Case Study Activity: Management of Attention-Deficit/Hyperactivity Disorder
Answers to Interactive Questions and Resources

Case 1: Management of Attention-Deficit/Hyperactivity in Adults

Activity Preview
Attention-deficit/hyperactivity disorder (ADHD) is one of the most prevalent neuropsychiatric disorders in American adults. According to a number of epidemiological studies, including surveys conducted by the National Institutes of Health, prevalence of ADHD in the adult population is between 3% and 5%. The prevalence of ADHD in 5- to 12-year-old youths in the United States is 6% to 9%, and 50% of these individuals experience functionally impairing symptoms into adulthood. In children, ADHD is more prevalent in boys than girls; however rates of ADHD in adults are comparable for men and women.

Although diagnostic criteria for ADHD are the same across the lifespan, presenting symptoms vary by developmental level. For example, hyperactivity in a child typically presents as an inability to sit in one place and excessive running and jumping. Adults with hyperactivity from ADHD may be prone to fidgeting excessively while trying to sit still, or they may engage in speeding while driving. The American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition, Text Revision) classifies ADHD by the following subtypes: inattentive, hyperactive-impulsive, or combined inattentive and hyperactive-impulsive.

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Similar to children and adolescents, adults more often fit the combined subtype of ADHD, however hyperactive and impulsive symptoms occur much less often than inattentive symptoms in adults.

*Inattentive symptoms* commonly reported by adults with ADHD include being easily distracted, difficulty sustaining attention, difficulty with sustained mental effort, inability to listen, and tendency to lose things. Procrastination with an inability to complete tasks initiated is another commonly reported symptom. Inattentive symptoms are similar in men and women, although one study showed women more frequently reported “losing things.”

*Hyperactive symptoms* in adults, other than speeding while driving, include feeling uncomfortable while sitting through meetings, impatience waiting in line, and having workaholic tendencies.

*Impulsive symptoms* include talking too much, talking out of turn, blurting out inappropriate comments, and intruding on others.

These symptoms of ADHD must be present in multiple settings (e.g., home, work) and cause functional impairment for at least 6 months to meet criteria for the diagnosis. The presence of symptoms prior to 7 years of age is also part of current diagnostic criteria, although it is possible that the adult did not receive appropriate evaluation during childhood to confirm symptoms.

Brain imaging studies in children and adults with ADHD show that parts of the brain that regulate executive function (e.g., higher levels of attention, prioritization, and decision making) are underdeveloped. Overall smaller brain volume and a delay in cortical thickening have been documented in unmedicated individuals with ADHD compared with individuals without ADHD. The biggest differences are found in brain regions that control attention, emotion, and motivation including the prefrontal cortex, precuneus, and hippocampus. Deficits in attention, working memory, and behavioral inhibition are well documented in ADHD and can contribute to poor performance on cognitive tests. Controlled trials of cognitive testing in unmedicated adults with
ADHD compared with adults without ADHD showed that those with ADHD scored lower on full-scale IQ testing as well as reading and math assessments. Limited data show that these ADHD-associated deficits may persist over each decade of life from ages 20 to 50 years. There is evidence showing that adults with ADHD whose symptoms remitted over time have increased cortical thickening and greater brain volume in key regions controlling attention and behavior than those with residual ADHD symptoms across adulthood.

The presence of untreated ADHD in adults causes poor quality of life and increases the risk for developing many concurrent conditions. Most notable (from greater to lesser frequency) are anxiety disorders, mood disorders, addictive disorders, and antisocial personality disorder. Higher rates of divorce, incarceration, and unemployment have been documented in adults with ADHD. For these reasons, it is crucial for pharmacists to refer adults presenting with inattentive and/or hyperactive-impulsive symptoms to clinicians skilled at ADHD evaluation and management. Inattention and impulsivity have many possible causes including bipolar disorder or substance abuse. Psychiatrists and psychologists typically have the most experience in evaluating adult ADHD and differentiating concurrent conditions, although primary care providers with appropriate training also may provide a diagnosis.

Accurate diagnosis and effective treatment can help minimize adverse outcomes and improve quality of life for adults with ADHD. Pharmacists can inform patients that both pharmacologic and nonpharmacologic interventions are available to decrease symptoms and improve functioning. Approximately 30% to 50% of adults experience residual ADHD symptoms with medication alone. A combination of medications and ADHD-specific cognitive behavioral interventions produce the greatest symptom relief and improved outcomes. Patients should be educated that ADHD is a biological brain disorder resulting in deficits in executive functioning, working memory, and inhibitory control. Patient counseling also should explain that ADHD is not a “pop culture” diagnosis or character flaw.

Methylphenidate, amphetamine salts, atomoxetine, and bupropion have been shown to be effective in decreasing symptoms and improving functioning for adults with ADHD in controlled
clinical trials. With the exception of bupropion, all of these agents are approved by the U.S. Food and Drug Administration for the treatment of ADHD in adults. These agents modulate dopamine and norepinephrine. Selective serotonergic agents such as fluoxetine or sertraline have not been found beneficial for treatment of ADHD. Stimulants are considered the most effective agents for adult ADHD, and improvement is typically noted within 1 week of an appropriate dose. Common adverse effects of stimulants include decreased appetite, nausea, and insomnia. Atomoxetine is a useful alternative to stimulants for individuals with active substance abuse disorders or for those who are unresponsive to or cannot tolerate stimulants. Atomoxetine is associated with significantly less insomnia and anorexia than methylphenidate or amphetamine salts, but it carries a greater risk of daytime sedation, constipation, and the rare risks of hepatotoxicity and new-onset suicidal thinking in young adults (less than 25 years of age). Bupropion is an option for patients with comorbid depression or for those patients trying to stop smoking. Alpha-2 adrenergic agonists such as extended-release guanfacine and extended-release clonidine have not been well studied for adult ADHD and are currently indicated only for youths aged 6 to 17 years.

Cognitive behavioral interventions are recommended during cognitive behavioral therapy sessions specifically designed to manage ADHD. Suggested interventions may include keeping an external organizer (e.g., smart phone, notebook with “to-do” lists), breaking up activities into short manageable tasks, recognizing triggers for distraction, and making a point of thinking before acting. Establishing a regular schedule that includes exercise and relaxation can be beneficial as well; however, based on available evidence, cognitive behavioral interventions are particularly effective. Controlled studies have shown that ADHD-specific cognitive behavioral therapy was more effective than psychoeducation and relaxation in individuals with ADHD whose symptoms were only partially responsive to medication. Similarly, adults with ADHD who partially responded to medications benefitted more from a group-administered meta-cognition program (2 hours per week over 12 weeks) compared with supportive therapy sessions administered for the same duration. Meta-cognitive therapy was designed to develop organizational skills and executive function self-management skills. Yoga, meditation, and some

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dietary supplements have been recommended for ADHD, but they should not take the place of more established effective treatments such as medications and cognitive interventions.
**Case Study**

Michael Johnson, a 42-year-old man, approaches the pharmacy counter and asks whether there is a supplement that can help with improving concentration, completing tasks, and being a better listener. He explains that he has difficulty starting and completing work projects and trouble being on time or keeping appointments and commitments. Mr. Johnson is currently unemployed but previously worked as a freelance editor for film and television production companies. He was divorced 6 months ago and has joint custody of two daughters ages 6 and 10 years old. On most days, he sleeps late and he has trouble keeping a regular schedule and getting his children to their lessons and extracurricular appointments on time. He tends to obsess about one task, which prevents him from prioritizing his activities. Mr. Johnson worries that his trouble with organization and attention may affect his custody agreement and prevent him from securing gainful employment. He cannot hold a conversation with others for longer than 5 minutes, because he is easily distracted. He has to be doing something all the time and moves from activity to activity. For example, while grilling for a backyard barbecue, he let the food burn after getting distracted with the flower garden and then gathering items to fix the screen door. Mr. Johnson’s family and friends have suggested to him that he should get evaluated for ADHD, but he has resisted because of concerns about the stigma of a psychiatric diagnosis and the risks of taking a psychotropic medication.

Mr. Johnson’s height is 5'10" and weight is 185 lb. He takes a men’s multivitamin daily, lisinopril 10 mg for hypertension, fish oil 1,000 mg at bedtime for hyperlipidemia, and loratadine 10 mg as needed for seasonal allergies. He has tried to start the Dietary Approaches to Stop Hypertension “DASH” diet for weight loss and to prevent heart disease, but he has difficulty planning his meals accordingly.

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**Answer to Question 1**

1. Which of Mr. Johnson’s symptoms are most consistent with adult ADHD?
   a. Persistent worries.
   b. **Inability to listen.**
   c. Sleeping past noon.
   d. Obsessive thoughts.

**The correct answer is “b.”** Adults more often exhibit inattentive symptoms rather than hyperactive and impulsive symptoms.

- Answers “a,” “c,” and “d” are not symptoms of adult ADHD.
You explain to Mr. Johnson that there is no supplement that can improve his multiple symptoms related to poor attention—particularly if he already eats a healthful diet and takes a multivitamin. Based on the symptoms he reports, you inform him about an ADHD adult self-report scale (ASRS-v1.1) symptom checklist that can provide screening for the likelihood of adult ADHD. The screening tool is available at www.addcoach4u.com/adultaddtest.html. Because there are many possible causes of these symptoms—including anxiety or mood disorders—a comprehensive clinical assessment should be performed. You assure him that, if he does have ADHD, it responds well to treatment.

The result of Mr. Johnson’s ASRS-v1.1 screening is positive, and his primary care provider refers him to a psychologist for assessment. The psychologist uncovers useful information from the psychosocial history; for example, Mr. Johnson recalls getting into trouble frequently in grade school and being told that he was hyperactive and a “troublemaker.” He was homeschooled from ages 13 to 17 years old. He went to a liberal arts college and graduated with a bachelor’s degree in theater. The psychologist conducts a more structured clinical assessment and reviews the duration and functional impairment associated with his symptoms. ADHD (combined inattentive and hyperactive-impulsive type) is diagnosed. Mr. Johnson asks about the possible causes of his difficulty with attention, prioritization, and carrying out tasks. He wonders if drinking too much in college may have damaged his brain or if he has a chemical imbalance.

**Answer to Question 2**

2. Which of the following statements is accurate and can be included in counseling Mr. Johnson about the clinical course and brain changes associated with persistence of ADHD symptoms?
   a. **ADHD typically starts before age 7 years and can persist into adulthood for 50% of individuals.**
   b. Individuals whose symptoms remit as adults have less brain volume and a thinner cortex.
   c. Low brain serotonin and gamma-amino butyric acid (GABA) contribute to adult ADHD.
   d. Boys are 30% more likely than girls to show persistence of ADHD in adulthood.
The correct answer is “a.” The prevalence of ADHD in 5- to 12-year-old youths in the United States is 6% to 9%, and 50% of these individuals experience functionally impairing symptoms into adulthood.

- **Answer “b” is incorrect** because the opposite is true: when brain volume and cortex increase, ADHD symptoms remit.
- **Answer “c” is incorrect** because these are not causes of ADHD.
- **Answer “d” is incorrect** because the rates of ADHD are similar for men and women.
Mr. Johnson is starting to accept his ADHD diagnosis. He is somewhat relieved to know that his symptoms have a biological cause when he learns that brain imaging studies show changes in areas of the brain that regulate attention, prioritization, and completion of tasks. He asks which medications are most effective and safe for adults with ADHD.

**Answer to Question 3**

3. What information will you include while counseling Mr. Johnson on pharmacologic treatment options?

   a. Serotonergic antidepressants such as fluoxetine and sertraline have been shown to help with attention and task completion with minimal risk of adverse effects.

   b. Antidepressants that modulate norepinephrine such as venlafaxine and duloxetine are more effective for ADHD than agents such as atomoxetine or bupropion.

   c. Alpha-adrenergic agonists such as guanfacine and clonidine are useful adjuncts to stimulants for enhancing efficacy and preventing insomnia.

   d. Once-daily stimulant preparations containing either methylphenidate or amphetamine are considered the most effective and are safe for adults.

The correct answer is “d.” Controlled trials show that stimulants are safe and effective for adults with ADHD.

- **Answer “a” is incorrect** because serotonergic antidepressants have not been shown effective for ADHD.
- **Answer “b” is incorrect** because there are no controlled studies of venlafaxine and duloxetine in adult ADHD.
- **Answer “c” is incorrect** because there is no evidence for efficacy for clonidine and guanfacine in adult ADHD.
One month later, Mr. Johnson returns and states that the extended-release methylphenidate that he takes once daily in the morning has improved his symptoms significantly, but he still has difficulty with time management and disorganization. He asks whether there are any additional treatment recommendations.

**Answer to Question 4**

4. Which adjunctive nonpharmacologic treatment has the most evidence for efficacy in improving symptom control for adult ADHD?

   b. Structured relaxation training.
   c. Regular yoga and meditation.
   d. Supportive group psychotherapy.

The correct is answer “a.” Controlled trials in adults show that cognitive behavioral therapy and meta-cognitive therapy are effective for treating ADHD.

- **Answer “b” is incorrect** because structured relaxation training has limited evidence for efficacy in adult ADHD.
- **Answer “c” is incorrect** because a search of the Cochrane database showed there is insufficient evidence to recommend meditation for adult ADHD.
- **Answer “d” is incorrect** because psychoeducation and supportive treatment were found inferior to cognitive behavioral therapy for ADHD.
Fast Facts About Adult ADHD

- 3% to 5% of American adults have functionally impairing ADHD.
- 30% to 50% of adults with ADHD experience persistent symptoms despite effective pharmacotherapy.

Resources


