

Attention Deficit Hyperactivity Disorder in Very Young Children: Early Signs and Interventions

The number of children diagnosed with attention deficit hyperactivity disorder (ADHD) is rising. It is now considered the most common neuropsychiatric syndrome in US school-age children, affecting 3% to 5%, or approximately 2 million children. ADHD is a chemical imbalance in the brain resulting in inappropriate degrees of inattention, hyperactivity, and impulsivity; these symptoms must be present prior to age 7. ADHD is difficult to diagnose as it is linked to many other conditions such as learning disabilities, conduct disorders, bipolar disorders, and manic-depressive illnesses. The authors offer information on behaviors signaling the need for referral in very young children and describe the positive and negative effects of common medications. They suggest specific behavioral coping strategies for both home and group care settings. Key words: *ADHD, hyperactivity, inattention, impulsivity, young children*

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IN THE PAST decade many young children were diagnosed with a disorder that was not commonly recognized in earlier years. This condition, attention deficit hyperactivity disorder (ADHD), has become the most common neuropsychiatric syndrome in children, reported to affect 3% to 5%, or approximately 2 million school-age children according to the US Department of Education.^{1,2} If this condition were diagnosed prior to school entry, then there would likely be a formidable surge in the request for early intervention services. By extrapolating population figures we can estimate these numbers. According to the US Census Bureau, there were over 18.9 million children under the age of 5 years in 1999.³ Applying the 3% to 5% range to this number, we can estimate that 568,260 to 947,100 children could show early signs of ADHD.

It is likely that the number of very young children who may later be diagnosed with ADHD will be higher among those who have already been diagnosed as having special needs, or those who get services because they are at high risk for poor school performance. According to one study,⁴ this problem accounts for as much as 50% of child psychiatry clinic patients. A recent study of the 1,200 children in foster care services in Broward County, Florida reported 675 (56%) had a mental

health diagnosis. The most common diagnosis was adjustment disorder (38%) followed by ADHD and/or “disruptive behavior disorder,” which accounted for another 19%.⁵ Unfortunately, few early childhood programs exist to assist family members in addressing their child’s behavioral manifestations of this syndrome.

The rise in ADHD has recently come to the attention of the national media.^{6–8} Specifically, many young children are being diagnosed after the parents describe their child’s problem behaviors to their pediatrician. In instances in which the pediatrician is not able to spend considerable time investigating the problem with the child and family, one of two things frequently happens: (1) the pediatrician will tell the parent that the behavior is normal and the child will outgrow it or (2) medication is prescribed based on the concerns and pleas of the parent and the pediatrician’s diagnosis. Unfortunately, it is rare for parents to present careful documentation of the troublesome behaviors or the strategies they have used in attempts to address the problems. This kind of evidence might alleviate premature diagnoses or provide a firm basis for more definitive diagnoses.

Parents and professionals who are well informed as to the distinctions between typical behaviors and behaviors that are extreme, and are thus possible signs of more serious problems, are better positioned to participate actively in the diagnostic process. Not only are they prepared to make a referral when one is appropriate, but also they may be able to begin some successful interventions before the troublesome behaviors escalate. Given that ADHD or attention deficit disorder (ADD) are seldom diagnosed in very young children, few early childhood specialists and therapists receive adequate training in their own discipline-specific programs to recognize the signs of this condition or to assist family members to address the child’s behavioral manifestations of this problem. The purpose of this article is to provide an overview of information on the signs of ADHD-type behaviors as seen in very young children and to suggest referral guidelines and intervention strategies.

DEFINING ADHD

ADHD, like learning disabilities, is multifaceted and lacks a single, universally accepted definition.⁹ If one looks back to the 1950s and 1960s, the characteristics we recognize today as ADHD were described during those times as minimal brain damage. Children with behaviors that exceeded what was normally expected for their age in the areas of inattention, impulsivity, and hyperactivity were characterized as children with minimal brain dysfunction as it was felt these children had experienced conditions that had damaged their brains. With publication of the second edition of the *Diagnostic and Statistical Manual* (DSM-II) in 1968, a reference was made to this condition; however, the emphasis was on hyperactivity as the major presenting characteristic.¹⁰

By 1980, when DSM-III was published, ADD became the new title because professionals were convinced that inattention was the central deficiency. In addition to inattention, children with ADD at times demonstrate lack of impulse control and hyperactivity. ADD was seen as a chronic condition that began in infancy and could extend through adulthood. However, it was still possible to label some children as ADHD, depending on whether hyperactivity was present.¹¹ In 1987, when DSM-III-R was released, the criteria for determining ADHD were included. They were in the form of a list of 14 characteristics. One notable criterion was that onset of the condition had to occur before the age of 7 years.¹² DSM-IV (1994) omitted the list of characteristics from the previous edition; rather, it grouped symptoms under the heading of either inattention or hyperactivity/impulsivity.

Individuals whose symptoms include difficulties in sustaining attention, distractibility, lack of task persistence, and disorganization are diagnosed with ADHD, “predominantly inattentive type.” Individuals with excessive motor activity and impulsive responding are diagnosed as ADHD, “predominantly hyperactive-impulsive type.” One could also carry the diagnosis of ADHD, “combined type.”¹³ These three types were later validated for

children age 4 through 6 years, in cases where a structured diagnostic protocol was used.¹⁴

Perhaps one of the most helpful definitions came in 1990, when Barkley provided a conceptual definition of ADHD as a “developmental disorder characterized by inappropriate degrees of inattention, overactivity and impulsivity. These often arise in early childhood; are relatively chronic in nature; and are not readily accounted for on the basis of gross neurological, sensory, language, motor impairment, mental retardation, or severe emotional disturbance.”^{15(p47)} However, this condition continues to remain a challenge to diagnose, as it is frequently associated with other conditions such as anxiety disorders, bipolar disorders, and depression. In addition, at older ages there are other conditions that are frequently comorbid with ADHD (ie, learning disabilities, oppositional defiant behavior, and conduct disorder) that further complicate the diagnosis.

EARLY BEHAVIORAL OBSERVATIONS OF POSSIBLE ADHD SYMPTOMS

According to the criteria for ADHD in the DSM-IV, ADHD can be diagnosed in a child after the behavior has been present for a minimum of 6 months and the child demonstrates at least six or more of the specific behaviors for inattention or hyperactivity/impulsivity prior to the age of 7 years. Despite these specific requirements, few assessment measures exist that include ways to diagnose the condition in very young children. The few behavior rating scales that did include questions about ADHD-type behaviors were broad in nature, time consuming to complete, and not designed for use during actual observations. After reviewing measures and studies of ADHD in young children, and relating these to our own experiences, we determined that an easy-to-use, short observation scale was needed. We believed that one could reasonably observe the three key domains of behavior relevant to an ADHD diagnosis within the context of play in very young children. Specifically,

these areas were: (1) how the child planned and approached interactions, (2) the activity level in executing actions, and (3) the attention and focus with which children engaged in interactions. These three domains were consistent with the three identified in scales that had been used for children as young as age 3 years.¹⁶ We identified four behaviors within each of the three areas and formed subscales (overactivity, impulsivity, and inattention), named for the characteristic of ADHD with which they were associated. The final version of the scale, named the Attention Deficit Hyperactivity Disorder–Observation Rating Scale,¹⁷ consisted of 12 items, each of which was scored on a 5-point Likert scale. The scale ranged from very limited or not present to behavior that was excessive or clearly exceeded that which was typical for the chronologic age of the child whose behavior was being observed.

Following scale development it was important to field-test the scale and determine whether the behaviors, now incorporated into 12 items, could be used with a very young population. Because of previous association with The Infant Health and Development Program¹⁸ we had access to archived data and videotapes of over 700 low-birth-weight children who were born prematurely. The videotapes included an 8-minute segment in which mothers played with their 30-month-old children. We determined through careful investigation that these short video segments were sufficient for use with the new scale. Our findings¹⁹ upheld the three subscales named above; however, a factor analysis suggested that some items were actually more congruent with other domains.

Further research on our observational tool pointed to six key items, all of which loaded on the inattention factor. The extremes of these behaviors, listed in Table 1, could serve as early warning signs in children under age 3 years of who may be diagnosed with ADHD at a later age. It is important to examine these items carefully, as in our view hyperactivity and impulsivity at this young age are embedded in the items in Table 1 even though they

Table 1. Early signs of possible ADHD

- Acts before thinking
- Changes activities frequently
- Has a short attention span
- Fails to focus and follow directions
- Distracts easily
- Has difficulty staying on task

loaded on the factor we have labeled “inattention.” Thus, our results are not inconsistent with previous reports that found that a high activity level, rather than inattention, is the symptom most noticeable in preschool-age children.²⁰

ADDRESSING EARLY SIGNS OF ADHD-TYPE BEHAVIORS AND MAKING REFERRALS

Early childhood professionals are in a unique position to help families obtain proper diagnosis at earlier ages before the harmful effects of ADHD-type behaviors influence learning, family harmony, and self-concept. Excessive levels of ADHD-type behaviors impede developmentally appropriate socialization, optimal learning, and positive parent-child interactions. However, environmental events, inadequate parenting skills, and other diagnoses (eg, anxiety or mood disorders and oppositional defiant disorders) can lead to behaviors that mimic ADHD. In addition, the child can carry one of these diagnoses and the ADHD is not recognized as problematic.²⁰ Yet, all young children are active, impulsive, and inattentive at times. The difficulty comes in ascertaining when these behaviors are out of the ordinary and creating a handicapping condition. In addition, each case of ADHD can be unique, with behaviors varying from child to child.

For these reasons, it is critical for early childhood education and therapy providers to refrain from overreacting and viewing each child who is easily distracted, runs around, fails to listen, and so forth as a potential candidate. Responses or the lack of response to these negative behaviors often unin-

tionally reinforce the conduct and result in undesirable, learned behaviors. When environments and expectations are not developmentally appropriate or when behavioral expectations are inconsistent and tolerated in one situation and not another, then ADHD-type behaviors can become common, learned responses. Even though the child may exhibit these ADHD-type behaviors, true ADHD may not be present.

The ability to discern when behavior is extraordinary and needs to be addressed either through a referral or through some kind of immediate intervention is an important skill for early childhood providers. When a child demonstrates an inability to sustain attention, to respond with thought, and to move purposefully, professionals should take notice. Because ADHD is a medical diagnosis, many child care professionals will be faced with a decision as to whether referral is warranted. There is no test for ADHD; the diagnosis is a clinical judgment. Therefore, evaluation of children suspected of having ADHD needs to be a multistep, multidisciplinary process. A diagnosis should be based on a complete medical examination and history, information gathered via interviews with a number of persons who know the child, observations made in different naturalistic settings at different times, and scores on parent and teacher rating scales. This is where professional care providers can help.

Early childhood professionals should document over time, and in different situations, behaviors of concern. It is important to keep in mind that the behaviors are not creating a problem unless they are handicapping the child by interfering with his or her cognitive, social, or emotional development. Then, it is appropriate and necessary not to wait, but to speak with the family. If they share similar concerns and have noticed the same type of behaviors at home, then the child care professional should suggest that the family speak to the child's pediatrician or perhaps a child psychiatrist. Table 2 provides some guidelines to help child care professionals make referral decisions.

Table 2. Referral guidelines for possible ADHD

Refer when behavior . . .	Wait and watch when behavior . . .
has been observed for at least 6 months	is recent and inconsistent
is a problem in several settings	appears at a single place or time
occurs during independent and group activities	occurs primarily during group times when prolonged sitting is required
cannot be explained by other circumstances or disabilities	could be the result of recent life events
interferes with learning	indicates child is acquiring skills
affects peer relationships and social development	demonstrates appropriate friendships and interactions
is inappropriate despite clear, consistent age-appropriate expectations	varies in the presence of different adults in the child's life
appears out of the child's control	appears purposeful or attention-getting

INTERVENTIONS AND TREATMENTS OF ADHD

Preschool-age children are infrequently diagnosed with ADHD and interventions are seldom offered. To look for intervention and treatment strategies, it is helpful to turn to what has been tried with young school-age children. Interventions and treatments for ADHD in this population have included various psychotropic medications, psychosocial strategies, dietary management, herbal and homeopathic treatments, biofeedback, and sensory/perceptual stimulation techniques. Of these, the first two are prescribed most often and have been subjected to more substantive research.

Common psychotropic interventions

Medication therapy for children with ADHD involves the intake of a substance that alters brain chemistry and thereby changes the outward behavior of the affected child. By far the most commonly administered medications are stimulants. It seems incongruous to many that children with problems that include hyperactivity are prescribed stimulant drugs such as Ritalin and Dexedrine. These psychostimulant drugs are given because the drugs

are thought to alter the neurotransmitter functioning in the frontal area of the brain, the area responsible for inhibiting behavior and attending to tasks. Thus, children taking these drugs will be able to attend to a task for a longer period of time and will focus better. Research investigations of psychotropic medications have supported the effectiveness of methylphenidate (MPH), dextroamphetamine, and pemoline in children with ADHD.^{1,21} It is estimated that between 70% and 90% of children will have a positive response to one of the major stimulants when it is first prescribed.²¹

While there is extensive research on the use of medications in school-age children, there remains a paucity of research on the use of drugs with young children. Investigators^{1,22} have reported that children who received methylphenidate benefited from this medication. Barkley suggested stimulants increase the "braking power of the brain over behavior."^{23(p252)} We now have a better understanding of how Ritalin works in the brain; it significantly increases extracellular dopamine levels.²⁴ Since dopamine is known to activate motivation and drive, increasing it could explain the improvement in attention seen in children taking this drug. Table 3 provides an overview of three commonly used

Table 3. Common medications and effects

Medication drug class (Trade names)	Effects
Methylphenidate (Ritalin)	A mild stimulant of the central nervous system (CNS) that increases the child's alertness and on-task behavior while decreasing impulsivity, overactivity, and distractibility; improvements are reported in short-term learning in academic areas and in social skills. Ritalin is rapidly absorbed and clinical effects wear off after 4 hours; therefore, it may not last through the school day. A long-lasting form of this medication is used in some cases. There have been some negative reports of the impact of the drug on weight gain and growth. Ritalin is prescribed in about 80% of cases and is reported to be beneficial in improving behavior. This drug has not been approved for children under the age of 6 years; however, trials are underway.
Amphetamines/dextroamphetamine (Dexedrine)	Increases ability to attend to specific activities and reduces hyperactivity; not recommended for children ages 3 to 6 years. It is available in a sustained-release form that lasts 6–8 hours. It is a legally controlled substance that has been abused among school-age children. It can be associated with appetite suppression and insomnia. It is a mild anticonvulsant that has been used concomitantly with seizure disorder.
Pemoline (Cylert)	CNS stimulant that increases attention to tasks, social skills, and intellectual functioning and decreases motor activity. A single dose will last 12 hours. A concern with this drug is liver toxicity and, to some extent, insomnia and anorexia. It is less frequently used than Dexedrine and Ritalin.
d-Amphetamine (Adderall)	A recent, well-controlled investigation ²⁴ compared Adderall with Ritalin and concluded that Adderall was at least as effective as Ritalin in improving acutely the behavior and academic performance of children with ADHD; there were no additional side effects. Two doses of Adderall produced consistently higher effect sizes than the two doses of Ritalin, and clinical recommendations made by both open and blinded staff were more likely to favor Adderall over Ritalin.

medications for children with ADHD. One additional drug, Adderall, was included due to some relatively new findings of the drug when compared with Ritalin.

Perhaps the most important study of treatment practices for children with ADHD was conducted over a 14-month period at six sites in the United States, with children age 7 to 9.9 years.²⁵ This randomized clinical trial examined the effects of four treatment groups: medication management followed by monthly visits, intensive behavioral treatment, a combined medication/behavioral treatment group, and a standard care offered by

community providers. Assessments across multiple domains occurred throughout phases of the investigation. Investigators reported reductions in the symptoms of ADHD over time in all four groups, with significant differences across the groups in degrees of change. The children in the medication management and the combined medication/behavioral treatment groups showed significantly greater improvement than those given behavioral treatment and community care. The combined treatment group did not differ significantly from the medication management group on core ADHD symptoms; however, for non-ADHD symptoms of

oppositional/aggressive behavior, internalizing behavior, teacher-rated social skills, parent-child relations, and reading achievement, the combined treatment group offered greater benefits.

Psychosocial strategies for children with early signs of ADHD

A major responsibility of early childhood professionals is to recognize child behavior that is possibly delayed or abnormal. Parents and professionals will then meet to discuss the problem and determine whether or not it is a mutual concern. This could confirm or question whether the behavior should be brought to the attention of the child's pediatrician. However, regardless of whether the parent takes the child for an evaluation, it is likely that the parents and professional will want to implement some strategies to address the behaviors. Researchers in the large Multimodal Treatment Study of Children with ADHD (MTA) concluded that "behavioral treatments may help families actively cope with their child's disorder and make the necessary life accommodations to optimize family functioning, even when such treatments are not as effective as medication in reducing children's ADHD symptoms."^{25(p1084)} Further support for parent-based therapies for preschool children with ADHD was reported in an investigation of two different models for such services. A parent training model and a parent counseling and support model plus a wait-list control group were compared. ADHD symptoms were reduced; moreover, parent training, when compared with the other two groups, increased mothers' sense of well-being. In addition, 53% of the children whose parents received the training also displayed clinically significant improvement.²⁶

The earlier behaviors are identified and interventions are implemented, the more likely the behavior can be modified before it becomes a more serious barrier to learning. The aim is to redirect children on the preferred developmental trajectory. A common plan is for professionals and families to agree on some strategies. Some will be structural and address environmental arrangements; others

will offer suggestions for adults in interactions with the child. Environments that can individualize and adapt routines and practices to make experiences more positive for the child's development are highly desired. When environments provide developmentally appropriate and meaningful activities, they invite the child's active involvement. Adults have numerous opportunities each day to influence the child's behavior in positive and constructive ways through their responses to the child's initiations. Among the strategies that facilitate the acquisition of appropriate behavior are clear and consistent expectations, directions, and follow-through. The adult can shape interaction by modifying his or her pace and intensity to encourage a

Table 4. Coping with ADHD: Strategies for home and school

- View the child as a good child with a special need.
- Remember that the child's misbehavior is organic in nature.
- Capitalize on the child's strengths and emphasize the positive.
- Provide a special time for the child each day.
- Plan ahead when introducing new concepts and for challenging situations.
- Reduce environmental distractions and be an alert listener.
- Establish clear rules and apply them consistently.
- Ensure that adults support the rules.
- Secure eye contact before giving directions.
- Give clear, simple, straightforward directions.
- Check child's understanding of directions and the consequences of failing to follow them.
- Be patient and low key, but firm.
- Act, don't over talk.
- Refrain from being drawn into debates or arguments.
- Use good and consistent behavior management techniques.
- Understand and use time-outs if the results are effective.
- Give positive feedback and praise frequently and quickly after appropriate behavior.
- Help the child recognize his or her own strengths and accomplishments.

calmer, more attentive atmosphere. Timely implementation of principles of behavior management, such as time-out to regain thoughts and composure, is sometimes helpful. These kinds of environments and interactions will help foster the development of a more positive self-concept in the child. Table 4 includes a more complete list of suggested strategies.

CONCLUSION

In summary, it is critical to pay more attention to preschoolers in order to identify those externalizing behaviors, distinguishing features, and interactions that are reliable predictors for a future ADHD diagnosis. The needs are present when children are very young, but professionals have been reluctant to refer at young ages. By delaying this process,

problems exacerbate and undesirable behaviors become learned. The earlier the recognition of a problem, the sooner appropriate interventions, treatments, and counseling can begin to counter the negative effects of family stress, lowered self-esteem, and ensuing learning and social difficulties. Regardless of a clear diagnosis, professionals can provide support to the families as they address the behaviors that are causing concerns. It is quite possible that some environmental changes can be made that can impact and redirect behavior in more productive ways. Continued research certainly needs to be conducted to further understanding of this handicapping disorder. Hopefully, more support for such research will be forthcoming, and more collaboration between academicians, the medical profession, and professionals in the field of early childhood development will result.

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