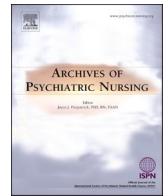


Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

## Archives of Psychiatric Nursing

journal homepage: [www.elsevier.com/locate/apnu](http://www.elsevier.com/locate/apnu)

## Attention deficit/hyperactivity disorder in adults: A case study

Keith O. Plowden, PhD, PMHNP-BC, CARN-AP, CNE, RN-C<sup>a,\*</sup>, Timothy Legg, PhD, PsyD, MSN, MPA, MSc, LMAC, GNP-BC, PMHNP-BC, CARN-AP, CBIS, NEA-BC, NPD-BC, CNE<sup>a</sup>, Dana Wiley, MD<sup>b</sup>

<sup>a</sup> University of North Dakota, United States of America<sup>b</sup> Dana Wiley, MD PA

## ARTICLE INFO

## Keywords:

Attention Deficit/Hyperactivity Disorder  
Adult  
Psychoeducation  
Stimulant  
Misuse

## ABSTRACT

Attention-Deficit/Hyperactivity Disorder (ADHD) is often misdiagnosed or mistreated in adults because it is often thought of as a childhood problem. If a child is diagnosed and treated for the disorder, it often persists into adulthood. In adult ADHD, the symptoms may be comorbid or mimic other conditions making diagnosis and treatment difficult. Adults with ADHD require an in-depth assessment for proper diagnosis and treatment. The presentation and treatment of adults with ADHD can be complex and often requires interdisciplinary care. Mental health and non-mental health providers often overlook the disorder or feel uncomfortable treating adults with ADHD. The purpose of this manuscript is to discuss the diagnosis and management of adults with ADHD.

## Introduction

A global multi-level mixed effect meta-analysis of adults who have symptoms of Attention-Deficit/Hyperactivity Disorder showed a prevalence of 6.67% (95% confidence interval [CI] 2.1–3.1) (Song et al., 2021). Characteristics of ADHD seen in children tend to persist into adulthood, but they are often overlooked. This means the prevalence might be higher in adults than reported (Katzman, Bilkey, Chokka, Fallu, & Klassen, 2017). Studies have shown that characteristics seen in children change when individuals enter their late teens or early adulthood. It is suggested that this might be due to changes in the environment and increased changes independent of responsibilities (Caye et al., 2016; Chung et al., 2019; Sandhu, Toll, & Poulton, 2020). If other disorders are present (such as depression, anxiety, or bipolar disorder), a diagnosis of ADHD could be missed and left untreated. Dual diagnosed individuals generally present with complex symptoms and are often difficult to manage. Evidence shows that adults with ADHD tended to score higher on assessment tools for these individual comorbid conditions (Bozkurt, Evren, Umut, Agachanli, & Evren, 2017; Richard-Lepouriel et al., 2016).

Although the prevalence of adult ADHD is lower than most other psychiatric disorders, failure to recognize and treat individuals with ADHD can result in profound impairments in cognitive and social functioning. For example, impaired short-term memory was higher in college students with ADHD (Dudukovic, Gottshall, Cavanaugh, &

Moody, 2014); adults with ADHD are more likely to procrastinate in activities of daily living and metacognition processes (Palacios-Cruz et al., 2018). In addition to cognitive impairment, adults with ADHD tend to be at higher risk for accidents (including automobile accidents), have more problems with employment and finances, have higher rates of substance misuse, more relationship issues, increased visits to health systems for comorbid mental and physical illnesses, and decreased life span (Owens, Zalecki, Gillette, & Hinshaw, 2017; Palacios-Cruz et al., 2018; Reid, Campos, Selochan, & Fong, 2018; Sadeghi et al., 2020; Şahan, Zengin Eroğlu, & Sertçelik, 2020). These factors make it vital for both mental and non-mental health providers to identify and manage adults with ADHD in order to reduce the impact at the individual, community, and health system levels.

At the individual level, young adults often delay seeking care because of the vague symptoms associated with the disorder. The triggers for seeking care vary, such as impairment in employment and other daily activities. At the systems level, several factors influence diagnosis and treatment, including lack of provider proper education and training in recognizing and treating an adult with ADHD, the belief that ADHD is a disorder of childhood and abates as the prefrontal cortex develops in adulthood, limited clinical experience in the diagnosis and treatment of ADHD in adults, and the lack of multidisciplinary teams necessary to adequately diagnose and treat adults with ADHD (French, Perez Vallejos, Sayal, & Daley, 2020; Pidano et al., 2016; Pidano et al., 2017).

\* Corresponding author at: 104 Maxwell Ave, Suite 346, Greenwood, SC 29646, United States of America.

E-mail address: [keithplowden30@gmail.com](mailto:keithplowden30@gmail.com) (K.O. Plowden).

<https://doi.org/10.1016/j.apnu.2021.12.003>

Received 6 June 2021; Received in revised form 6 September 2021; Accepted 4 December 2021

Available online 5 January 2022

0883-9417/© 2022 Elsevier Inc. All rights reserved.

Additionally, clinical guidelines for assessment and treatment for providers are not consistent with the DSM-5, which tends to focus on characteristics seen in children (Amer et al., 2019). Many providers would feel more comfortable diagnosing and managing ADHD with the availability of proper resources (Adler, Shaw, Sitt, Maya, & Morrill, 2009).

Adults are usually unsure of their symptoms, and they find it challenging to describe their symptoms (Owens, Zalecki, Gillette, & Hinshaw, 2017). Once an accurate diagnosis is made, many adults express a feeling of relief. This is because they can better understand the root cause which often brings comfort to individuals and their significant others (Aoki, Tsuboi, Furuno, Watanabe, & Kayama, 2020). Health care providers (mental and non-mental health) are also more likely to feel comfortable caring for adults with ADHD if resources for diagnosing and management were available. The purpose of this manuscript is to discuss the general approach to the diagnosis and effective treatment of adults with ADHD.

### Neuropathology of ADHD

Brain changes occurring during childhood contribute to symptoms seen in ADHD. Overall, general brain development in critical motor and cognitive function areas is delayed in individuals with ADHD (Kakuszi, Szuromi, Bitter, & Czobor, 2020). In ADHD, there is decreased gray matter volume in several brain areas responsible for information processing and impulse control (Humphreys et al., 2018; Wang et al., 2020). These alterations from typical neurodevelopment are believed to be responsible for the impulsive behavior and other cognitive impairment in daily activities seen in individuals with ADHD (Giedd et al., 2014). Similar pathological changes and behaviors are also seen with other mood disorders, which could explain the similarities in clinical presentations and the risk for misdiagnosis (Zhao et al., 2020).

There is growing evidence that altered neurotransmitter actions of dopamine, serotonin, and norepinephrine may play an essential role in ADHD symptomatology. Dopamine is involved in executive functioning, decision-making, and concentration; norepinephrine is responsible for working memory, attention, and attention control; and decreased serotonin is associated with impulsivity (Bokor & Anderson, 2014). In ADHD, there is impairment in the functioning of these neurotransmitters similar to those seen in other mood disorders. Individuals with ADHD and major depression have shown an abnormality in dopamine and norepinephrine functioning (Katzman & Sternat, 2016). This further explains the difficulty in differentiating adult ADHD from other mood disorders, such as depression. This means that an individual could possibly have ADHD alone or comorbid with another mood disorder.

ADHD is a neurodevelopmental disorder characterized by inattention, hyperactivity/impulsivity, or both (Diagnostic and Statistical Manual of Mental Disorders [DSM-5], 2013). The DSM-5 incorporates characteristics of ADHD across the lifespan. The defining characteristics does not take into account compensatory behaviors developed as an individual ages, which complicates diagnosing in adults. Children are required to meet six of the DSM-5 characteristics while adolescents and adults are only required to meet five (APA, 2013). The characteristics outlined tend to be more readily observed in children. The 18 criteria in the DSM-5 may not be readily recognized in adults making diagnosis difficult for clinicians. This could be because adults with ADHD may have advanced brain development and other compensatory behavior learned as they mature. Factor analysis of various ADHD characteristics have been shown to be much broader in adults than outlined in the DSM-5, which makes it difficult to make a clear diagnosis (Adler et al., 2017). For example, impaired executive functioning is predominately seen in adults while hyperactivity is the main characteristic in children. This is possibly due to impaired sensory processing (Papp et al., 2020). Inattention in adults may present as hyper-focusing behaviors characterized by an inability to shift attention from one activity to another in adults with ADHD (Ozel-Kizil et al., 2016). The characteristics in adults are not

clearly defined in the DSM-5. Because they are not clearly described characteristic, ADHD in adults can be easily overlooked and diagnosed as another disorder.

### Assessment

As with most disorders, assessment begins at the time a referral is made to the provider. A review of the referral should be done to prepare necessary resources to assist with probable diagnoses. Children are more likely than adults to meet the DSM-5 criteria for ADHD hyperactivity or combined, but adults are more likely to meet the criteria for ADHD inattention. The challenge with using the characteristics as outlined in the DSM-5 is that it does not clearly describe some behaviors seen in adults. For example, hyperactive behavior in adults may manifest as emotional dysregulation, increased exercise, and excessive spending (Adler et al., 2017; Bangma, Tucha, Fuermaier, Tucha, & Koerts, 2020). These behaviors are also seen in other disorders, complicating the diagnosis.

Characteristics of ADHD must be seen in two or more settings before a diagnosis can be made. This is easier in children because they tend to have consistent contact with the same individuals, such as parents and teachers. This makes corroboration of behavioral and cognitive problems easier in children. However, cognitive and behavioral impairments are not easily detected in adults since they often interact with multiple individuals daily, making it difficult to obtain collateral information of impaired function. Adults are also not under the supervisory control of parents or caregivers; thus, the impaired functioning may not be recognized and delay health-seeking behavior. Additionally, adults with ADHD also develop compensatory behaviors over time by learning new skills or adapting to their environment to meet their needs. For example, adults may compensate for cognitive difficulties by using checklists or electronic devices to aid with memory. The individual may create a highly structured environment to assist with focus and task completion; they may participate in sports to relieve the hyperactivity; they might be overly early for activities to compensate for inappropriate social skills, and conversations tend to be tangential and circumstantial in nature (Castagna, Roye, & Calamia, 2018). To compensate for occupational and other executive functioning deficiencies, adults with ADHD tend to do activities during quiet times to reduce distractions (Adler et al., 2017; Canela, Buadze, Dube, Eich, & Liebrezn, 2017; Castagna et al., 2018). Adults are able to adapt cognitive and emotional behavioral changes over time, which can mask impairment. These compensatory behaviors may not be apparent to others and are seen as normal adult behaviors making ADHD challenging to detect (Britton, 2011). These characteristics are not clearly found in the DSM-5 criteria for ADHD, making it possible to miss the diagnosis in adults.

Vague behaviors can complicate assessment, which contributes to misdiagnosis. Irritability, mood lability, increased activity, racing thoughts, paranoia, and worrying can be seen in adults with ADHD, but they are also DSM-5 criteria for anxiety, bipolar disorder, and ADHD, further complicating the diagnosis process. To reduce the chances of misdiagnosis, assessment tools to evaluate for other mood disorders should be completed to rule out other problems, including existence of a possible dual diagnoses. When other assessment tools are done, each should be scored separately, and the responses to items reviewed with the individual to ensure accuracy (Kooij et al., 2018). This ensures that the responses truly reflect their symptoms and allows clients to elaborate on their symptoms. Review of responses also assists the provider in making a more accurate diagnosis and treatment plan by picking up on some of the compensatory activities that may have developed. It may also help identify individuals who may engage in malingering behaviors for personal gains, such as stimulant medication, disability benefits, cognitive improvement at work and school, and general stress relief (Ramachandran, Dertien, & Bentley, 2020).

Although the literature supports interviewing as important in assessing ADHD in adults, objective measures are also important.

Objective measures to assess for adult ADHD help reduce clinician bias and increase the accuracy of diagnosis (Emser et al., 2018). Several self-administered Adult ADHD instruments are available. This section will discuss two commonly used objective measures for ADHD.

The first measure is the six-item version of the ADHD Self-Report Scale (ASRS-v1.1) is commonly used in ambulatory care settings. Experts at the World Health Organization used interviews, other ADHD scales, and the DSM-IV to develop the instrument (Kessler et al., 2005). The instrument is self-administered and can be easily utilized in any setting. There is both a short and long version of the instrument. Although it was developed using the DSM-IV, the instrument also reflects the DSM-5 criteria (Takeda, Tsuji, & Kurita, 2017). Scores for each item vary, and the results can range from 0 to 24. The score is an indicator of the severity of ADHD. The higher the score Psychometric assessment of the ASRS-v1.1 demonstrated a sensitivity of 91.4%–91.9% and specificity of 74%–96.0% even when interpreted into other languages (Kessler et al., 2005; Takeda et al., 2017). Initial responses to items should be reviewed with the client to obtain a baseline score and periodically during treatment to assess response to treatment. Compared to other ADHD objective assessment measures, such as the Wender Utah Rating Scale, the ASRS accurately detects adult ADHD (Brevik, Lundervold, Haavik, & Posserud, 2021). The scale has been used to differentiate adult ADHD from other illnesses, such as bipolar and depression (Jhaveri, Rana, Shah, & Malhotra, 2019; Stanton, Forbes, & Zimmerman, 2018). The tool also demonstrated high validity and reliability in detecting ADHD in adults with other health problems, such as cystic fibrosis and substance misuse (Georgiopoulos et al., 2018; Tamburin et al., 2017). The ASRS is available for free and can be downloaded by providers for use in clinical settings.

The second self-administered assessment tool is the Conner's Adult ADHD Rating Scale (CAARS). The scale covers characteristics of ADHD in both adults and children. The CAARS is self-administered with 66 items on a 4-point Likert-type scale. Scores range from 0 (not at all/never) and 3 (frequently). Factors analyses of the tool reveal that four subscales are measured: Inattention/memory, hyperactivity/restlessness, impulsivity/labile mood, and self-concept problems. All subscales have high specificity and sensitivity. Internal consistency for this instrument subscales ranged from 0.82 to 0.85 (Smyth & Meier, 2016). The tool is designed to be completed by individuals with ADHD or their significant others and has been translated into several languages. The tool has also effectively differentiated adult ADHD from other illnesses (Christiansen et al., 2020; Grogan et al., 2017).

#### Treatment and management of adult ADHD

The overall goal of treatment of adults with ADHD is the relief of distressing symptoms and improvement in occupational and social performance. Treatment is usually individualized based on the client's presentation and accompanying impairments. Pharmacological and nonpharmacological approaches have been shown to be effective in the treatment of adult ADHD. Pharmacological treatment for ADHD has been shown to improve daily activities positively, and adults receiving medication treatment reported great satisfaction with the outcomes (Sandhu et al., 2020).

Treatment is guided by objective and subjective assessment findings and severity of symptom impairment. It may require multiple medications to relieve symptoms. Many times, ADHD occurs with other mental health disorders. In these situations, optimal treatment outcomes are accomplished by medication combinations targeting each disorder (Karlstad et al., 2016). If ADHD is comorbid with other mood disorders, it is recommended to initially treat the most impairing disorder (Bloch et al., 2016). For example, if the client with a mood disorder identifies the inability to focus or to complete a task as most impairing, ADHD should be considered, and symptoms should be treated before treating the mood disorder.

**Table 1**  
Commonly prescribed stimulant medication.

Medication	Doses	Dosage form
Amphetamine (Dexedrine)	5–40 mg/day	Immediate release tablet; long acting capsule
Dextroamphetamine (Adderall)	5–40 mg/day	Immediate and extended release tablet
Mixed amphetamine salts (Adderall XR, Evekeo)	5–30 mg/day	Tablet, oral suspension
Methylphenidate (Ritalin)	5–60 mg/day	Tablet
Focalin	2.5–10 mg	Immediate and extended release
Delayed release Methylphenidate (Concerta, Ritalin LA)	10–60 mg/day	Tablet, transdermal patch, capsule, chewable tablet
Lisdexamfetamine (Vyvanse)	30–70 mg/day	Capsule. Activated in the stomach and less likely to be abused

Source: Stahl's Essential Psychopharmacology Prescriber's Guide 6th edition 2017.

#### Stimulant treatment

Stimulant medications have been shown to be effective in the treatment of ADHD in both children and adults. The mechanism of action for drug therapy is believed to be linked to an increase in extracellular dopamine and norepinephrine levels in the frontal cortex by inhibiting the reuptake of these neurotransmitters (Contini et al., 2013). The overall outcome is improvement in impulsive behavior and cognitive processes (Hawk et al., 2018). Methylphenidate (Ritalin) is a common stimulant medication prescribed for individuals diagnosed with ADHD and shown to decrease symptoms, such as frustration and anxiety, and to improve cognitive functioning in adults. Methylphenidate is available in immediate-release and extended-release. Extended-release methylphenidate has proven effective in relieving both ADHD and mood disorder symptoms if individuals can tolerate the therapy (Koyuncu, Çelebi, Ertekin, Kök, & Tükel, 2017). However, methylphenidate can cause decreased appetite impaired sleep, palpitations, hypertension, and tremors in some clients. If this occurs, the dose should be lowered, discontinued, or changed to another stimulant (Pozzi et al., 2018). Table 1 shows commonly prescribed stimulants for adults with ADHD. Other medications are constantly being developed with fewer side effects. The medication prescribed will be dependent on the provider, client preference, symptom alleviation, and tolerance (McCarthy, 2014).

#### Non-stimulant therapy

Although stimulant medications are usually the first-line treatment for adults with ADHD, there are times when alternate methods should be used. Non-stimulant medications can be an effective alternative. Individuals at risk for adverse reactions include clients with a history of cardiac disease, substance misuse (especially cocaine or methamphetamine), sleep disorders, or anyone who may have experienced an increase in anxiety or other emotional responses with stimulant use (Berro, Andersen, Spielman, Tufik, & Howell, 2017; Dogra, 2018; Fairman, Davis, Peckham, & Sclar, 2018). Individuals with comorbid mood disorder and ADHD show a decrease in inattentive depressive behaviors when treated with a non-stimulant (Shaker, Helmy, Adel, & Fahmy, 2020). These findings are important in consideration of the adverse effects of stimulant therapy.

Atomoxetine (Strattera) is a non-stimulant medication that can be prescribed to reduce the symptoms of adult ADHD. It does not exacerbate the symptoms of other comorbid disorders and has demonstrated efficacy in comorbid anxiety (Clemow, Bushe, Mancini, Ossipov & Upadhyaya, 2017). Tricyclic antidepressants (TCAs) such as imipramine and desipramine at doses of 200 mg/day have effectively treated anxiety and decreased ADHD symptoms (Elliott et al., 2020). Wellbutrin

(bupropion) sustained-release dosed at 75–150 mg/day is also effective (Verbeeck, Bekkering, Van den Noortgate, & Kramers, 2017). However, cardiac abnormalities, such as QTc prolongation, are a major complication associated with Atomoxetine and TCAs (Aronow & Shamliyan, 2020). Wellbutrin is contraindicated if there is a history of seizure disorder. Non-stimulant medications show the same efficacy as stimulant therapy and should be considered if stimulant therapy is not feasible, such as impaired tolerance or potential abuse.

#### Nonpharmacological treatment

Evidence supports the incorporation of cognitive enhancement therapies along with psychopharmacology to improve psychological functioning (Adhikari, Parul, Dhaliwal, & Sarin, 2021). Cognitive improvement therapies have demonstrated efficacy when combined with medication management or for individuals who do not respond to pharmacological treatment. Cognitive restructuring is an effective treatment for adults with ADHD and comorbid anxiety. Several therapy techniques have shown effective cognitive restructuring methods for adults with ADHD. Cognitive-Behavioral Therapy (CBT) and mindfulness are effective therapy techniques utilized to treat ADHD. These cognitive methods teach life skills, such as mood regulation, vital social skills, and attention regulation. Mindfulness approaches such as being present in the moment also reduce ADHD symptoms, increasing the overall quality of life (Hoxhaj et al., 2018). Similar results were seen with CBT. Therapy can be done face-to-face and internet-based for areas with limited mental health providers, such as rural remote areas (Månsson, Klintmalm, Nordqvist, & Andersson, 2017). Cognitive therapies can be utilized as an adjunct with medication treatment or monotherapy.

Education is essential in the treatment of adult ADHD. Education of individuals and health care providers has been shown to improve compliance in individuals and has increased the identification and treatment of the disorder. Families and communities can be educated about the illness and how to recognize ADHD symptoms in others, resulting in families or friends encouraging the individual to seek treatment. This can be a potentially promising outcome, especially among members of communities that may have a history of high levels of mistrust of the healthcare system. Lack of education is also a factor in ADHD treatment compliance. Compliance with treatment has been shown to increase when individuals and their significant others received education about ADHD, and the stigma associated with the disorder was reduced (Andrade & Harshe, 2019). Education is essential at the individual, community, and system levels to improve effective outcomes.

Technology has made mental health care delivery possible for individuals where mental health providers are not physically present. Delivering education to clients and the community can take place via telemedicine. Collaborative treatment between providers using telemedicine interaction is just as effective as face to face interactions (Rockhill, 2015). The use of technology for education and treatment can be an essential component of adult ADHD management.

The education of providers is an essential intervention. In some cases, mental health providers might diagnose adult ADHD and initiate treatment, but management and compliance monitoring might be the responsibility of other providers. Primary care providers or mental health providers with limited exposure to adults with ADHD might be reluctant to treat these clients based on the bias that ADHD is a childhood illness. Fortunately, this bias can be reduced with provider education. When providers were assessed, they identified several issues impacting their ability to care for adults with ADHD: lack of knowledge of signs and symptoms of adult ADHD, medication management of ADHD, preconceived beliefs about ADHD as a childhood disorder, available community resources, and inability to communicate with other mental health providers who understand adult ADHD. Physicians exposed to ADHD during their residency expressed comfort with diagnosing and treating the disorder (French et al., 2020). The “Curbside

Consultation” is an example of a program available for self-paced training of health care providers. The programs incorporate an interdisciplinary approach to teaching providers how to manage adults with ADHD cared for at various integrated health clinics (Olufs, Valleley, Hembree, & Evans, 2016). The educational program information focuses on recognition and treatment of adult ADHD. The program has been shown to improve recognition of adult ADHD by providers and improved their knowledge about the management of ADHD in adults (Olufs et al., 2016).

The *Practitioner Training in Child and Adolescent Psychiatry (PTCAP)* program is another example of an effective education strategy for providing education related to diagnosing and managing adult ADHD. The PTCAP was developed based on a survey of rural health care providers about issues affecting their ability to effectively care for individuals with ADHD and other psychiatric disorders (Espinete et al., 2019). The program emphasizes therapeutic communication between local health care providers and mental health professionals. It also focuses on effective communication skills between the provider and individuals with ADHD. The goal of the training is to improve attitudes and stigma surrounding ADHD among primary care providers. The program has been shown to increase confidence in diagnosing and managing adults with ADHD. The educational program is an 8-hour training program for providers, and it uses didactic and interactive methods to deliver the training. As a result, providers participating in the program acknowledge greater confidence in communicating concerns regarding diagnosis and management of ADHD and improved attitudes about the disorder (Espinete et al., 2019).

The *Triple Board Program* is another computer-based training for providers with little exposure to adults with ADHD using vignettes. The program was developed for physicians specializing in pediatrics and psychiatry. An online portal containing various training modules is available to providers and can be used for continuing education in the area of ADHD. Vignettes have been used as an effective educational modality to assess healthcare providers’ skills in assessing and managing various clinical situations (Evans et al., 2015). The *Triple Board* approach uses this method to assess and increase health care providers’ confidence in diagnosing and managing adult ADHD (Khan & Parisa, 2020). The programs are self-paced and can be reviewed by providers as needed.

#### Stimulant misuse prevention

Because of the potential for dependency and misuse, stimulants usually used to treat ADHD are classified by the U.S. Drug Enforcement Administration as Schedule II controlled substances. As a result, measures must be in place to reduce the potential for misuse of stimulants. Studies have shown increased prevalence and misuse of stimulants on college campuses among students in order to enhance academic performance (Prosek et al., 2017). If an intervention is not in place to prevent misuse, serious consequences can result, such as diversion and dependency. Physicians surveyed indicated they had limited knowledge about drug diversion and misuse (Colaneri, Keim, & Adesman, 2018). This supports the need for interventions to reduce stimulant misuse.

Several interventions are effective in reducing the likelihood of stimulant misuse by individuals. Prescription drug monitoring programs (PDMPs) are in place in most states for providers to monitor the potential for controlled substance misuse. The system was initially developed to combat the opioid crisis but was soon expanded to include all substances with the potential for abuse (Holmgren, Botelho, & Brandt, 2020). The system has been shown to be effective in several areas, including in the prevention of opioid overdosing, improved provider comfort in prescribing a controlled substance, identification of those clients going to multiple providers for prescriptions, and individuals securing large quantities of drugs, possibly for diversion, by allowing the providers access to multiple state control substance information (Patrick, Fry, Jones, & Buntin, 2016). Although PDMPs have been shown to



be effective in monitoring controlled substance use, some providers felt a lack of state and institutional infrastructure to adequately monitor misuse (Yuanhong Lai et al., 2018). To reduce the burden of using PDMP, efforts have been made to ease use by providers, such as integrating it into electronic medical records (Holmgren & Apathy, 2020).

There are other ways to overcome misuse or diversion stimulants. For instance, clients asked to sign a controlled substance contract were less likely to divert or misuse their stimulant medication and more likely to adhere to urine screening, which is one way of assessing for diversion (Downey et al., 2017). In addition, providers can prescribe a long-acting stimulant or prescribe non-stimulant medication (Colaneri et al., 2018). However, diversion and misuse should always be considered when prescribing stimulants. Interventions to prevent them should be in place to reduce the chances of misuse or diversion.

### Clinical case presentation

LB is a 31-year-old divorced woman who presented with complaints of racing thoughts, irritability, worrying, nervousness, labile sleep due to racing thoughts, and inability to remain focused on tasks. The symptoms were pervasive and interfered with her normal daily activities, such as work. She initially presented to her primary care provider and was treated for generalized anxiety disorder with a selective serotonin reuptake inhibitor (SSRI). However, after weeks of treatment, her symptoms persisted. Finally, LB became more frustrated and made an appointment with a mental health provider.

Given that her symptoms could be indicative of several mood disorders, LB was given several assessment tools: 1) Patient Health Questionnaire 9 (PHQ-9) (a self-administered questionnaire utilized in primary care to assess for depression), 2) General Anxiety Disorder-7 (GAD-7) to assess for anxiety, 3) Mood Disorder scale a 13 item scale indicative of bipolar disorder, and the 4) ASRS-6 questionnaire to assess for ADHD. The provider numerically scored the PHQ-9 and GAD-7, and the scores indicated the severity of symptoms. Total scores of the PHQ-9 range from 0 to 27 indicate none to severe depression, while the GAD-7 scale score ranges from 0 to 21, where 21 indicates severe anxiety. The Mood Disorder scale items are answered yes or no and used to indicate possible bipolar disorder. The ASRS-6 answers range from none to very often. Her PHQ-9 score was within the low range, which ruled out a diagnosis of depression. Her GAD-7 was in the moderate to high range. Therefore, anxiety was suspected as a possible diagnosis. She answered no to most of the questions on the mood disorder scale; therefore, bipolar disorder was ruled out. Interestingly, she indicated “often” and “very often” to several items on the ASRS-6 scale, which indicated the possibility of Attention-Deficit/Hyperactivity Disorder. To gather further information about her symptoms, LB’s answers were reviewed with her. During the assessment interview, LB endorsed she was anxious with the thought of starting a task because she believed she would be unable to focus and complete it. This led to procrastination and forgetting important appointments and events. She compensated by using a calendar to keep up with activities. LB reported a problem with concentration in school, average school performance, and easy distractibility. Based on the information obtained from the assessment tools and interview, she was started on methylphenidate (Ritalin) 5 mg in addition to her SSRI because she also demonstrated signs and symptoms of ADHD. At her 1 month follow-up appointment, her anxiety symptoms decreased, as demonstrated by her GAD score of mild. She expressed more self-confidence in her ability to perform daily activities. Given the follow-up information, she was diagnosed with ADHD, predominately inattentive type. Ritalin 5 mg every morning and psychotherapy were prescribed. LB returned to work and daily activities with little to no impairment.

### Conclusion

The purpose of this manuscript was to discuss adult ADHD and the

1. Client presents with impaired concentration, memory, and impaired occupation and social functions.
2. Inquire about the following: <ul style="list-style-type: none"> <li>• School Performance or any difficulties specifically requiring extra time for academic activities, attending special classes, repeating a grade, and behavioral performance in school and other places.</li> <li>• Problems with time management, organization and self-regulation.</li> <li>• Driving history</li> <li>• substance use</li> <li>• participation in risky behavior</li> <li>• Employment history</li> <li>• Diagnosis of ADD/ADHD as a child</li> <li>• Family history of ADD or ADHD.</li> <li>• Medical History</li> </ul>
3. Consider PHQ-9, GAD-7, and Mood disorder scale if co-occurring disorder suspected. <ul style="list-style-type: none"> <li>• Administer ADHD screening instrument, such as ASRS or Conner Adult ADHD.</li> <li>• Consider severity of functional Impairment and quality of life.</li> </ul>
4. Consider treating most impairing disorder initially
5. If ADHD is suspected, Consider medical treatment with stimulant or nonstimulant and psychotherapy <ul style="list-style-type: none"> <li>• Implement a Prescription monitoring system if using a stimulant.</li> </ul>

Fig. 1. Care of adults with suspected ADHD.

role of health care providers in the diagnosis and management of the disorder. Fig. 1 summarizes suggested steps in caring for adults with ADHD and can guide providers with limited experience in treating the disorder. With improved science and longer life spans, many disorders once seen only during childhood are now continuing into adulthood. ADHD is one of many disorders once thought to only occur in children and resolve as individuals matured. This is untrue. ADHD does not go away and can result in serious personal and community consequences for individuals if unrecognized and not treated. Adult ADHD treatment is needed to improve individuals’ social and occupational functioning with the illness and reduce the burden on already stressed health and social systems. Providers are often challenged to diagnose and treat adults with ADHD. Given the complexity of ADHD and the possibility of other comorbid psychiatric disorders, appropriately normed and validated instruments should be used for each suspected illness, and an individualized treatment plan developed to address each problem.

### References

- Adhikari, A., Parul, Dhaliwal, K., & Sarin, J. (2021). Upgrading self-esteem: Effectiveness of cognitive enhancement package among psychiatric inpatients. *Archives of Psychiatric Nursing*, 35(4), 395–400. <https://doi.org/10.1016/j.apnu.2021.03.007>
- Adler, L., Faraone, S., Spencer, T., Berglund, P., Alperin, S., & Kessler, R. (2017). The structure of adult ADHD. *International Journal of Methods in Psychiatric Research*, 26(1), Article e1555. <https://doi.org/10.1002/mp.1555>
- Adler, L., Shaw, D., Sitt, D., Maya, E., & Morrill, M. I. (2009). Issues in the diagnosis and treatment of adult ADHD by primary care physicians. *Primary Psychiatry*, 16(5), 57–63.
- Amer, Y., Al-Joudi, H., Varnham, J., Bashiri, F., Hamad, M., Al Salehi, S., et al. (2019). Appraisal of clinical practice guidelines for the management of attention deficit hyperactivity disorder (ADHD) using the AGREE II instrument: A systematic review. *PLoS ONE*, 14(7), Article e0219239. <https://doi.org/10.1371/journal.pone.0219239>
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Publishing.
- Andrade, C., & Harshe, D. (2019). Comments on “Factors associated with treatment adherence in children with attention deficit hyperactivity disorder”. *Indian Journal of Psychological Medicine*, 41(5), 497–498. [https://doi.org/10.4103/ijpsym.ijpsym\\_276\\_19](https://doi.org/10.4103/ijpsym.ijpsym_276_19)
- Aoki, Y., Tsuboi, T., Furuno, T., Watanabe, K., & Kayama, M. (2020). The experiences of receiving a diagnosis of attention deficit hyperactivity disorder during adulthood in Japan: A qualitative study. *BMC Psychiatry*, 20(1). <https://doi.org/10.1186/s12888-020-02774-y>
- Aronow, W., & Shamliyan, T. (2020). Effects of antidepressants on QT interval in people with mental disorders. *Archives of Medical Science*, 16(4), 727–741. <https://doi.org/10.5114/aoms.2019.86928>
- Bokor, G., & Anderson, P. (2014). Attention-deficit/hyperactivity disorder. *Journal of Pharmacy Practice*, 27(4), 336–349. <https://doi.org/10.1177/0897190014543628>
- Bangma, D., Tucha, L., Fuermaier, A., Tucha, O., & Koerts, J. (2020). Financial decision-making in a community sample of adults with and without current symptoms of ADHD. *PLoS ONE*, 15(10), Article e0239343. <https://doi.org/10.1371/journal.pone.0239343>

- Berro, L., Andersen, M., Spielman, A., Tufik, S., & Howell, L. (2017). Assessment of tolerance to the effects of methamphetamine on daytime activity and on sleep parameters evaluated with actigraphy in rhesus monkeys. *Sleep Medicine*, 40, Article e33. <https://doi.org/10.1016/j.sleep.2017.11.089>
- Bloch, Y., Aviram, S., Segev, A., Nitzan, U., Levkovitz, Y., Braw, Y., & Mimouni Bloch, A. (2016). Methylphenidate reduces state anxiety during a continuous performance test that distinguishes adult ADHD patients from controls. *Journal of Attention Disorders*, 21(1), 46–51. <https://doi.org/10.1177/1087054712474949>
- Bozkurt, M., Evren, C., Umur, G., Agachanli, R., & Evren, B. (2017). Severity of craving is related with severity of ADHD symptoms among inpatients with alcohol use disorder. *Anatolian Journal of Psychiatry*, 1. <https://doi.org/10.5455/apd.217741>
- Brevik, E., Lundervold, A., Haavik, J., & Posserud, M. (2021). Validity and accuracy of the adult attention-deficit/hyperactivity disorder (ADHD) self-report scale (ASRS) and the wender Utah rating scale (WURS) symptom checklists in discriminating between adults with and without ADHD. *Brain and Behavior*. <https://doi.org/10.1002/brb3.2067>
- Britton, G. (2011). Cognitive and emotional behavioural changes associated with methylphenidate treatment: A review of preclinical studies. *The International Journal of Neuropsychopharmacology*, 15(1), 41–53. <https://doi.org/10.1017/s1461145711000472>
- Canela, C., Buadze, A., Dube, A., Eich, D., & Liebrezn, M. (2017). Skills and compensation strategies in adult ADHD – A qualitative study. *PLoS ONE*, 12(9), Article e0184964. <https://doi.org/10.1371/journal.pone.0184964>
- Castagna, P., Roye, S., & Calamia, M. (2018). The compensatory ADHD behaviors scale (CABS): Development and initial validation. *Assessment*, 26(5), 783–798. <https://doi.org/10.1177/1073191118774841>
- Caye, A., Rocha, T., Anselmi, L., Murray, J., Menezes, A., Barros, F., et al. (2016). Attention-deficit/hyperactivity disorder trajectories from childhood to young adulthood. *JAMA Psychiatry*, 73(7), 705. <https://doi.org/10.1001/jamapsychiatry.2016.0383>
- Christiansen, H., Chavanon, M., Hirsch, O., Schmidt, M., Meyer, C., Müller, A., et al. (2020). Use of machine learning to classify adult ADHD and other conditions based on the conners' adult ADHD rating scales. *Scientific Reports*, 10(1). <https://doi.org/10.1038/s41598-020-75868-y>
- Chung, W., Jiang, S., Paksarian, D., Nikolaidis, A., Castellanos, F., Merikangas, K., & Milham, M. (2019). Trends in the prevalence and incidence of attention-deficit/hyperactivity disorder among adults and children of different racial and ethnic groups. *JAMA Network Open*, 2(11), Article e1914344. <https://doi.org/10.1001/jamanetworkopen.2019.14344>
- Clemow, D. B., Bushe, C., Mancini, M., Ossipov, M. H., & Upadhyaya, H. (2017). A review of the efficacy of atomoxetine in the treatment of attention-deficit hyperactivity disorder in children and adult patients with common comorbidities. *NEUROPSYCHIATRIC DISEASE AND TREATMENT*, 13, 357–371.
- Colaneri, N., Keim, S., & Adesman, A. (2018). Physician training and qualification to educate patients on attention-deficit/hyperactivity disorder stimulant diversion and misuse. *Journal of Child and Adolescent Psychopharmacology*, 28(8), 554–561. <https://doi.org/10.1089/cap.2017.0066>
- Contini, V., Rovaris, D., Victor, M., Grevet, E., Rohde, L., & Bau, C. (2013). Pharmacogenetics of response to methylphenidate in adult patients with attention-deficit/hyperactivity disorder (ADHD): A systematic review. *European Neuropsychopharmacology*, 23(6), 555–560. <https://doi.org/10.1016/j.euroneuro.2012.05.006>
- Dogra, P. (2018). Cardiovascular effects of methylphenidate in children with attention deficit hyperactivity disorder (ADHD). *Journal of Medical Science And Clinical Research*, 6(6). <https://doi.org/10.18535/jmscr/v6i6.39>
- Downey, L., Tysse, B., Ford, T., Samuels, A., Wilson, R., & Parrott, A. (2017). Psychomotor Tremor and Proprioceptive Control Problems in Current and Former Stimulant Drug Users: An Accelerometer Study of Heavy Users of Amphetamine, MDMA, and Other Recreational Stimulants. *Journal of Clinical Pharmacology*, 57(10), 1330–1337. <https://doi.org/10.1002/jcph.925>
- Dudukovic, N. M., Gottshall, J. L., Cavanaugh, P. A., & Moody, C. T. (2014). Diminished testing benefits in young adults with attention-deficit hyperactivity disorder. *Memory*, 23(8), 1264–1276. <https://doi.org/10.1080/09658211.2014.977921>
- Elliott, J., Johnston, A., Husereau, D., Kelly, S., Eagles, C., Charach, A., et al. (2020). Pharmacologic treatment of attention deficit hyperactivity disorder in adults: A systematic review and network meta-analysis. *PLoS ONE*, 15(10), Article e0240584. <https://doi.org/10.1371/journal.pone.0240584>
- Emser, T., Johnston, B., Steele, J., Kooij, S., Thorell, L., & Christiansen, H. (2018). Assessing ADHD symptoms in children and adults: Evaluating the role of objective measures. *Behavioral and Brain Functions*, 14(1). <https://doi.org/10.1186/s12993-018-0143-x>
- Espinat, S., Gotovac, S., Knight, S., Wissow, L., Zwarenstein, M., Lingard, L., & Steele, M. (2019). Primary care practitioner training in child and adolescent psychiatry (PTCAP): A cluster-randomized trial. *The Canadian Journal of Psychiatry*, 65(5), 319–329. <https://doi.org/10.1177/0706743719890161>
- Evans, S., Roberts, M., Keeley, J., Blossom, J., Amaro, C., Garcia, A., et al. (2015). Vignette methodologies for studying clinicians' decision-making: Validity, utility, and application in ICD-11 field studies. *International Journal of Clinical and Health Psychology*, 15(2), 160–170. <https://doi.org/10.1016/j.ijchp.2014.12.001>
- Fairman, K., Davis, L., Peckham, A., & Sclar, D. (2018). Diagnoses of cardiovascular disease or substance addiction/abuse in US adults treated for ADHD with stimulants or atomoxetine: Is use consistent with product labeling? *Drugs - Real World Outcomes*, 5(1), 69–79. <https://doi.org/10.1007/s40801-017-0129-2>
- French, B., Perez Vallejos, E., Sayal, K., & Daley, D. (2020). Awareness of ADHD in primary care: Stakeholder perspectives. *BMC Family Practice*, 21(1). <https://doi.org/10.1186/s12875-020-01112-1>
- Holmgren, A., & Apathy, N. (2020). Evaluation of prescription drug monitoring program integration with hospital electronic health records by US county-level opioid prescribing rates. *JAMA Network Open*, 3(6), Article e209085. <https://doi.org/10.1001/jamanetworkopen.2020.9085>
- Giedd, J., Raznahan, A., Alexander-Bloch, A., Schmitt, E., Gogtay, N., & Rapoport, J. (2014). Child psychiatry branch of the National Institute of Mental Health longitudinal structural magnetic resonance imaging study of human brain development. *Neuropsychopharmacology*, 40(1), 43–49. <https://doi.org/10.1038/npp.2014.236>
- Grogan, K., Gormley, C., Rooney, B., Whelan, R., Kiiski, H., Naughton, M., & Bramham, J. (2017). Differential diagnosis and comorbidity of ADHD and anxiety in adults. *British Journal of Clinical Psychology*, 57(1), 99–115. <https://doi.org/10.1111/bjc.12156>
- Georgiopoulos, A., Friedman, D., Porter, E., Krasner, A., Kakarala, S., Glaeser, B., et al. (2018). Screening for ADHD in adults with cystic fibrosis: Prevalence, health-related quality of life, and adherence. *Journal of Cystic Fibrosis*, 17(2), 276–280. <https://doi.org/10.1016/j.jcf.2017.08.011>
- Hawk, L., Fosco, W., Colder, C., Waxmonsky, J., Pelham, W., & Rosch, K. (2018). How do stimulant treatments for ADHD work? Evidence for mediation by improved cognition. *Journal of Child Psychology and Psychiatry*, 59(12), 1271–1281. <https://doi.org/10.1111/jcpp.12917>
- Holmgren, A., Botelho, A., & Brandt, A. (2020). A history of prescription drug monitoring programs in the United States: Political appeal and public health efficacy. *American Journal of Public Health*, 110(8), 1191–1197. <https://doi.org/10.2105/ajph.2020.305696.p.m>
- Hoxhaj, E., Sadohara, C., Borel, P., D'Amelio, R., Sobanski, E., Müller, H., et al. (2018). Mindfulness vs psychoeducation in adult ADHD: A randomized controlled trial. *European Archives of Psychiatry and Clinical Neuroscience*, 268(4), 321–335. <https://doi.org/10.1007/s00406-018-0868-4>
- Humphreys, K., Watts, E., Dennis, E., King, L., Thompson, P., & Gotlib, I. (2018). Stressful life events, ADHD symptoms, and brain structure in early adolescence. *Journal of Abnormal Child Psychology*, 47(3), 421–432. <https://doi.org/10.1007/s10802-018-0443-5>
- Jhaveri, S. J., Rana, D. A., Shah, P. D., & Malhotra, S. D. (2019). Detection and evaluation of attention deficit hyperkinetic disorder (ADHD) in adult Indian students of different programmes using adult self report scale v1.1. *National Journal of Integrated Research in Medicine*, 10(5), 28–34.
- Kakuszi, B., Szurómi, B., Bitter, I., & Czobor, P. (2020). Attention deficit hyperactivity disorder: Last in, first out - delayed brain maturation with an accelerated decline? *European Neuropsychopharmacology*, 34, 65–75. <https://doi.org/10.1016/j.euroneuro.2020.03.011>
- Katzman, M., & Sternat, T. (2016). Neurobiology of hedonic tone: The relationship between treatment-resistant depression, attention-deficit hyperactivity disorder, and substance abuse. *Neuropsychiatric Disease and Treatment*, 12, 2149–2164. <https://doi.org/10.2147/ndt.s111818>
- Katzman, M., Bilkey, T., Chokka, P., Fallu, A., & Klassen, L. (2017). Adult ADHD and comorbid disorders: Clinical implications of a dimensional approach. *BMC Psychiatry*, 17(1). <https://doi.org/10.1186/s12888-017-1463-3>
- Karlstad, Ø., Zoëga, H., Furu, K., Bahmanyar, S., Martikainen, J., Kieler, H., & Pottegård, A. (2016). Use of drugs for ADHD among adults—A multinational study among 15.8 million adults in the Nordic countries. *European Journal of Clinical Pharmacology*, 72(12), 1507–1514. <https://doi.org/10.1007/s00228-016-2125-y>
- Kessler, R., Adler, L., Ames, M., Demler, O., Faraone, S., Hiripi, E., et al. (2005). The World Health Organization adult ADHD self-report scale (ASRS): A short screening scale for use in the general population. *Psychological Medicine*, 35(2), 245–256. <https://doi.org/10.1017/s0033291704002892>
- Khan, M., & Parisa, A. (2020). Exploring Factors Influencing Medication Adherence From Initiation to Discontinuation in Parents and Adolescents With Attention Deficit Hyperactivity Disorder. *Research in Social and Administrative Pharmacy*, 59(3), 285–296. <https://doi.org/10.1177/000922819900973>
- Koyuncu, A., Çelebi, F., Ertekin, E., Kök, B., & Tükel, R. (2017). Extended-release methylphenidate monotherapy in patients with comorbid social anxiety disorder and adult attention-deficit/hyperactivity disorder: Retrospective case series. *Therapeutic Advances in Psychopharmacology*, 7(11), 241–247. <https://doi.org/10.1177/2045125317714193>
- Månsson, K., Klintmalm, H., Nordqvist, R., & Andersson, G. (2017). Conventional cognitive behavioral therapy facilitated by an internet-based support system: Feasibility study at a psychiatric outpatient clinic. *JMIR Research Protocols*, 6(8), Article e158. <https://doi.org/10.2196/resprot.6035>
- McCarthy, S. (2014). Pharmacological interventions for ADHD: How do adolescent and adult patient beliefs & attitudes impact treatment adherence? *Patient Preference and Adherence*, 1317. <https://doi.org/10.2147/ppa.s42145>
- Olufs, E., Valleley, R., Hembree, K., & Evans, J. (2016). Brief educational “curbside consultation”: Impact on attention-deficit/hyperactivity disorder referrals in an integrated healthcare setting. *Families, Systems, & Health*, 34(3), 221–228. <https://doi.org/10.1037/fsh0000210>
- Owens, E. B., Zalecki, C., Gillette, P., & Hinshaw, S. P. (2017). Girls with childhood ADHD as adults: Cross-domain outcomes by diagnostic persistence. *Journal of Consulting & Clinical Psychology*, 85(7), 723–736. <https://doi.org/10.1037/ccp0000217>
- Ozel-Kizil, E., Kokurcan, A., Aksoy, U., Kanat, B., Sakarya, D., Bastug, G., et al. (2016). Hyperfocusing as a dimension of adult attention deficit hyperactivity disorder. *Research in Developmental Disabilities*, 59, 351–358. <https://doi.org/10.1016/j.ridd.2016.09.016>
- Palacios-Cruz, L., Galicia, F., Arias-Caballero, A., Cárdenas Godínez, E. M., Vázquez-Medina, J., Mayer-Villa, P.Lara-Muñoz, M. C., ... (2018). Comparison of clinical and cognitive characteristics of a Mexican adult clinical population with and without

- ADHD. *Salud Mental*, 41(6), 297–305. <https://doi.org/10.17711/sm.0185-3325.2018.042>
- Pidano, A., Slater, C., Dale, L., Wilbur, K., Sandhu, P., & Honigfeld, L. (2016). Availability of telephone-based child psychiatry consultation: Implications from a survey of pediatric providers in two states. *Journal of Child and Family Studies*, 25(8), 2607–2615. <https://doi.org/10.1007/s10826-016-0423-8>
- Pidano, A., Dale, L., Morgan, C., Wilbur, K., Sandhu, P., & Honigfeld, L. (2017). Different mental health-related symptoms, different decisions: A survey of pediatric primary care providers. *Journal of Child and Family Studies*, 26(12), 3525–3534. <https://doi.org/10.1007/s10826-017-0846-x>
- Papp, S., Tombor, L., Kakuszi, B., Balogh, L., Réthelyi, J. M., Bitter, I., & Czobor, P. (2020). Impaired early information processing in adult ADHD: A high-density ERP study. *BMC Psychiatry*, 20(1). <https://doi.org/10.1186/s12888-020-02706-w>
- Patrick, S., Fry, C., Jones, T., & Buntin, M. (2016). Implementation of prescription drug monitoring programs associated with reductions in opioid-related death rates. *Health Affairs*, 35(7), 1324–1332. <https://doi.org/10.1377/hlthaff.2015.1496>
- Pozzi, M., Carnovale, C., Peeters, G., Gentili, M., Antoniazzi, S., Radice, S., et al. (2018). Adverse drug events related to mood and emotion in paediatric patients treated for ADHD: A meta-analysis. *Journal of Affective Disorders*, 238, 161–178. <https://doi.org/10.1016/j.jad.2018.05.021>
- Prosek, E., Giordano, A., Turner, K., Bevil, C., Reader, E., LeBlanc, Y., et al. (2017). Prevalence and correlates of stimulant medication misuse among the collegiate population. *Journal of College Student Psychotherapy*, 32(1), 10–22. <https://doi.org/10.1080/87568225.2017.1313691>
- Ramachandran, S., Dertien, D., & Bentley, S. (2020). Prevalence of ADHD symptom malingering, nonmedical use, and drug diversion among college-enrolled adults with a prescription for stimulant medications. *Journal of Addictive Diseases*, 38(2), 176–185. <https://doi.org/10.1080/10550887.2020.1732762>
- Reid, R. C., Campos, M., Selochan, N., & Fong, T. W. (2018). Characteristics of treatment seeking problem gamblers with adult ADHD. *International Journal of Mental Health and Addiction*, 18(4), 875–890. <https://doi.org/10.1007/s11469-018-9986-5>
- Richard-Lepouriel, H., Etain, B., Hasler, R., Bellivier, F., Gard, S., Kahn, J., et al. (2016). Similarities between emotional dysregulation in adults suffering from ADHD and bipolar patients. *Journal of Affective Disorders*, 198, 230–236. <https://doi.org/10.1016/j.jad.2016.03.047>
- Rockhill, C. (2015). Telepsychiatry intervention is better for ADHD symptoms than usual treatment augmented by telemedicine consultation. *Evidence Based Mental Health*, 18(4). <https://doi.org/10.1136/eb-2015-102151>. e9-e9.
- Sadeghi, H., Shabani, Y., Pakniyat, A., Karimian, K., Harorani, M., & Naderi Rajeh, Y. (2020). Road crashes in adults with attention deficit hyperactivity disorder and risky driving behavior. *Iranian Journal of Psychiatry*. <https://doi.org/10.18502/ijps.v15i2.2682>
- Şahan, E., Zengin Eroğlu, M., & Sertçelik, S. (2020). Eating behaviors, depression, and anxiety levels of pre-bariatric surgery patients with obesity comorbid with or without attention deficit and hyperactivity disorder. *Brain and Behavior*, 11(1). <https://doi.org/10.1002/brb3.1915>
- Sandhu, A., Toll, J., & Poulton, A. (2020). A community survey of adults with attention deficit hyperactivity disorder (ADHD) and their experience of medication effectiveness. *Australasian Psychiatry*, 29(1), 75–79. <https://doi.org/10.1177/1039856220947941>
- Shaker, N., Helmy, D., Adel, A., & Fahmy, Y. (2020). Follow up study on attention deficit hyperactivity disorder patients with and without comorbid mood disorders receiving non-stimulant medication. *QJM: An International Journal of Medicine*, 113 (Supplement 1). <https://doi.org/10.1093/qjmed/hcaa054.024>
- Smyth, A., & Meier, S. (2016). Evaluating the psychometric properties of the Conners adult ADHD rating scales. *Journal of Attention Disorders*, 23(10), 1111–1118. <https://doi.org/10.1177/1087054715624230>
- Song, P., Zha, M., Yang, Q., Zhang, Y., Li, X., & Rudan, I. (2021). The prevalence of adult attention-deficit hyperactivity disorder: A global systematic review and meta-analysis. *Journal of Global Health*, 11. <https://doi.org/10.7189/jogh.11.04009>
- Stanton, K., Forbes, M. K., & Zimmerman, M. (2018). Distinct dimensions defining the Adult ADHD Self-Report Scale: Implications for assessing inattentive and hyperactive/impulsive symptoms. *Psychological Assessment*, 30(12), 1549–1559. <https://doi.org/10.1037/pas0000604>
- Takeda, T., Tsuji, Y., & Kurita, H. (2017). Psychometric properties of the Japanese version of the Adult Attention-deficit hyperactivity disorder (ADHD) Self-Report Scale (ASRS-J) and its short scale in accordance with DSM-5 diagnostic criteria. *Research in Developmental Disabilities*, 63, 59–66. <https://doi.org/10.1016/j.ridd.2017.02.011>
- Tamburin, S., Federico, A., Morbioli, L., Faccini, M., Casari, R., Zamboni, L., et al. (2017). Screening for adult attention deficit/hyperactivity disorder in high-dose benzodiazepine dependent patients. *The American Journal on Addictions*, 26(6), 610–614. <https://doi.org/10.1111/ajad.12573>
- Verbeeck, W., Bekkering, G., Van den Noortgate, W., & Kramers, C. (2017). Bupropion for attention deficit hyperactivity disorder (ADHD) in adults. *Cochrane Database of Systematic Reviews*. <https://doi.org/10.1002/14651858.cd009504.pub2>
- Wang, L., Li, S., Kuo, H., Chou, W., Lee, M., Chou, M., et al. (2020). Gray matter volume and microRNA levels in patients with attention-deficit/hyperactivity disorder. *European Archives of Psychiatry and Clinical Neuroscience*, 270(8), 1037–1045. <https://doi.org/10.1007/s00406-019-01032-x>
- Yuanhong Lai, A., Smith, K., Vernick, J., Davis, C., Caleb Alexander, G., & Rutkow, L. (2018). Perceived unintended consequences of prescription drug monitoring programs. *Substance Use & Misuse*, 54(2), 345–349. <https://doi.org/10.1080/10826084.2018.1491052>
- Zhao, Y., Niu, R., Lei, D., Shah, C., Xiao, Y., Zhang, W., et al. (2020). Aberrant gray matter networks in non-comorbid medication-naïve patients with major depressive disorder and those with social anxiety disorder. *Frontiers in Human Neuroscience*, 14. <https://doi.org/10.3389/fnhum.2020.00172>