CLINICAL IMPLICATIONS OF ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD) ON ADOLESCENCE: REVIEW

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ABSTRACT

Attention deficit hyperactivity disorder (ADHD) is a neurobehavioral disorder that begins in early childhood and has a deteriorating effect on a child or adolescent’s physical, mental, psychological, and emotional functions. ADHD rates as high as 9.5% have been reported in adolescents. The “inattention subtype” is the most frequently observed form of ADHD in adolescents, who potentially experience a decrease in school achievement and a decline in academic performance. Familial inheritance, severe childhood symptoms, psychosocial difficulties, the presence of conduct disorder, comorbid mood or anxiety disorders, and lower IQ levels are predictors of ADHD that continue throughout the adolescent period. Family-based information and clinical interviewing are the most significant methods of diagnosis. Treatment should be recommended for adolescents or adults whose functional deterioration levels and difficulties are high, even if they do not meet the criteria for a formal diagnosis of ADHD. More than half the patients with ADHD are diagnosed with an additional comorbid disorder. Individual assessment and treatment are crucial to the treatment of ADHD. Early intervention, the support of family, and appropriate therapeutic support are useful methods for achieving the goal that adolescents with ADHD might experience adolescence to the fullest.

Key words: attention deficit, hyperactivity disorder, adolescent, DSM-V, comorbidity
Introduction

Attention deficit hyperactivity disorder (ADHD) is a neurobehavioral disorder that begins in early childhood and affects many aspects of functioning areas in which social, academic, individual, and interpersonal fields (Goldman et al. 1998). Main symptoms of the disorder are hyperactivity, inattention, and impulsivity. Hyperactivity can be seen as fidgetiness, excessive talking, or restlessness, while inattention is the appearance of daydreaming, distractibility, and difficulty in focusing on a task for a long time. The basic characteristics of ADHD are hyperactivity-impulsivity and/or inattention symptoms that continue for a minimum of 6 months, and which are prominent, severe, and inappropriate for the individual’s developmental level. For diagnosis of ADHD, the symptoms need to arise in at least two domains (such as home, school, or work) and have a deteriorating effect on function; in addition, some of the symptoms must begin before 12 years of age (APA, 2013). While more noticeable symptoms, such as hyperactivity, tend to decline in the later stages of life, cognitive impulsivity and inattention are chief symptoms that typically show a chronic course (Biederman et al. 1996a). The prevalence of ADHD throughout the world is 3-7% for children (APA, 2000) and 4.4% for adults (Faraone 2003; Kessler et al. 2006), presenting approximately three to five times more frequently in boys than in girls (Kaplan et al. 1994). Boy/girl rates vary from 2/1 to 9/1 in population-based studies. It has been argued that this is because girls mainly experience inattention symptoms while the concurrence of conduct-disorder symptoms is rare; consequently, girls experience less trouble in home or school domains and are less frequently admitted to hospitals for evaluation and treatment by specialists (Rohde and Halpern 2004).

Clinical Implications of ADHD in the Adolescent Period

ADHD rates have been reported as high as 9.5% in adolescents (Kessler et al. 2006; Gimpel and Kuhn 2000; Barbaresi et al. 2002). In the past, ADHD seemed to be a disorder that declines as time passes, and which is cured by the adolescent period. This assumption, however, has been disproved by follow-up studies. ADHD symptoms may disappear in some children, while continuing permanently in others (Biederman et al. 1996b). Although the most common ADHD subtype for children is the “combined type,” the “inattention type” is the form of ADHD most frequently observed in adolescents. In hyperactive/impulsive children, symptoms tend to disappear, for the most part, during adolescence, when compared to children grouped into the other subtypes of ADHD; while some children are designated as being in the “combined type” subgroup, they could meet the criteria for the “inattention type” during adolescence (Hurtig et al. 2007).

The symptoms of ADHD in adolescents and adults include a “difficulty to organize an activity, distractibility caused by environmental signals, a tendency to postpone, difficulty in starting or completing tasks, an inability to shift one’s attention, and being unable to use time effectively”. Hyperactivity symptoms, on the other hand, can be seen as “impatience, a feeling of inner restlessness, an increase in adaptive behaviors, such as the avoidance of activities (like making job choices or occasions that require one to stand still or remain quiet), and frequent job changes. Symptoms generally are experienced internally rather than overtly. Impulsivity is noticed by means of symptoms such as lower levels of tolerance to frustration, quick decision making, fast and reckless driving and frequent motor-vehicle accidents, difficulties in relationships and frequent partner changes, interrupting conversations, and difficulties in controlling anger. If the symptom of inattention is more dominant than hyperactivity, ADHD may not be recognized until the adolescent period (Adler et al. 2007). Inattention and other cognitive problems may lead to a decrease in school achievement and a deterioration of academic performance throughout adolescence (Weiss 1996). Adolescents and adults with ADHD have been reported to experience frequent need to repeat grade levels due to academic insufficiencies (Biederman et al. 1993; Barkley et al. 1990; Murphy and Barkley 1996; Galera et al. 2009). In addition, they are often seen to have trouble keeping their
jobs, sustaining routines, and organizing time (Wasserstein 2005). It is believed that making fewer plans for the future and a weaker self-efficacy could adversely affect the academic achievements of these individuals (Young et al. 2005). Follow-up studies have shown that children with ADHD experience academic difficulties in the very early period of life and that these difficulties tend to continue throughout adolescence and adulthood (Gadow et al. 2001; Mariani and Barkley 1997). Also, studies have revealed that children with ADHD have lower average grade scores and that 32% of them have not been able to complete high school. The grade repetition causes negative outcomes by decreasing learning motivation and academic performance, and leads to an increase in anxious and disruptive behaviors (Barkley et al. 2006).

Clinical Course of ADHD

The developmental course of ADHD varies from person to person in a widely broad range. Cantwell (1985) reported three types of courses: 1) developmental delay, seen in 30% of the cases, in which symptoms disappear in the early young-adulthood period; 2) continual display, in which 40% of patients experience many emotional and social difficulties throughout adulthood; and 3) developmental decay, in which some psychopathologies, such as alcoholism, substance use, and antisocial personality traits, accompany ADHD symptoms in 30% of patients (Cantwell et al. 1985).

There are some follow-up studies showing that ADHD continues in 65-85% of children during adolescence (Biederman et al. 1996; American Academy of Pediatrics 2011; Taylor et al. 1996) and in 4-66% of those in adulthood (Barkley et al. 2002; Weiss et al. 1985; Gittelman et al. 1985; Mannuzza et al. 1998). Hill and Schoener (1996) argued that the risk of ongoing ADHD at age 13 was 40% in children who had ADHD at 7 to 10 years of age whereas the same risk had been found as low as 15-30% at age 18 (Hill and Schoener 1996). Nevertheless, other studies revealed that many ADHD patients have continued to meet the diagnostic criteria of ADHD in their adolescent period (Biederman et al. 1996b; Barkley et al. 1990; August et al. 1998). A five-year follow-up study conducted by August et al. (1998) demonstrated that an ADHD diagnosis continues at a 69% rate (August et al. 1998). Another follow-up study, which was carried out in a first-step health care unit, revealed that 5.5% of young adults had met the criteria for an ADHD diagnosis in their adult period (McCormick 2004; Steinhausen et al. 2003). It is thought that remission rates reported in a wide range are related to differences between diagnostic and follow-up procedures rather than differences in the course of the disorder (Brasset-Harknett and Butler 2007). Similarly, ADHD rates could be determined as in lower rates because of the self-report based diagnosis. Hart et al. (1995) found that ADHD symptoms have continued at an approximate rate of 84% the first year and at a rate of 77% the fourth year (Hart et al. 1995). In a four-year follow-up study conducted by Biederman et al. (1996), ADHD symptoms were found to be permanent in approximately 85% of children during the adolescent period (Biederman et al. 1996b). In another 8-year follow-up study, conducted by Barkley et al. (1990), 72% of boys who had ADHD during childhood met the criteria during adolescence (Barkley et al. 1990). Another 7-14 years follow-up study of children aged who were diagnosed with ADHD during the preschool or primary school period indicated that 88% of them continued to meet the criteria during adolescence and young adulthood (Guney et al. 2013). These results are consistent with the supposition that ADHD often continues through the adolescent or young-adulthood periods.

Ongoing symptoms during adolescence or adulthood could negatively affect the quality of life, resulting in functional loss in many life domains, such as difficulties in academic and social compliance, as well as problems associated with interpersonal or family relations. However, the persistency of ADHD symptoms may not always end negatively. In a study that evaluated the function of adolescents with persistent ADHD symptoms, variables were designated in three domains (emotional, academic, and social compliance) as determiners. Twenty percent of
adolescents were found to function less than satisfactory in all three domains, 20% were found to function better in all three of domains, and 60% were found to function at moderate levels. It is reported that the persistence of ADHD symptoms has not always led to the same result: The symptoms’ effects on the emotional, educational, or social compliance of adolescents have varied from person to person (Biederman et al. 1998).

Many predicting factors that can determine the continuity of ADHD throughout adolescence or adulthood have been defined to include familial inheritance, severity of symptoms during childhood, psychosocial difficulties, the presence of conduct disorders, comorbid mood or anxiety disorders, and lower IQ levels (Biederman 2005; Erçan 2013). The presence of any psychiatric disorders in parents, inappropriate child-rearing attitudes, and lower socioeconomic levels are familial factors that negatively affect the course of the disorder (Erçan 2013). It is interesting to note that some reports conclude that the negative environmental factors that trigger the disorder onset do not have an effect on the course (Kessler et al. 2005). In addition, some follow-up studies have concluded that treating the disorder with psychostimulants during childhood is correlated with increased academic performance in adolescents (Powers et al. 2008), and that transferring from elementary to secondary school could cause the changes in the developmental course of ADHD, and that its symptoms might temporarily worsen during this period (Langberg et al. 2008).

**Diagnostic Procedures for ADHD in Adolescents**

Adolescence is a challenging period in terms of diagnostic issues. Because an increasing number of teachers have limited time to spend with the adolescent, it becomes more difficult to obtain information related to adolescents and the process of evaluating them (Evans and Youngstrom 2006). Thus, family-based information and clinical interviews are the chief means of assessment. In addition, some comorbid disorders, which are seen frequently in this period, may change the clinical representations of ADHD symptoms; this change could, at times, be a primary complaint and the main reason for admission to the hospital (Steinhoff 2008). Furthermore, adolescents who admitted to the hospital with inattention or hyperactivity complaints could be actually diagnosed with other psychiatric disorders (mainly depression or anxiety disorders) (Akdemir and Cuhadaroglu-Cetin 2008, Fettahoglu and Ozatalay 2006; Oner et al. 2002). Moreover, according to some studies 16-21% of those have not been diagnosed with any psychiatric disorder at all (Fettahoglu and Ozatalay 2006; Oner et al. 2002). In conclusion, it is reported that most of the children or adolescents admitted to the hospital with hyperactivity and/or inattention are not primarily diagnosed with ADHD; additionally, reports stress that cases who are admitted because of inattention complaints should be screened and evaluated for many other diagnoses (Oner 2002).

According to DSM-IV, an ADHD diagnosis requires that at least six out of nine symptoms of hyperactivity/impulsivity and/or inattention have been met for at least 6 months. For DSM-V, the requirement is the same with one difference: for those 17 years or older, meeting five out of nine symptoms for at least 6 months is sufficient for diagnosis. It has been suggested that, for those adolescents or adults who display fewer than six symptoms in inattention and/or hyperactivity/impulsivity domains, but have decreased functional levels, the number of criteria can be reduced further. To diagnose ADHD in adolescents, deterioration arising from these symptoms is considered more important than the number of symptoms. It has been suggested that DSM criteria could exclude some patients who display severe symptoms and who may benefit from treatment (Rohde and Halpern 2004; McGough 2007). Although some criteria in DSM are inappropriate for adolescents and adults (APA, 2000), and some adolescents and adults are not able to meet criteria needed for formal ADHD diagnosis (e.g., 6/9), they need to be treated because of deteriorated function (Barkley et al. 2002); this statement is consistent with the aforementioned suggestion. Although adolescents or adults do not meet the criteria for formal diagnosis of ADHD
(at least six symptoms), treatment should be recommended according to the level of function and difficulties faced (McGough 2007).

Comorbidity in Adolescents with ADHD

It has been reported that 40-75% of patients with ADHD have another comorbid psychiatric disorder (Pliszka 1998; Wiener 1997). In adolescents with ADHD, reported comorbidity rates are the following: 20-60% for academic underachievement; 0-45% (mean 25%) for major depression, 10-40% (mean 25%) for anxiety disorders, 20-56% for conduct disorder, 20-80% (mean 35%) for oppositional defiant disorder, and 6-10% for bipolar disorder (Adler 2007; Pliszka 1998; Wiener 1997; Yazgan 2013).

Several studies have reported a high concordance (9-40%) of ADHD and substance-use disorders in adolescence and in adulthood. Rohde and Halpern (2004) revealed that substance-use disorders were at higher rates in adolescence when ADHD and conduct disorder occurred simultaneously. In two studies with long follow-up periods, the majority of children with ADHD experienced academic/occupational difficulties in their adolescence or young adulthood; approximately 40% of them developed antisocial personality disorder, substance use, or a tendency toward delinquency (Fischer et al. 1993; Mannuzza et al. 1993). Galera et al. (2008) reported that hyperactivity/inattention symptoms seen in boys indicate an increase in the risk of substance use in later life, whereas, independently, this conclusion was not found to be valid for girls. Also, in this study, severe hyperactivity/inattention symptoms in girls were found to be associated with legal smoking, while boys in the same circumstances tended to more frequently use illegal substances (Galera et al. 2008).

Bipolar disorder can appear as a decrease in school performance, difficulties in social communication, and impulsive behaviors. Grandiosity, a reduction in the need for sleep, and an increase in sexual interests and thought speed are helpful for differentiating bipolar disorder from ADHD (Luby et al. 2007). Motor hyperactivity and impulsivity are common in both, but the course of ADHD and its chronic nature can distinguish it from bipolar disorder (Bowring and Kovacs 1992; Gokler 2008).

Conclusion

Adolescence is an important psychosocial adaptation period in which independence and autonomy from parents are gained, sexual identity is determined and accepted, personal value judgments are developed, the preliminary process of becoming a productive individual is completed, and the adult identity is acquired. During this period, some risk-taking behaviors can be seen, such as mild antisocial behaviors, a drop in the school performance level, skipping school, and partly contradictory life-style trials. However, these risky behaviors and aggressive attitudes are thought to be healthy adaptive behaviors that help adolescents to gain autonomy and a healthy sense of identity (Guvenir 2006). These inconsistent, unpredictable, and contradictory behaviors and verbal aggression can sometimes mimic the impulsivity of ADHD. When these behavioral changes that begin with puberty are handled well by family and by others in the adolescent's environment, they do not lead to significant changes in functionality and can be distinguished from ADHD by obtaining a full developmental history (Guvenir 2006).

ADHD, which affects the quality of life and level of function throughout all life periods, causes difficulties in dealing with the challenges existing in all life domains of the adolescence period, during which many important physical and psychological changes occur (Yazgan 2013). Individual assessment and treatment are crucial to the treatment of ADHD. Thus, early intervention, an understanding of the problems by the adolescent him/her self, the support of family, and appropriate therapeutic support are useful methods for achieving the goal that adolescents with ADHD might experience adolescence to the fullest.
Tablo1 : DSM-5 Criteria for ADHD

A. A persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development, as characterized by (1) and/or (2):

1. Inattention: Six or more symptoms of inattention for children up to age 16, or five or more for adolescents 17 and older and adults; symptoms of inattention have been present for at least 6 months, and they are inappropriate for developmental level:
   - Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or with other activities (e.g., overlooks or misses details, work is inaccurate).
   - Often has difficulty sustaining attention in tasks or play activities (e.g., has difficulty remaining focused during lectures, conversations or lengthy reading).
   - Often does not seem to listen when spoken to directly (e.g., mind seems somewhere, even in the absence of obvious distraction).
   - Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., loses focus, side-tracked).
   - Often has trouble organizing tasks and activities (e.g., difficulty managing sequential tasks, difficulty keeping materials and belongings in order; messy, disorganized work; has poor time management; fails to meet deadlines).
   - Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (e.g., schoolwork or homework; for older adolescents and adults, preparing reports, completing forms, reviewing lengthy papers).
   - Often loses things necessary for tasks and activities (e.g. school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones).
   - Is often easily distracted by extraneous stimuli (for older adolescents and adults, may include unrelated thoughts).
   - Is often forgetful in daily activities (e.g., doing chores, running errands; for older adolescents and adults, returning calls, paying bills, keeping appointments).

2. Hyperactivity and Impulsivity: Six or more symptoms of hyperactivity-impulsivity for children up to age 16, or five or more for adolescents 17 and older and adults; symptoms of hyperactivity-impulsivity have been present for at least 6 months to an extent that is disruptive and inappropriate for the person’s developmental level:
   - Often fidgets with or taps hands or feet, or squirms in seat.
   - Often leaves seat in situations when remaining seated is expected (e.g., leaves his or her place in the classroom, in the office or workplace, or in other situations that require remaining in place).
   - Often runs about or climbs in situations where it is not appropriate (adolescents or adults may be limited to feeling restless).
   - Often unable to play or take part in leisure activities quietly.
   - Is often "on the go" acting as if "driven by a motor" (e.g., is unable to be or uncomfortable being still for extended time, as in restaurants, meetings; may be experienced by others as being restless or difficult to keep up with).
   - Often talks excessively.
   - Often blurts out an answer before a question has been completed (e.g., completes people’s sentences; cannot wait for turn in conversation).
• Often has trouble waiting his/her turn (e.g., while waiting in line).
• Often interrupts or intrudes on others (e.g., butts into conversations or games, or activities; may start using other people’s things without asking or receiving permission; for adolescents and adults, may intrude or take over what others are doing).

In addition, the following conditions must be met:
B. Several inattentive or hyperactive-impulsive symptoms were present before age 12 years.
C. Several symptoms are present in two or more setting, (e.g., at home, school or work; with friends or relatives; in other activities).
D. There is clear evidence that the symptoms interfere with, or reduce the quality of, social, school, or work functioning.
E. The symptoms do not happen only during the course of schizophrenia or another psychotic disorder. The symptoms are not better explained by another mental disorder (e.g. Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

Based on the types of symptoms, three kinds (presentations) of ADHD can occur:
*Combined Presentation*: if enough symptoms of both criteria inattention and hyperactivity-impulsivity were present for the past 6 months
*Predominantly Inattentive Presentation*: if enough symptoms of inattention, but not hyperactivity-impulsivity, were present for the past six months
*Predominantly Hyperactive-Impulsive Presentation*: if enough symptoms of hyperactivity-impulsivity but not inattention were present for the past six months.

Because symptoms can change over time, the presentation may change over time as well.

References


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