awaiting turn
10. often interrupts or intrudes on others (e.g., butts into conversations or games)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g., at school [or work] and at home).

D. There must be clear evidence of clinically significant impairment in social, academic or occupational functioning.

E. The symptoms do not occur exclusively during the course of Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

### **Neurobiology**

Studies have aimed to investigate the neurobiological manifestations of ADHD. Extant studies have found that ADHD is associated with decreased cerebral volume in children and adolescents (Filipek et al. 1997). Deficiencies in the pre-frontal cortex, caudate nucleus, caudate head, right anterior-superior frontal region, white matter, and bilateral anterior-inferior regions, bilateral retrocallosal region are important as these regions have been linked to a number of cognitive functions. Research has shown that the pre-frontal cortex is crucial to self-regulation, the performance of complex reasoning while the caudate nucleus is essential to learning and

memory function. The corpus callosum is a narrow fibrous band of tissue that facilitates communication between the two hemispheres. The cerebellum is vital to motor control, attention, language, emotion and the regulation of fear and pleasure responses. According to a number of studies, children who have been diagnosed with combined-type ADHD have less volume and cortical structures related to self-regulation of behavior and emotion. However, these studies have been criticized on a number of methodological grounds, including small single sex samples and inconsistent measurement techniques. Additionally, some studies have attributed these cerebral differences to the use of stimulant medications during early childhood.

There are a number of studies that have failed to replicate these findings. In a 2002 study using magnetic resonance imaging to measure the volume of various cerebral and subcortical structures, children with ADHD were found to have roughly equivalent ratios of gray and white matter in all cortical structures except for the cerebellum and caudate nucleus (Castellanos et al. 2002). The findings of Castellanos et al. are important, as they suggest that cerebral differences between non-symptomatic children and those with ADHD should not be attributed to the use of stimulant medications. Rather, these observed differences may be a result of early neurobiological developmental disturbances that are fixed and do not progress as children mature.

### **Treatment Strategies**

#### *Behavioral Therapy and Parental Training*

When approaching the treatment of ADHD, clinicians tend to recommend an approach that includes some measure of behavioral therapy. Extant studies have found that behavioral

therapies aimed at directly modifying the behavior of preschool children are ineffective (Pelham & Fabiano, 2008). From these findings we can gather that the most effective way to treat a child with ADHD at this developmental stage is through parent-directed intervention programs.

Intervention programs using parental training are generally designed for preschoolers with more mild symptoms, although they can be used in conjunction with psycho-stimulants for children with more severe symptoms. Parent training has been associated with consistent behavioral improvements in the behavior of preschoolers with ADHD. In general multi-modal treatments involving parental training, pharmacological treatment, and interventions in a school setting are reserved for school-aged and adolescent children. With regard to its effectiveness in the treatment of early onset ADHD in preschoolers, parent training has been shown to be effective in reducing the frequency of negative parent-child interactions and enhancing feelings of efficacy for parents as they deal with their ADHD symptomatic child. Parent training programs teach caregivers strategies to cope with their child's behavior through a variety of techniques. Clinicians instruct parents to reward prosocial behavior using praise, attention and tangible rewards while discouraging antisocial behavior by using non-physical discipline (Young & Amarasighne 2009).

Several intervention programs have resulted in clinically significant treatment outcomes. The Triple P program reduced instances of hyperactive and inattentive behaviors in the experimental group when compared to the control group (Bor, Sanders, & Markie-Dadds, 2002). After the treatment stopped, the behavioral improvements persisted for approximately one year. The New Forest Parenting package was found to reduce ADHD symptoms and improve maternal well-being with these outcomes persisting for 15 weeks after the cessation of treatment (Weeks,



Thompson, Laver-Bradbury, 2009). When clinicians begin treatment it is essential that they be aware of parental attitudes toward the program as they are a significant predictor of the eventual treatment outcome (Young et al. 2009). In some instances, 'parent training' is seen as a pejorative term, by which parents believe that their child's behavior is attributed to their personal shortcomings. Clinicians must make an extra effort to ensure that parents understand they are simply receiving training to deal with the extraordinary requirements of parenting a child with ADHD. A 2010 study investigated parental attributions for success in the treatment of their child's ADHD. In a sample of 96 subjects using a between subjects design, parents were treated using three conditions: high behavior modification, low behavior modification, and no-behavior modification. Additionally, each child was prescribed physiologically appropriate doses of methylphenidate after completing a medication assessment procedure. Over the course of the study the level of medication was manipulated by researchers, with the subjects receiving a placebo on some days. Using parents' logs of their child's behavior and self reports of their effectiveness in treating it researchers were able to analyze what affected parental attributions of success. Coles et al. 2010 found that parents were more likely to attribute success in treatment to their own behavior in treatment conditions where behavior modification was used along with medication. Parents were less likely to feel successful in managing their child's behavior in treatments where no behavior modification was involved. Coles et al. noted that there were several weaknesses. The between subjects design may have influenced parents perception of the no behavior modification treatment, as in the high-behavior modification condition parents were more likely to attribute success to child effort and parental strategies. Coles et al. suggest that the use of behavior modification techniques is important because they contributes to parental

feelings of efficacy. A number of studies have demonstrated that parental feelings of efficacy are associated with reduced parental stress, and improved parent child relationships (Dix & Grusec, 1985).

### **Safety of Stimulant Use in Preschoolers**

Although methylphenidate is widely prescribed by pediatricians and physicians for use on children aged three to five and a half, the FDA does not approve the use of methylphenidate in children under the age of 6. Use of medication in preschoolers is something that should be considered with the greatest care as a child's behavior and development may be significantly impacted. Metabolic rates within the nervous system are highest during the first three years of life (Shonkoff & Phillips 2000). Despite the number of recent studies investigating the efficacy of stimulant use for ADHD in small children, there is a considerable lack of research investigating their safety. During this critical period of social and physiological development, it is of utmost importance that clinicians consider the physiological risks of stimulant medication. A number of studies measuring behavioral adjustment with methylphenidate use have found that at adequate dosages, methylphenidate is effective in reducing off task and disruptive behavior (Barkley 1988). Methylphenidate use has also been associated with a number of adverse physiological side effects. In a double blind study investigating adverse side effects of methylphenidate, Wigal et al. (2006) found that even with adequate dosage 30% of parents reported that their children had difficulties falling asleep, with repetitive behaviors and or thoughts, appetite decrease, emotional outbursts, and irritability. Eleven percent of the original participants withdrew from the study due to the severity of the effects. For preschoolers, reduced appetite may be an incredibly salient issue. A lack of nutrition during the earlier stages of the

development of the central nervous system may lead to an increased likelihood of later cognitive deficits and behavioral problems. Second, the temperament and behavior of a child play a key role in levels of parental stress and the development of a secure attachment style. An increase in emotional outbursts and irritability may contribute greatly to later intractable problems in the development of prosocial behavior and social relationships. It is essential that more longitudinal studies be performed to evaluate the effectiveness of continued methylphenidate use on social development.

A 1998 study performed by Firestone et al. used low-dose (0.3 mg/kg) and high-dose (0.5mg/kg) methylphenidate treatments in a double-blind, placebo cross over design. To measure the the drug's effect on behavior and physiological well being, Firestone et al. used the Side Effects Rating Scale. They found that methylphenidate exerted a positive effect on the behavior of children when assessed on the sub-scale for temperament. However there were significant decreases on the sociability and somatic sub-scales. High-dose methylphenidate was associated with increased reports of 'sad/unhappy' behavior as well as a decrease in reports of irritability and anxiety. Additionally, the high-dose methylphenidate group had fewer reports of insomnia when compared to the low-dose methylphenidate group (Firestone et al. 1998). In comparison to the experiences of the participants in the Wigal study, the adverse side effects described here were considered to be relatively benign. No children withdrew due to adverse side effects. The findings of this study indicate the importance of individual assessment for each patient and careful consideration of adverse side effects after diagnoses and during treatment.

### **Comorbidity and Its Considerations**

#### *Mood and Behavioral Disorders*

According to the DSM-IV-TR approximately half of children diagnosed with ADHD will be comorbid for other mental disorders including Developmental Coordination Disorder, Oppositional Defiant Disorder or Conduct Disorder, as well as a number of mood, anxiety, communication and learning disorders. Conduct and Oppositional defiant disorder are characterized by a consistent pattern of disobedient and defiant behaviors towards parents and other authority figures that exceeded norms of child behavior (DSM-IV-TR). The treatment of ADHD along comorbid disorder presents a unique clinical challenge. Some existing studies suggest that the use of stimulant medications can be ineffective when young children exhibit symptoms of three or more comorbid disorders. Other studies with differing methodology have failed to replicate these findings however.

In a large 70 week study examining the safety of methylphenidate use in 300 preschool children aged three to five and a half years old, researchers found that when preschool children presented 3 or more comorbidities the effectiveness of stimulant treatment was significantly reduced based on parent and teacher ratings (Ghuman, Riddle, Vitiello 2007). For children with one comorbid disorder, treatment was nearly as effective as for children with only ADHD. Children with two comorbid disorders experienced a moderate response to stimulant medication while children with three experienced nearly no treatment response whatsoever.

A later study performed suggests that the specific type of comorbidity is a significant factor in the success of stimulant treatment (Ter-Stepanian, Grizenko, Zappitelli, Joobar 2010).

Ter-Stepanian et al. performed a two week trial involving 267 children aged 6 to 12 years to explore whether a difference in treatment success arose in children with oppositional defiant disorder/ conduct disorder or anxiety and depressive disorders. Their findings indicate that children who are symptomatic of conduct and oppositional defiant disorder are more likely to demonstrate a greater response to methylphenidate treatment, while children with comorbid anxiety are more likely to experience a poorer response to the same treatment. Admittedly, the sample Ter-Stepanian et al. chose to investigate did not contain children from the preschool age group and the possibility exists that the differences in development between these two populations may change the outcome of a similar study involving preschool children. Nevertheless, these findings are an important contribution to the literature exploring this topic. There is however, a need for further empirical research pertaining to behavioral disorder comorbidity and the effectiveness of stimulant medications.

### *Motor Problems*

While diagnosing ADHD, clinicians tend to refrain from considering treatment of motor problems that are often comorbid with ADHD like symptoms. Motor problems in this context are referred to as Developmental Coordination Disorder [DCD]. DCD occurs in approximately 30-50% of children who have been diagnosed with ADHD (Fliers et al., 2008; Magalhaes, Missiuna, & Wong, 2006; Polatajko & Cantin, 2005; Visser, 2003). Consideration of motor problems is of utmost importance in the treatment of children with ADHD. Behavioral impairment and emotional outbursts often undermine a symptomatic child's ability to reach out socially to their peers and may hamper a child's academic advancement. Motor problems may contribute to these impairments, especially in cases where physical interaction is necessary or

encouraged. Motor difficulties can be especially salient for preschoolers and infants. Preschool children generally lack the ability to explore the world through an intellectual framework. Instead, preschool children gain an understanding of the world largely through their own manipulation of the physical world around them. In order to facilitate development in these critical periods, it is essential that clinicians include a focus on motor skills while treating children who are symptomatic for ADHD like behavior (Gaines et al., 2008). According to a study by Fliers et al. only 50% of children who exhibited symptoms of DCD, received physiotherapy treatment. Fliers et al. found that children who were rated by their parents as having motor difficulties had a higher likelihood of receiving treatment than those who were rated by teachers. This observed difference could be explained by the pedagogical culture of the classroom. That is, teachers may be more likely to recommend a child for treatment if their behavior is congruent with ADHD, as behavioral issues tend to make themselves more apparent in an academic context. What's more, there may be an equal occurrence of motor problems in the non-clinical population. These questions necessitate further empirical investigation.

### **Social and Emotional Regulation**

#### *ADHD and Attachment*

There is a dearth of empirical research investigating the formation of attachment styles and the influence of ADHD in very young children. The lack of empirical research can likely be attributed to the nature of the disorder, diagnostic procedure and when most children are diagnosed with the disorder, upon entrance of school. It is generally accepted that the behavior of very young children is more variable than that of children in middle childhood. Because of this, it is

more difficult for clinicians to distinguish between genuine cases of ADHD and children who may have a more active or inattentive temperament. Regardless, there have been several studies that have shown a link between caregiver-child attachment styles and ADHD symptoms in children. The strength and quality of the caregiver-child attachment is of utmost importance to the long term psychological development of the child. This concept and its related behaviors are referred to as attachment (Bowlby 1969). The quality of this relationship has been shown to account for much of the observed variation in children's emotional, social and behavioral development (Cox and Paley 1997). It is prudent to note that the relationship between the caregiver and the child is bidirectional even in cases where abnormal neurodevelopment (ADHD) is not a factor (Collins et al. 2000). That is, the behavior of the parent influences the behavior of the child and the behavior of the child influences the behavior of the parent in a fluid system. The behavior of a child who has been diagnosed with ADHD can be significantly impacted by a variety of environmental factors, including the parenting style used within the home (Johnston and Mash 2001). In homes where a child with ADHD is present, parenting styles have been observed to be more authoritative, with child-parent interactions described as having more conflict (Lange et al. 2005). Recently, there have been a variety of studies investigating the influence of neuro-developmental disorders like ADHD on parental stress, and the quality of attachment in the caregiver-child dyad. A multi-method assessment of 104 children demonstrated that child and parent characteristics, defiant behavior from the child and maternal psychopathology were predictors of parental stress in homes where a child with ADHD is present (Anastopoulos et al. 1992). After running a hierarchical regression analysis the severity of the child's ADHD symptoms was found to be the most potent predictor of parental

stress (41%). This study demonstrates it is critical to consider a variety of factors when making recommendations for treatment within these contexts. To best facilitate the development of a secure attachment relationship in populations of preschoolers it would seem the best way to reduce conflictual interactions and reduce parental stress is to reduce the severity of the child's ADHD symptoms.

Some studies have shown that the use of stimulant medications like methylphenidate can have a positive effect on the caregiver-child dyad in certain contexts. Barkley 1984 demonstrated that the use of Ritalin (methylphenidate) increased child compliance, with higher doses contributing strongly to reducing mothers controlling behavior towards children. The ability to regulate one's behavior and emotions is fostered in early relationships with caregivers. To encourage the development of this relationship it is best: "Attachment theory assumes that the parents' or caregiver's early acceptance of the child's needs and their responsiveness to his/her signals determine the child's level of attachment security or insecurity (anxious or avoidant attachment), and the child's ability to use the parent as a "secure base." This in turn determines the development of internal representations of the self and others (termed "internal working models" by Bowlby) (Finzi-Dottan et al. 2006). If stimulant medication is an effective treatment for ADHD symptoms in older children, it is likely that these medications may be effective in even younger children as inhibition control issues pertaining to temperament have been observed in infants (White 1999). However, there may be a variety of physiological and developmental differences between children in middle childhood and infants.



### **Trends in the Use of Medication**

To understand current trends in the use of medications to treat attention deficit hyperactivity disorder, it is essential to consider sociocultural factors and their impact on families, education, and the pharmaceutical system. The United States is responsible for 80% of the world's methylphenidate consumption (United Nations International Narcotics Control Board, 2005). During the latter portion of the 20<sup>th</sup> and early parts of the 21<sup>st</sup> century there has been a marked increase in the prescription of methylphenidate (MPH) and other stimulant based medications for the treatment of ADHD in children of all ages across cultures. Though the general increase in the use of MPH may be explained by improved understanding of the nature of ADHD, it is more likely that this phenomenon can be explained by cultural changes in expectations of child behavior and the acceptance of medical intervention. Olfson et al. (2003) found that medicinal treatment of ADHD has increased in part due to expanding access of special education services, increase in the availability of behavioral healthcare and the growing acceptance of the use of psychotropic medications in the treatment of behavioral disorders.

Schools contribute greatly to individual child development in that they are the only public institutions charged with responsibility for educating children in academia and standards of behavior in a social context. Furthermore, public schools in the United States are expected to moderate student physical and mental health through a number of physical and special education programs. As a result of these cultural expectations, it is unsurprising that public school systems across the nation now carry medical personnel on their staffs to ensure that students receive

adequate care. According to an investigation performed by Singh (2008), the cultural shift in the public schools from traditional education without the expectation of mental and physical care is explained by a shift in cultural expectations during the post World War II period. The founding of the National Association for Mental Health (NAMH) contributed to the 'medicalization' of the American education system (Cohen 1989). As one of its primary aims the NAMH sought to combine prevailing biomedical theories of the day with pedagogical techniques to influence the development of student personalities (Cohen 1983). It is this shift that can account for an increase in diagnoses for all kinds of mental disorders:

The process of implementing a preventive mental healthcare agenda in schools likely helped to establish the school and school personnel as legitimate primary diagnosticians of children's cognitive and emotional problems. It also set up a potential tension between the school and the home, in relation to observation and definition of behavior problems in a child....The level of integration among school, clinic, government policy and psychiatric understanding of child development may have resulted in a unique fertile ground for drug treatments for children's problem behaviors to find acceptance in the US context (p. 353).

Singh suggests that the culture surrounding ADHD, and the perceived responsibility of the teachers to intervene creates a culture which contributes to an increased rate of diagnoses. These factors work in conjunction with accepted norms of behavior in the classroom, the amount of available resources and teaching techniques to affect rates of diagnoses. In classrooms where teachers are responsible for a larger group of students and the school may lack the necessary resources to assist the teachers with their lessons, the teacher may be more inclined to recommend an unruly student visit a clinician. Often, teachers are the first to suggest that

parents consider seeking out a doctor for a prescription, if a student's behavior differs from these accepted norms.

Insurance status and ethnicity have been shown to be significant predictors in whether a child receives a prescription. A factorial survey of primary care physicians found that race moderates the effects of insurance status when physicians decide to diagnose and treat children with ADHD. Using vignettes as a means to study a physician's ability to distinguish between ADHD and non-ADHD cases, Morley (2010) found that being male and uninsured decreases the odds of diagnosis. Similar effects for female cases were not found. Additionally, physicians were twice as likely to recommend psycho-stimulant and or psychotherapeutic treatment when identified as African American. When the hypothetical subjects were uninsured and African American the odds of diagnosis and treatment decreased. The findings of this study indicate that physicians are able to distinguish between true and false cases of ADHD. However, it is clear that race and other factors affect the outcome of what is supposed to be an objective diagnostic process. To be sure, the physicians surveyed did not have the option of seeking further information about their patients as they only had access to textual vignettes. Due to these theoretical shortcomings, there is a strong need for more research exploring how patient characteristics affect the diagnostic process.

### **Conclusion**

From existing cultural and controlled empirical research it is clear that the growing frequency of ADHD diagnosis and use of stimulant medication in the preschool population is a

serious concern. The use of stimulant medications and the subsequent social stigma that accompany an ADHD diagnosis may place an undue strain on future students, their families and the academic institutions that they attend. Since ADHD is a heritable condition, there must be some cultural influence to explain the extreme difference researchers have observed in diagnosis rates between the United States and other nations with near equivalent education and health care systems. For preschoolers it is recommended that the use of stimulant medication be considered as a last resort when behavioral treatments are ineffective as their developing nervous system may render them more vulnerable to developmental disturbances (Gleason, Egger, Emslie 2007). In order for there to be an improvement in the way parents and clinicians treat children there will need to be a number of legislative, cultural and clinical changes. Additionally, there is a dire need for further longitudinal into the neurobiological changes that occur when children use these medications over a long duration (with the appropriate ethical concerns taken into account).

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