Attention deficit hyperactivity disorder in adults: Epidemiology, clinical features, assessment, and diagnosis

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INTRODUCTION

Attention deficit hyperactivity disorder (ADHD), one of the most common neuropsychiatric disorders of childhood and adolescence, often persists into adulthood [1]. Studies have found that a majority of people diagnosed with ADHD in childhood continue to meet criteria for the disorder as adults [2]. More recent studies have found that a substantial proportion of those with adult ADHD did not have the condition in childhood. ADHD in adulthood is associated with significant impairment in occupational, academic, and social functioning.

ADHD in adults is characterized by symptoms of inattention, impulsivity, and restlessness, resulting in functional impairment. Impairment in executive function is common. Emotional dysregulation is often seen in these patients.

This topic discusses the epidemiology, pathogenesis, clinical manifestations, course, assessment, and diagnosis of ADHD in adults. Treatment overview of ADHD in adults, including treatment choices, pharmacotherapy, and psychotherapy are discussed elsewhere and in algorithms (algorithm 1 and algorithm 2). Topics related to ADHD in adolescents and children are also found elsewhere.

- (See "Attention deficit hyperactivity disorder in adults: Treatment overview".)

- (See "Attention deficit hyperactivity disorder in adults: Psychotherapy".)
- (See "Attention deficit hyperactivity disorder in children and adolescents: Clinical features and diagnosis".)
- (See "Attention deficit hyperactivity disorder in children and adolescents: Epidemiology and pathogenesis".)
- (See "Attention deficit hyperactivity disorder in children and adolescents: Overview of treatment and prognosis".)
- (See "Attention deficit hyperactivity disorder in children and adolescents: Treatment with medications".)
- (See "Pharmacology of drugs used to treat attention deficit hyperactivity disorder in children and adolescents".)

EPIDEMIOLOGY

Prevalence — Epidemiologic studies of adult attention deficit hyperactivity disorder (ADHD) have estimated the current prevalence to be:

- 2.6 (95% CI 1.5-4.6) percent globally [3]
  - Resource-poor countries (1.9 percent) [1]
  - Resource-rich countries (4.2 percent) [1]
- 4.4 percent among 18 to 44 year olds in United States, National Comorbidity Survey Replication [4]

Comorbidity — Adult ADHD is often comorbid with other psychiatric disorders. In United States samples, adults with ADHD were more likely than adults from the general United States population to have the following co-occurring disorders, with the following odds for comorbidity [4]:

- Mood disorders, odds ratio 2.7 to 7.5 (95% CI 3.0-8.2)
- Anxiety disorders, odds ratio 1.5 to 5.5 (95% CI 2.4-5.5)
- Any substance use disorders (SUDs), odds ratio 3.0 (95% CI 1.4-6.5)
- Intermittent explosive disorder, odds ratio 3.7 (95% CI 2.2-6.2)

Similar results have been reported internationally [1]:

- Mood disorders, odds ratio 3.9 (95% CI 3.0-5.1)
- Anxiety disorders, odds ratio 4.0 (95% CI 3.0-5.2)
- SUDs, odds ratio 4.0 (95% CI 2.8-5.8)

As an example, in a meta-analysis of 29 studies of adults with an SUD, the lifetime prevalence of ADHD was 23.1 percent [5].

A dose-response relationship exists between ADHD and the number of comorbid disorders with the highest odds ratio (7.2, 95% CI 5.1-10.2) associated with having three or more other disorders [1].

The rate of comorbid psychiatric disorders in adults with ADHD tends to increase with age [4,6,7]. As people with ADHD age, the likelihood of anxiety, depression, SUD, and antisocial personality disorder increases and often becomes more evident, while the underlying ADHD becomes less evident. In our clinical experience, adults with ADHD are commonly diagnosed and treated for a comorbid condition, while ADHD is often unrecognized and untreated.

PATHOGENESIS

The pathogenesis of attention deficit hyperactivity disorder (ADHD) in adults is not known. The most noticeable deficits in the area of attention are, in general, related to frontal-subcortical dysfunction and deal with executive function [8]. However, adults with ADHD also suffer from impairments unrelated to executive functioning, including memory impairments, and information processing speed deficits. (See 'Executive dysfunction' below.)

Neurobiology — It is likely that a network of interrelated brain areas is involved in the attentional-executive impairments of individuals with ADHD.

- **Neuroimaging** – Both structural and functional imaging studies of adults, using either computerized tomography or magnetic resonance imaging, show evidence of structural brain abnormalities among ADHD patients. These abnormalities are related to the functional impairments seen in ADHD [9]. The most common findings are smaller volumes in the frontal cortex, cerebellum, and subcortical structures and abnormalities in the prefrontal (especially right fronto-subcortical) and parietal circuits [10]. Additionally, in individuals with ADHD, dysfunction is found in the caudate, putamen, and globus pallidus, three subcortical structures which are part of the neural circuitry underlying motor control, executive functions, inhibition of behavior, and the modulation of reward pathways. These frontal-striatal-pallidal-thalamic circuits provide feedback to the cortex for the regulation of behavior [11,12].

  Preliminary studies suggest that subcortical structural abnormalities noted in childhood studies of ADHD normalize into adulthood but that cortical abnormalities persist [13].

- **Neurotransmitters** – Because of the catecholaminergic nature of many of these brain circuits, hypoactivity of dopamine and norepinephrine in frontal-subcortical circuits underlies the brain and functional dysfunction in ADHD [14]. Noradrenaline and dopamine exert neuromodulatory influences over behavior and cognition through fronto-striato-cerebellar circuitry [15]. ADHD medications that block the dopamine transporter or the norepinephrine transporter increase free brain levels of noradrenaline and dopamine by blocking reuptake and triggering release. These medications are thought to target the systems to ameliorate problems with impulsivity, inattention, and hyperactivity. [16].

Genetics — The risk of ADHD in parents and siblings of children with ADHD is increased two to eight times [17], with heritability estimated at 76 percent based on pooled data from twin studies [17,18].

Results of behavioral genetic investigations using family, twin, and adoption studies converge with those of molecular genetic studies in showing that genes influence susceptibility to ADHD. Several genes have been implicated in the etiology of ADHD, however small their effects. Polymorphisms in the dopamine transporter gene (DAT1, SLC6A3) and the dopamine 4 (D4) receptor gene (DRD4) have been most often associated with ADHD [18]. This suggests a complex genetic mechanism by which the disorder is caused by the combined actions of several genes interacting with environmental risk factors.

In a meta-analysis of genome-wide association studies on persistent ADHD in adults and ADHD in children, samples from over 17,000 cases and 32,000 controls were analyzed. Results support a shared contribution of common genetic variants to ADHD in children and adults [19,20].

CLINICAL MANIFESTATIONS

Attention deficit hyperactivity disorder (ADHD) in adults is characterized by symptoms of executive dysfunction, inattention, impulsiveness, restlessness, and emotional dysregulation. These symptoms collectively lead to marked deficits in functioning [4].

The predominant features of ADHD in adults differ from typical ADHD features in children. Symptoms of hyperactivity or impulsivity are less obvious or overt in adults (eg, impulsivity may be seen in verbalizations rather than physical behavior); symptoms of inattention are more prominent.

Executive dysfunction — Many of the symptoms of inattention in adults with ADHD are also classified as deficits in executive function, which has been defined as, “self-directed actions

needed to choose goals and to create, enact, and sustain actions toward those goals" [21]. (See 'Inattention' below and 'DSM-5 diagnostic criteria' below.)

Executive functions that may be deficient in an adult with ADHD include:

- Working memory
- Task-shifting
- Self-monitoring
- Initiation
- Self-inhibition

These deficits contribute to the inattention problems characteristic of adult ADHD:

- Remaining focused in a task, especially for long periods
- Organizing activities
- Prioritizing tasks
- Following through and completing tasks
- Forgetfulness
- Time management (eg, missing appointments or deadlines)

Inattention — The predominant inattention symptoms of ADHD in adults are primarily manifested in problems remaining focused on a task, especially for long periods. Such adults often have difficulties in organizing activities, prioritizing tasks, following through and completing tasks, forgetfulness, and time management (eg, missing appointments or deadlines) [22,23]. Adults with ADHD will often report that tasks are finished only at deadlines, often late or even not at all. Increased problems related to driving, including increases in driving errors, traffic tickets, and speeding may be related to attention deficits. For example, in a prospective study including 2832 older adult drivers (age 65 to 79 years; mean = 71 years) individuals with ADHD had an increased risk of self-reported traffic ticket events (relative risk 2.02, 95% CI 1.42-2.88), increased risk of self-report vehicular crashes (relative risk 1.74, 95% CI 1.26-2.40), and higher incidence of hard-braking events (relative risk 1.07, 95% CI 1.02-1.12) as compared with older adults without ADHD [24]. (See 'Executive dysfunction' above.)

Impulsivity — Impulsivity in adult ADHD is characterized by excessive involvement in activities or speech that has a high potential for consequences. Impulsivity in adults often results in more serious consequences than during childhood and may include premature termination of relationships or quitting jobs without having any alternative [23,25]. Impulsivity can contribute to the driving errors, traffic tickets, and speeding described above.

Hyperactivity (restlessness) — Rather than overly hyperactive, adults with ADHD will seem or report feeling fidgety or restless. Similar to many children with ADHD, adults and their informants may report talking too much and/or interrupting others.

Emotional dysregulation — Mood lability, irritability, anger outbursts, low frustration tolerance, and motivational deficits are commonly seen in adults with ADHD though not specific to the disorder [23,26-28]. These mood symptoms are commonly referred to as emotional dysregulation, which is the inability to manage uncomfortable emotions when necessary, and to engage in appropriate behavior (eg, go to work, engage in social relationships) when distressed. In a meta-analysis of 13 studies involving 2535 adults with ADHD, subjects with ADHD showed higher levels of general emotional dysregulation than healthy controls [29]. Emotionally lability and negative emotional response, two dimensions of emotional dysregulation, correlated closely with ADHD symptoms severity.

Other impairments and health and social problems — Adults with ADHD have higher rates of occupational difficulties, criminal activity, substance use disorder, traffic accidents, and motor vehicle citations compared to adults without ADHD [27,30-32]. ADHD-related impairments from childhood – such as educational difficulties, problems with self-esteem, significantly impaired family and peer relationships – are believed to underlie or contribute to these behavioral problems of adults.

Occupational effects — A systemic review of adverse occupational effects of ADHD found that adults with ADHD had higher levels of unemployment compared to control groups [33]. Adults with ADHD who are employed experience workplace impairment and reduced productivity; they are also at increased risk of accidents, trauma, and workplace injuries, particularly traffic accidents. Other problems associated with adult ADHD include reduced educational achievement and increased rates of substance use disorder, and criminality [2,34-36].

Mortality rates — In a study of Danish national registries, mortality rates were found to be higher in persons diagnosed with ADHD compared to persons without ADHD [37]. In an analysis of all residents (nearly 2 million) born during the 30 year period ending in 2013, 32,061 had been diagnosed with ADHD; they had a mortality rate greater than persons without ADHD (5.85 versus 2.21 per 10,000 person-years), after adjusting for sociodemographic and clinical characteristics. Excess mortality remained present in persons without more common, higher risk co-morbidities of ADHD (oppositional defiant disorder, conduct disorder, and substance use disorder). Accidents were the most common cause of death among persons with ADHD. Excess mortality was higher among individuals diagnosed with ADHD as adults compared to those diagnosed prior to age 18 years.

COURSE

Longitudinal studies of children with attention deficit hyperactivity disorder (ADHD) have found that the disorder persists into adulthood in a substantial proportion of cases. Treatment of ADHD in adults is discussed elsewhere and in algorithms (algorithm 1 and algorithm 2). (See "Attention deficit hyperactivity disorder in adults: Treatment overview".)

Persistence from childhood ADHD — Studies have reported that approximately 40 to 60 percent of patients go on to have significant ADHD-related problems in adulthood [2,34,35,38]. As an example, a sample of 147 children diagnosed with ADHD based on parent report had a higher rate of ADHD when reassessed as adults (age 19 to 25), compared with adult rates in 71 patients who were assessed as a community control sample in childhood (46 versus 5 percent) [2].

Factors predicting persistence into adulthood — Several patient and family characteristics have been identified as increasing the likelihood of persistence of adult ADHD symptoms. In a multivariate analysis of longitudinally collected data from 453 participants with ADHD (mean age 25 years), patient, parent, and family characteristics collected at initial assessment were examined [39]. The most important childhood predictors of adult ADHD symptom persistence were initial ADHD symptom severity (odds ratio 1.89, standard error 0.28), comorbidities (odds ratio 1.19, standard error 0.07), and parental mental health problems (odds ratio 1.30, standard error 0.09).

Additionally, in one prospective follow-up study of 344 Brazilians with childhood ADHD, the persistence of ADHD into adulthood was associated with higher numbers of inattention and hyperactivity/impulsivity symptoms, and with co-occurring oppositional defiant disorder and social phobia at study entry [40].

Persistence throughout adulthood — Some evidence suggests that a proportion of patients with adult ADHD experience a reduction or remission of symptoms. As an example, in the prospective follow-up study of Brazilians with ADHD, one-third of participants did not meet diagnostic criteria for the disorder after an average 7.3 years and 12.4 percent of the sample met criteria for full remission (less than four symptoms) [40].

The domains of emotional, educational, and social adjustment follow variable courses in individuals with ADHD, ranging from poor to good. The persistence of ADHD is not associated with a uniform functional outcome but leads instead to a wide range of emotional, educational, and social adjustment outcomes [33,41].

Possible late-onset subtype — Studies examining the existence of a late-onset subtype have had mixed results. While some studies have suggested the existence of two syndromes, childhood-onset and adult- (or late)-onset ADHD, with distinct developmental trajectories [42-44], others have questioned the validity of the data supporting the late-onset subtype. As examples:

- A study of a representative birth cohort of 1,037 individuals born in New Zealand in 1972 to 1973 and followed to age 38 found little overlap in ADHD between participants who had been diagnosed with ADHD in childhood and those diagnosed in adulthood [43]. The adult ADHD cases did not show tested neuropsychological deficits in childhood; 90 percent of adult ADHD cases lacked a history of childhood ADHD.

- A longitudinal cohort study, which followed all children born in Pelotas, Brazil in 1993 up to the ages of 18 or 19 years, diagnosed 393 of the 5249 children with ADHD at age 11 and 492 with ADHD at age 18 to 19 [44]. Only 60 children with ADHD continued to have ADHD as young adults (17.2 percent) and only 60 young adults with ADHD had the disorder in childhood (12.6 percent).

- In a nationally representative birth cohort of 2232 twins born in England and Wales in 1994 to 1995, results from logistic regressions indicated that individuals with late-onset ADHD showed fewer externalizing problems and higher intelligence quotient (IQ) in childhood compared with a group with persistent ADHD from childhood [42]. At age 18 years, however, those with late-onset ADHD demonstrated comparable ADHD symptoms and impairment as well as similarly elevated rates of mental health disorders.

- In a longitudinal cohort study, most patients who were initially identified through screening to have late-onset ADHD were found on more thorough assessment to be false positives [45]. The study analyzed data from longitudinally administered psychiatric assessments of 239 patients in the local normative comparison group of the Multimodal Treatment Study of ADHD from mean ages of 9.9 to 24.4 years old. Approximately 95 percent of those who initially screened positive on symptom checklists for late-onset ADHD were ultimately diagnosed as having another condition.

ASSESSMENT

Identification of symptoms, behaviors, and impairments — The primary objectives of the assessment of an adult for attention deficit hyperactivity disorder (ADHD) is to identify symptoms and behaviors consistent with the American Psychiatric Association's Diagnostic and

Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) diagnostic criteria for ADHD, evaluate the patient for impairment attributable to these symptoms, and rule out other disorders such as mood and/or anxiety disorders. The patient's symptoms should be persistent and severe enough to have contributed to significant psychosocial impairment.

Specific impairments should be documented, along with the age of onset of symptoms and impairments. Recall bias can affect the reliability of self-assessment, particularly with ADHD patients [46]. Many adults have difficulty recalling when ADHD symptoms began. Obtaining patient history from another adult informant (eg, parent, significant other, friend) can be very useful in making a valid ADHD diagnosis. (See 'DSM-5 diagnostic criteria' below and 'Differential diagnosis' below.)

The best approach to the assessment of adult ADHD may be to use a combination of a structured or semi-structured diagnostic interview along with a dimensional rating scale that provides quantitative measures of symptom severity and impairment. Neuropsychological testing may be used to complement the interview and rating scale if indicated by other cognitive deficits. (See 'Diagnostic interviews for ADHD in adults' below and 'Rating scales' below.)

Adult-specific manifestations — The clinical interview should focus on adult manifestations of ADHD. The DSM criteria for the disorder (DSM-5 and earlier versions) were developed to diagnose ADHD in children, and this is reflected in their content. To assess possible ADHD in adults, the clinician should also ask about common adult manifestations [47], which are discussed above and summarized below. (See 'Inattention' above and 'Impulsivity' above and 'Hyperactivity (restlessness)' above.)

- Hyperactivity symptoms
  - Restlessness
  - Verbosity
  - Constant activity
  - A tendency to choose very active jobs
- Impulsivity symptoms – Impulsivity may have more serious consequences in adults than during childhood
  - Ending relationships
  - Quitting jobs
  - Overreacting to frustrations
  - More driving violations

- Inattention symptoms
    - Procrastination
    - Difficulty making decisions
    - Poor time management
    - Difficulty in organizing activities

Comorbidities — The clinician should screen for psychiatric comorbidities, particularly depressive disorders, anxiety disorders, and substance use disorders as well as symptoms and behaviors commonly associated with ADHD such as poor anger control. (See 'Comorbidity' above and 'DSM-5 diagnostic criteria' below.)

Rating scales — Several rating scales can be useful for assessment of adult ADHD [47,48]. We use these as a supplement to the clinical interview.

Useful assessments have both informant and self-rated versions for assessment of both adult and childhood symptoms [2,49]. Of 14 adult ADHD rating scales with a total of 35 validation studies, the Conners' Adult ADHD Rating scale (CAARS) and the Wender Utah Rating Scale (short version) have the most robust psychometric statistics and content validity [48].

In individuals with prominent executive dysfunction we often use the Barkley Deficits in Executive Functioning Scale (table 1). (See "Attention deficit hyperactivity disorder in adults: Treatment overview", section on 'Monitoring' and "Attention deficit hyperactivity disorder in adults: Psychotherapy", section on 'Monitoring'.)

- **Conners' adult ADHD rating scale** — The CAARS is suggested for use by mental health professionals assessing patients prior to and/or over the course of ADHD treatment. Although longer than many of the available instruments and requiring a modest cost, the CAARS provides a detailed assessment of relevant symptoms and domains [50]. The CAARS comes in formats for self-report and observer report, which provide multimodal assessments of the same behaviors and problems, and contain an identical set of scales, subscales, and indexes. CAARS forms are available in long, short, and screening versions. The reliability and validity of the CAARS-S are satisfactory. Nine empirically-derived scales that help assess a broad range of problem behaviors, including:
    - Inattention/memory problems
    - Impulsivity/emotional lability
    - Hyperactivity/restlessness
    - Problems with self-concept

A study of the ability of the CAARS to discriminate between 249 postsecondary students with carefully diagnosed ADHD and 507 clinical controls found that the overall discriminant validity of the CAARS was 69 percent, and it had an unacceptably high false positive and false negative rate [51]. At lower prevalence rates, a high score on the CAARS displayed only a 22 percent chance of accurately identifying individuals with ADHD. As it frequently misidentifies individuals with other psychological problems as having ADHD, it should not be the sole method of diagnosis.

- **Adult ADHD self-report scale** — For assessing adults in primary care for ADHD, the Adult ADHD Self-Report Scale (ASRS) is a brief and practical choice. ASRS is the World Health Organization's (WHO) rating scale for adult ADHD and is designed to measure current ADHD symptoms [4,52]. It consists of 18 items based on DSM-IV symptoms/criteria adapted to adults with ADHD, which are measured on a five-point scale (0 = never/seldom and 4 = very often). ASRS has normative data and information on psychometric properties are available for several populations [52,53]. A shorter self-administered version of ASRS has been developed for screening purposes (form 1) [53]. Revision of adult ADHD diagnostic criteria from DSM-IV to DSM-5 has prompted an update in the brief screening scale, which consists of six items from the ASRS [54]. The revised screen has high sensitivity and specificity as well as excellent concordance with blinded clinical diagnosis of ADHD in adults. A study of two general population samples showed that the ASRS resulted in considerable overestimation of ADHD, indicating probable ADHD in 26.0 and 17.3 percent of participants, as compared with expected prevalence of 2.5 percent [55]. These results emphasize the need for rating scales to be complemented by clinical assessment in determining possible cases.

- **Barkley Deficits in Executive Functioning Scale** - For individuals with prominent executive dysfunction we also administer the Barkley Deficits in Executive Functioning Scale (table 1) to identify symptomatic targets for cognitive-behavioral therapy and to monitor their change over time [56].

DIAGNOSIS

DSM-5 diagnostic criteria — The DSM-5 diagnostic criteria for attention deficit hyperactivity disorder (ADHD) are described below [57]. These criteria are used to diagnose ADHD in both children and adults. Changes from the DSM-IV include modifications to criterion B, which now requires that several inattentive or hyperactive-impulsive symptoms were present prior to age 12 years, versus age 7 years in DSM-IV. Some examples of ADHD symptom manifestations in adults were added to the criteria, which are described as follows:

- 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) of the following symptoms have persisted for at least six months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities:

    Note: The symptoms are not solely a manifestation of oppositional behavior, defiance, hostility, or failure to understand tasks or instructions. For older adolescents and adults (age 17 and older), at least five symptoms are required. The patient often:

    - a. Fails to give close attention to details or makes careless mistakes in schoolwork, at work, or during other activities (eg, overlooks or misses details, work is inaccurate).

    - b. Has difficulty sustaining attention in tasks or play activities (eg, has difficulty remaining focused during lectures, conversations, or lengthy reading).

    - c. Does not seem to listen when spoken to directly (eg, mind seems elsewhere, even in the absence of any obvious distraction).

    - d. Does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (eg, starts tasks but quickly loses focus and is easily sidetracked).

    - e. Has difficulty organizing tasks and activities (eg, difficulty managing sequential tasks; difficulty keeping materials and belongings in order; messy, disorganized work; has poor time management; fails to meet deadlines).

    - f. Avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (eg, schoolwork or homework; for older adolescents and adults, preparing reports, completing forms, reviewing lengthy papers).

    - g. Loses things necessary for tasks or activities (eg, school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones).

    - h. Is easily distracted by extraneous stimuli (for older adolescents and adults, may include unrelated thoughts).

    - i. Is forgetful in daily activities (eg, doing chores, running errands; for older adolescents and adults, returning calls, paying bills, keeping appointments).

- 2. Hyperactivity and impulsivity – Six (or more) of the following symptoms have persisted for at least six months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities:

  Note: The symptoms are not solely a manifestation of oppositional behavior, defiance, hostility, or a failure to understand tasks or instructions. For older adolescents and adults (age 17 and older), at least five symptoms are required.

  - a. Often fidgets with or taps hands or feet or squirms in seat.
  - b. Often leaves seat in situations when remaining seated is expected (eg, leaves his or her place in the classroom, in the office or other workplace, or in other situations that require remaining in place).
  - c. Often runs about or climbs in situations where it is inappropriate. (Note: In adolescents or adults, may be limited to feeling restless.)
  - d. Often unable to play or engage in leisure activities quietly.
  - e. Is often "on the go," acting as if "driven by a motor" (eg, 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).
  - f. Often talks excessively.
  - g. Often blurts out an answer before a question has been completed (eg, completes people' sentences; cannot wait for turn in conversation).
  - h. Often has difficulty waiting his or her turn (eg, while waiting in line).
  - i. Often interrupts or intrudes on others (eg, butts into conversations, games, or activities; may start using other people's things without asking or receiving permission; for adolescents and adults, may intrude into or take over what others are doing).

- B. Several inattentive or hyperactive-impulsive symptoms were present prior to age 12 years.

- C. Several inattentive or hyperactive-impulsive symptoms are present in two or more settings (eg, 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, academic, or occupational functioning.

- E. The symptoms do not occur exclusively during the course of schizophrenia or another psychotic disorder and are not better explained by another mental disorder (eg, mood disorder, anxiety disorder, dissociative disorder, personality disorder, substance intoxication or withdrawal). (See 'Differential diagnosis' below.)

Specify whether:

- **Combined presentation** – If both Criterion A1 (inattention) and Criterion A2 (hyperactivity-impulsivity) are met for the past six months.

- **Predominantly inattentive presentation** – If Criterion A1 (inattention) is met but Criterion A2 (hyperactivity-impulsivity) is not met for the past six months.

- **Predominantly hyperactive/impulsive presentation** – If Criterion A2 (hyperactivity-impulsivity) is met and Criterion A 1 (inattention) is not met for the past six months.

Specify if:

- **In partial remission** – When full criteria were previously met, fewer than the full criteria have been met for the past six months, and the symptoms still result in impairment in social, academic, or occupational functioning.

Specify current severity:

- **Mild** – Few, if any, symptoms in excess of those required to make the diagnosis are present, and symptoms result in no more than minor impairments in social or occupational functioning.

- **Moderate** – Symptoms or functional impairment between "mild" and ''severe" are present.

- **Severe** – Many symptoms in excess of those required to make the diagnosis, or several symptoms that are particularly severe, are present, or the symptoms result in marked impairment in social or occupational functioning.

ADHD criteria in DSM-5 are applicable to diagnosis in children and adults, and include examples of adult manifestations of the disorder [23]. Examples of hyperactivity and impulsivity that are likely to be manifested by adults with ADHD include fidgetiness and verbal impulsivity, respectively.

Diagnostic interviews for ADHD in adults — The use of a structured or semistructured diagnostic interview, such as the Diagnostic Interview for ADHD in adults (DIVA 5.0) may be best basis for a definitive diagnosis. Although less commonly used than the ADHD scales listed above, the use of a structured interview allows the clinician to inquire about the presence of ADHD symptoms in both adulthood and childhood, the chronicity of these symptoms, and significant impairments resulting from these symptoms. The DIVA provides typical examples of the manifestation of these symptoms which can be used to prompt the assessor and guide clinical judgement.

Differential diagnosis — The differential diagnosis of ADHD in adults includes disorders that are also commonly comorbid with ADHD such as mood disorders, anxiety disorders, and substance use disorders (SUDs). Psychotic disorders such as schizophrenia also have prominent cognitive symptoms similar to those noted in ADHD. (See 'Comorbidity' above.)

In diagnosing ADHD in adults, the clinician should keep in mind clinical features of the disorder that overlap with the conditions below, as well characteristics that differentiate these conditions.

- Depression – ADHD shares with depressive disorders a diminished ability to think or concentrate, poor motivation to undertake many activities, and indecisiveness. Depression can be distinguished from ADHD in adults by a typically later onset and episodic course.

- Mania – ADHD shares with mania distractibility, impulsivity, and increased talkativeness. Mania can be distinguished from ADHD in adults by a typically later onset and episodic course; the symptoms of elated mood, rapid cycling, grandiosity, and increased sexuality have been shown to discriminate youth with early-onset bipolar disorder from youth with ADHD [58].

- Anxiety disorders – ADHD is often accompanied by anxiety. Patients with anxiety disorders can be distracted by the focus of the disorder, which can present similarly to the distractibility seen in ADHD. In contrast to ADHD, distraction with an anxiety disorder only occurs in the presence of the focus of that disorder (eg, when the patient is experiencing obsessional thinking in OCD or is preoccupied with self-conscious ideation in social phobia). The onset of anxiety disorders may be later than the onset of ADHD in adults.

- SUDs – Cognitive and behavioral impairments (poor attention, distractibility, hyperactivity) can be seen in both ADHD and in SUDs. Acute impairments in SUDs, however, occur only the context of substance use.

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See "Society guideline links: Attention deficit hyperactivity disorder".)

SUMMARY AND RECOMMENDATIONS

- **Epidemiology** – Attention deficit hyperactivity disorder (ADHD), one of the most common neuropsychiatric disorders of childhood and adolescence, often persists in adults. Studies have found that a majority of people diagnosed with ADHD in childhood continue to meet criteria for the disorder as adults. However, a substantial proportion of those with adult ADHD did not have the condition in childhood. Prevalence studies show widely varied results. (See 'Epidemiology' above.)

  Worldwide, individuals with ADHD are more likely to have comorbid mood disorders, anxiety disorders, and substance use disorders (SUDs) than those without ADHD. (See 'Comorbidity' above.)

- **Clinical manifestations** – ADHD in adults is characterized by symptoms of inattention, impulsivity, restlessness, executive dysfunction, and emotional dysregulation. These symptoms collectively lead to marked deficits in functioning. (See 'Clinical manifestations' above.)

  The predominant features of ADHD in adults differ from typical ADHD features in children. Symptoms of hyperactivity or impulsivity are less obvious or overt in adults (eg, impulsivity may be seen in verbalizations rather than physical behavior). Symptoms of inattention are more prominent in adults.

  Adults with ADHD have higher rates of occupational difficulties, criminal activity, substance abuse problems, traffic accidents, and motor vehicle citations compared to adults without ADHD.

- **Course** – Longitudinal studies of children with ADHD have found that the disorder persists into adulthood in a substantial proportion of cases. (See 'Course' above.)

  - **Possible late-onset subtype** – Studies examining the existence of a late-onset subtype have had mixed results. While some studies have suggested the existence of two syndromes, childhood-onset and adult (or late)-onset ADHD, with distinct

developmental trajectories others have questioned the validity of the data supporting the late-onset subtype. (See 'Possible late-onset subtype' above.)

Clinically significant impairments in neuropsychological functioning have been found in some studies of adults with ADHD, although those with adult-onset ADHD may be much less likely to show impaired neuropsychological function and impact on intelligence quotient (IQ) compared with adults who had childhood-onset ADHD.

- **Adult-specific manifestations** – In assessing possible ADHD in adults, the clinician should additionally ask about common adult manifestations of the disorder. These include (see 'Adult-specific manifestations' above):
  - Hyperactivity symptoms such as restlessness, verbosity, and constant activity.
  - Impulsivity such as quitting jobs, overreacting to frustration, driving violations, and ending relationships.
  - Inattention symptoms such as procrastination, poor time management, and lack of organization.
- **Differential diagnosis** – The differential diagnosis of ADHD in adults includes disorders that are also commonly comorbid with ADHD such as mood disorders, anxiety disorders, and SUDs. (See 'Differential diagnosis' above.)

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