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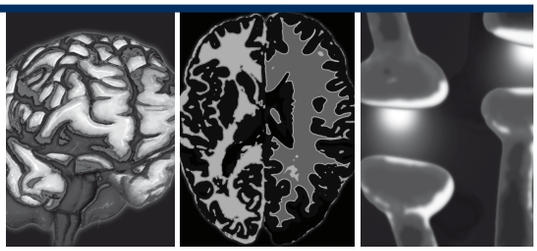

Substance-use disorders in adolescents and adults with ADHD: focus on treatment

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Practice points

- In adolescents with ADHD and substance-use disorder (SUD), three open (n = 42 subjects) and five controlled (n = 557 subjects) studies were identified. Similarly, in adults with ADHD plus SUD, six open (n = 124 subjects) and seven controlled (n = 703 subjects) studies were identified. Studies included both stimulants and nonstimulants used in the treatment of ADHD.
- SUD onset is usually in adolescence or early adulthood and there appears to be a higher risk of ADHD in adolescents and adults with SUD, as well as a higher risk of SUD in ADHD adolescents and adults.
- Stimulant medications remain among first-line agents for treatment of ADHD; however, other effective medications include α-agonists, noradrenergic agents and catecholaminergic antidepressants.
- Results from controlled trials of pharmacotherapy suggest the potential utility of incorporating other treatment modalities, such as cognitive behavioral therapy, in adolescent and adult groups with comorbid ADHD and SUD.
- While the majority of adolescents and adults appropriately use their ADHD medications, a minority is reported to misuse and divert stimulants, often in context with substance abuse.
- Patients presenting with comorbid ADHD and SUD require multimodal interventions; if possible, it is preferred to stabilize the substance use prior to initiating pharmacotherapy.
- Nonstimulants or extended-release stimulants should be considered to treat those with recent addictions or those at high risk to misuse or divert their medications.
- As evidenced by the extant literature, future studies should continue to examine multimodal treatment strategies addressing comorbid ADHD and SUD.

SUMMARY A high prevalence of comorbidity of ADHD and substance-use disorders (SUDs) has been shown in the literature. In this article, the literature for the treatment of adolescents and adults with co-occurring ADHD and SUD is examined. Findings from pharmacotherapy suggest mild improvement in ADHD without demonstrable changes in SUD unless the addiction was stabilized prior to treating the ADHD. No unique adverse

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effects, worsening of SUD, misuse or diversion of stimulants are reported in the included studies. Treating ADHD pharmacologically in individuals with ADHD plus SUD only has a modest impact on ADHD and SUD that is not observed in controlled trials. Limited data in adults with ADHD and brief abstinence of their SUD showed improvements in both ADHD and SUD with treatment. Further studies of cognitive behavioral therapy, sequencing of therapies and longer term treatment outcomes for groups with ADHD and active SUD are necessary.

ADHD is among the most prevalent neurobehavioral disorders presenting for treatment in children and adolescents [1]. Between 6 and 9% of youths and 4–5% of adults have ADHD worldwide [2,3]. ADHD is associated with a persistent course, impairment in multiple domains, and co-occurring learning and psychiatric problems (for a review see [4]). Cigarette and substance-use disorders (SUDs) remain among the most problematic co-occurring disorders with ADHD.

SUDs onset is usually in adolescence or early adulthood and affects up to 30% of US adults [1,5] with approximately 9% of adolescents manifesting a drug-use disorder and 6% an alcohol-use disorder [1]. The study of comorbidity between SUD and ADHD is germane to both research and clinical practice in developmental pediatrics, psychology and psychiatry, with implications for diagnosis, prognosis, treatment and healthcare delivery.

There appears to be a bidirectional relationship between ADHD and SUD. From a quarter to a half of adolescents and adults with SUD have ADHD (for a review see [6,7]). For instance, in samples of cannabis-abusing youths, ADHD occurs in 40–50% of both girls and boys. In adult groups with SUD, a higher risk for ADHD (~20–25%), as well as earlier onset and more severe SUD, has been linked with ADHD [8,9]. It is also thought that ADHD remains underidentified in addiction treatment centers. For example, in one study, while 3% of individuals in a residential treatment center were noted in the records as having ADHD, systematic assessment using a standardized screener identified a rate of ADHD of 44% [10].

ADHD and accompanying comorbidity is also a risk for SUD as demonstrated in a recent meta-analysis [11]. Charach *et al.* reported on 13 studies of ADHD youths growing up and found that a significant increase in SUD was associated with ADHD [11]. Prospective data also shows that co-occurring conduct or bipolar disorders beget the highest risk for SUD [12–16]. Interestingly, the authors recently examined other internal characteristics in ADHD that may predict later SUD and found that family history of SUD, cognitive impairment, executive dysfunction, socialization or family environment did not predict SUD in the 10-year follow-up of prepubescent children with ADHD [16,17].

The stimulants remain among first-line agents for the treatment of ADHD across the lifespan [18]. As controlled substances, the stimulant abuse liability and potential kindling of specific types of later abuse (i.e., cocaine) secondary to earlier stimulant exposure in ADHD children have been raised [19]. It appears that stimulant treatment does not increase the risk for SUD. Data seem to suggest a reduction in the risk and delay of onset of SUD through adolescence [20] in stimulant-treated youths with ADHD that appears to be lost in adulthood [21]. It is possible that the protective effect in adults may be lost, in part, owing to the fact that findings in adolescents do not span through the full age of risk of SUD. Also, most adolescents have stopped their ADHD treatment during later adolescence and young adulthood. This suggests the potential loss of the protective effect of stimulants in later years. While the mechanism of ADHD resulting in SUD remains unclear, family genetics, self medication, exposure to SUD and common biological pathways remain the most likely candidates [7,16,22,23].

While aggregate data exists on the prevention of SUD in context to ADHD treatment [24], a number of questions related to the impact of ADHD treatment on individuals affected with both ADHD and SUD remain. For instance, do specific psychosocial treatments such as cognitive behavioral therapy (CBT) or dynamic psychotherapies exist to treat concomitant ADHD and SUD? Likewise, does ADHD pharmacotherapy in context with SUD improve the subject's ADHD or does it reduce or exacerbate SUD? Previous clinical guidelines, while helpful, were completed prior to the benefit of a number of recent open and controlled trials [25–27]. To this end, to evaluate the treatment of

adolescents and adults with ADHD and SUD the literature are reviewed.

Methods

A search of the literature included journal articles using keywords including 'SUD derivatives', 'antidepressants', 'nonstimulants', 'stimulants', 'pharmacotherapy' and 'ADHD'. Prospective treatment studies examining the effect of psychosocial and/or pharmacological treatment in adults or adolescents with ADHD and SUD were included, and our search was supplemented with data from a variety of peer-reviewed scientific presentations at national and international scientific conventions and meetings.

Included were articles with adolescents or adults who met the Diagnostic and Statistical Manual of Mental Disorders III-Revised or IV criteria for current ADHD and had an active SUD. Studies had to be prospective and treat participants psychosocially or pharmacologically for ADHD. The sample size of each study had to be at least ten. Excluded were articles that lacked current diagnoses of ADHD and SUD, did not provide quantitative outcome information, were retrospective or were case reports/studies.

Results

■ Cognitive behavioral therapy

Despite the frequent comorbidity of ADHD and SUD, there is a dearth of literature examining psychotherapy exclusively for individuals with both disorders. However, recent studies have demonstrated efficacy of CBT for ADHD and related problems in adults with ADHD using both individual [28] and group [29] therapies. While specific trials of psychotherapies in ADHD and SUD are lacking, data from recently reported studies shed some light on the potential usefulness of psychotherapies. A recently reported, well-conducted multisite controlled study of adolescents with mixed SUD and ADHD found that both groups improved in both ADHD and SUD independent of the study medication (osmotic-release oral system [OROS] methylphenidate [MPH]), leading the authors to posit that the improvement may have been related to the CBT provided to all adolescents in the study [30]. Similar findings were reported in a single-site controlled trial of atomoxetine in adolescents with ADHD and SUD [31]. Clearly, more work examining the role of modified CBT addressing both ADHD and SUD in adolescents and adults with ADHD and SUD is necessary.

Effective medications for ADHD include the stimulants, α-agonists, noradrenergic agents and catecholaminergic antidepressants [18].

■ Medications

Stimulants

In general, while open studies are more encouraging, results from controlled trials with stimulants and/or bupropion suggest that ADHD pharmacotherapy used in adolescent and adult groups with ADHD plus mixed SUD has meager effects on ADHD and substance use or cravings **(Tables 1 & 2)**. In an early 13-week randomized controlled study, Schubiner and colleagues reported that MPH was linked to small but significant reductions in symptoms of ADHD without changes in cocaine use or cravings [32]. Levin *et al.* in two published studies of MPH and/or bupropion in adults with cocaine addiction (± opioid replacement with methadone) found only small to no improvements in ADHD and SUD outcomes [33,34]. In a more recent pilot study of 24 adults with amphetamine abuse and ADHD, Konstenius *et al.* conducted a 12-week, placebo-controlled trial of OROS MPH (72 mg). No significant differences in outcome for either ADHD or SUD were found [35].

A related multisite controlled study of stimulants in adult smokers with ADHD indicated a similar outcome [36]. In this 11-week study, 255 adults with ADHD who were treated with the nicotine patch to examine the effects on cigarette cessation and ADHD were also dosed to 72 mg/day of OROS MPH/placebo. The results of this trial showed improved ADHD but no effects on rates of cigarette cessation [36]. Of interest, despite recent concerns of stimulants potentially increasing cigarette smoking in ADHD [37], there was no increased cigarette smoking in the medicated group and side effects in these adults were similar to those noted in previous stimulant trials. In a 16-week placebo-controlled multisite study, 300 adolescents with mixed SUD (not including opioid abuse) received 72 mg/day OROS MPH/placebo along with weekly individual CBT resulting in no significant improvement in ADHD (investigator/parent) or SUD (adolescent self-report) between treatment groups. Side effects were reminiscent of adolescent studies and the medication was reported to be of low-abuse liability. As in the study by Riggs, no evidence exists that treating ADHD with stimulants through an active SUD worsens the SUD [38] – consistent with longstanding work

Table 1. Representative open-label studies of pharmacological efficacy in individuals with ADHD and substance-use disorder.

Author (year)	Individuals (n)	Mean age (years)	Sample description	Medication	Duration	Daily dose (range)	Retention	Outcome	Concurrent treatment	Comments	Ref.
Riggs *et al.* (1996)	15	15	Adolescent boys with CD, ADHD, and SUD in Res Tx	Pemoline	1 month	112.5–185.5 mg (1.2–3.3 mg/kg)	13/15	Significant reductions in activity (-7%) and hyperactivity (-14%; $p \leq 0.002$)	All subjects in a Res Tx program; three were taking other medications	Two subjects dropped out because of side effects; no change in CPT	[60]
Levin *et al.* (1998)	12	34	Adults with ADHD and cocaine dependence	MPH	12 weeks	68 mg (40–80 mg)	8/12	Improvements in ADHD; decrease in self-reported cocaine use and positive urine samples	Individual weekly relapse prevention therapy	Mild AEs	[61]
Riggs *et al.* (1998)	13	16	Adolescent boys with CD, ADHD, and SUD in Res Tx	BPR	5 weeks	300 mg (3.9–5.6 mg/kg)	13/13	Severity of ADHD decline 39% ($p < 0.002$)	All subjects in a Res Tx program	Side effects mild and transient, one developed hypomania	[62]
Upadhyaya *et al.* (2001)	10	35	Adults with ADHD and alcohol and/or cocaine ab/dep	Venlafaxine	12 weeks	300 mg	4/10	Significant improvements in ADHD and in alcohol craving and frequency	Weekly and then monthly psychotherapy	Ambiguous effect on cocaine use; four out of ten patients with depression	[63]
Levin *et al.* (2002)	11	31	Adult outpatients with cocaine dependence and ADHD	BPR	12 weeks	250–400 mg	10/11	Reductions in ADHD and cocaine cravings ($p < 0.01$)	Individual weekly relapse prevention therapy; weekly meetings	No subjects dropped out due to AEs	[64]
Somoza *et al.* (2004)	41	–	Adults with ADHD and cocaine dependence	MPH	10 weeks	60 mg MPH	29/41	Subjective measures showed improvement in cocaine use and adult ADHD	Individual substance use therapy	MPH was well tolerated	[65]
Solhkhah *et al.* (2005)	14	15	Adolescent outpatients with ADHD, SUD and a mood disorder	BPR SR	6 months	315 mg (100–400 mg)	13/14	Significant reductions in DUSI (-39%), ADHD (-43%), HAM-D (-76%), SUD by CGI	21% of subjects on concurrent medication; 57% had concurrent counseling	Naturalistic Tx; no significant adverse events	[66]

–: Not reported; Ab/dep: Abuse/dependence; AE: Adverse event; BPR: Bupropion; CD: Conduct disorder; CPT: Continuous performance task; CGI: Clinical global impression; DUSI: Drug-use screening inventory; HAM-D: Hamilton depression rating scale; MPH: Methylphenidate; Res Tx: Residential treatment; SR: Sustained release; SUD: Substance-use disorder; Tx: Treatment.

Table 1. Representative open-label studies of pharmacological efficacy in individuals with ADHD and substance-use disorder (cont.).

Author (year)	Individuals (n)	Mean age (years)	Sample description	Medication	Duration	Daily dose (range)	Retention	Outcome	Concurrent treatment	Comments	Ref.
Wilens *et al.* (2010)	32	32	Adult outpatients with ADHD and mixed SUD	BPR SR	6 weeks	326 mg (100–400 mg)	19/32	Improved ADHD (-46%); little change in SUD (-22%; $p < 0.01$)	No additional Tx	Low retention; three dropped due to AEs; no drug interactions	[67]
Adler *et al.* (2010)	18	36.8	Adults with SUD meeting ADHD criteria	Atomoxetine	10 weeks	25–120 mg	12/18	Significant improvement in ADHD and SUD cravings	No additional Tx	All AEs were mild/moderate; no AEs resulted in discontinued participation	[42]
Total (n = 9)	166	–	ADHD and mixed SUD; some comorbid disorders	BPR: 4 MPH: 2 Venlafaxine: 1 Pemoline: 1 Atomoxetine: 1	1–6 months	Moderate doses	–	Reduction in ADHD symptoms; modest SUD reduction	The majority of subjects received concurrent treatment	Mild AEs	

–: Not reported; Ab/dep: Abuse/dependence; AE: Adverse event; BPR: Bupropion; CD: Conduct disorder; CPT: Continuous performance task; CGI: Clinical global impression; DUSI: Drug-use screening inventory; HAM-D: Hamilton depression rating scale; MPH: Methylphenidate; Res Tx: Residential treatment; SR: Sustained release; SUD: Substance-use disorder; Tx: Treatment.

Table 2. Representative controlled studies of pharmacological efficacy in individuals with ADHD and substance-use disorder.

Author (year)	Individual (n)	Mean age (years)	Sample description	Medication	Duration (weeks)	Daily dose (range)	Retention	Outcome	Concurrent treatment	Comments	Ref.
Schubiner *et al.* (2002)	48	37	Adults with cocaine use and some evidence of ADHD	MPH	13	90 mg	25/48	Trend to improved hyperactive-impulsive sxs; no difference in cocaine use	Twice weekly group CBT for SUD; weekly individual CBT for ADHD	55% of the MPH group dropped out of the study	[32]
Riggs *et al.* (2004)	69	13–19	Adolescents with ADHD, SUD and CD	Pemoline	12	(75–112 mg)	36/69	Reduced hyperactivity, inattention; no change in SUD	No additional Tx	No hepatic dysfunction, three adverse events were reported	[68]
Carpentier *et al.* (2005)	25	31.9	Adults with ADHD receiving substance use disorder Tx	MPH	8	0.6 mg/kg	19/25	Positive response to active Tx (36%) was not significantly higher than that of placebo (20%)	One subject was using benzodiazepine	24% of subjects dropped out of the study	[69]
Levin *et al.* (2006)	98	39: placebo 40: MPH 38: BPR	Methadone-maintained adults with ADHD, 53% meeting DSM-IV criteria for cocaine ab/dep	MPH and BPR	12	MPH 10–80 mg BPR 100–400 mg	69/98 75%: placebo 65%: MPH 29%: BPR	Significant reduction of ADHD sxs in all three groups; no significant difference between Tx	Methadone, individual CBT	No subjects dropped out due to AEs. One MPH subject dropped out due to side effects	[33]
Levin *et al.* (2007)	106	37	Adults with ADHD, currently seeking treatment for cocaine dependence	MPH	14	10–60 mg	47/106	Both groups showed >30% improvement in their ADHD sxs, with no significant difference between groups	Weekly individual CBT	High drop out rates in both groups, MPH responders exhibited lower cocaine use	[34]
Wilens *et al.* (2008)	147	≥18	Adults with ADHD and alcohol ab/dep	Atomoxetine	12	25–100 mg	80/147	Significant improvement in ADHD; inconsistent effects on drinking	No additional Tx	Heavy drinkers had higher rates of decreased appetite and increased irritability	[41]

–: Not reported; Ab/dep: Abuse/dependence; AE: Adverse event; BPR: Bupropion; CBT: Cognitive behavioral therapy; CD: Conduct disorder; CGI: Clinical global impression; MPH: Methylphenidate; SODAS: Spheroidal oral drug absorption system; OROS: Osmotic-release oral system; SNAP-IV: Swanson, Nolan and Pelham questionnaire; SR: Sustained release; SUD: Substance-use disorder; sxs: Symptoms; Tx: Treatment.

Table 2. Representative controlled studies of pharmacological efficacy in individuals with ADHD and substance-use disorder (cont.).

Author (year)	Individual (n)	Mean age (years)	Sample description	Medication	Duration (weeks)	Daily dose (range)	Retention	Outcome	Concurrent treatment	Comments	Ref.
Monuteaux *et al.* (2007)	99	9–18	Outpatient adolescents with ADHD without regular nicotine use	BPR	Assessed ≥12	100–300 mg/day	57/99	While BPR was not associated with a lower rate of smoking, stimulant treatment may have been	29 subjects (BPR/placebo) received stimulant Tx	Mild side effects, with one subject reporting suicidal ideation	[70]
Szobot *et al.* (2008)	16	15–21	Adolescents with ADHD/SUD	MPH-SODAS	6	0.3–1.2 mg/kg	14/16	Improved global functioning (SNAP-IV and CGI); no effect on SUD	No additional Tx	Drug well tolerated	[71]
Winhusen *et al.* (2010)	255	38	Adults with ADHD who smoke cigarettes	OROS MPH	11	≤72 mg/day	204/255	Significant improvements in ADHD; no differences in cigarette cessation rates between groups	Brief office-based manualized counseling	Trends to fewer cigarettes in OROS MPH group; medication well tolerated	[36]
Konstenius *et al.* (2010)	24	37.4	Abstinent adults with amphetamine dependence and ADHD	MPH	13	18–72 mg	84%: placebo 59%: MPH	Both groups significantly reduced self-rated ADHD symptoms, but no difference between treatment arms	Weekly sessions of a skills training program	No difference found between the two groups with regards to craving for amphetamine	[35]
Thurstone *et al.* (2010)	70	16	Adolescents with ADHD/SUD	Atomoxetine	12	<70 kg: 0.5–1.5 mg/kg >70 kg: 50–100 mg	65/70	No difference in change in ADHD scores or change in days substances used vs placebo	All received motivational interviewing and CBT	–	[31]

–: Not reported; Ab/dep: Abuse/dependence; AE: Adverse event; BPR: Bupropion; CBT: Cognitive behavioral therapy; CD: Conduct disorder; CGI: Clinical global impression; MPH: Methylphenidate; SODAS: Spheroidal oral drug absorption system; OROS: Osmotic-release oral system; SNAP-IV: Swanson, Nolan and Pelham questionnaire; SR: Sustained release; SUD: Substance-use disorder; sxs: Symptoms; Tx: Treatment.

Table 2. Representative controlled studies of pharmacological efficacy in individuals with ADHD and substance-use disorder (cont.).

Author (year)	Individual (n)	Mean age (years)	Sample description	Medication	Duration (weeks)	Daily dose (range)	Retention	Outcome	Concurrent treatment	Comments	Ref.
Riggs *et al.* (2011)	303	16.5	Adolescents with ADHD/SUD	OROS MPH	16	≤72 mg/day	72%: placebo 78%: OROS MPH	Both groups improved in ADHD and SUD; no significant differences between groups on primary SUD and ADHD outcomes	CBT in all subjects	11 site NIH study, good adherence; medication well tolerated without evidence of abuse/liability	[30]
Total (n = 12)	1260	–	ADHD and mixed SUD; some comorbid disorders	MPH: 8 BPR: 2 Atomoxetine: 2 Pemoline: 1	6–16	Moderate doses	–	None-to-mild reduction in ADHD and in SUD (vs placebo)	The majority of subjects received concurrent treatment	Mild AEs; some improvement with therapy	

–: Not reported; Ab/dep: Abuse/dependence; AE: Adverse event; BPR: Bupropion; CBT: Cognitive behavioral therapy; CD: Conduct disorder; CGI: Clinical global impression; MPH: Methylphenidate; SODAS: Spheroidal oral drug absorption system; OROS: Osmotic-release oral system; SNAP-IV: Swanson, Nolan and Pelham questionnaire; SR: Sustained release; SUD: Substance-use disorder; sxs: Symptoms; Tx: Treatment.

of Grabowski and colleagues who used stimulants ('agonist therapy') to block cocaine and amphetamine abuse [39].

Nonstimulants

Owing to the broad spectrum of activity in ADHD and a lack of abuse liability [40], atomoxetine has been examined for its usefulness in ADHD plus SUD [41]. In this 12-week multisite study in recently abstinent adult alcoholics, atomoxetine (compared with placebo) was effective in treating ADHD and in reducing recurrent episodes of heavy drinking, but not relapse to heavy drinking [41]. Similarly, in a small 10-week, open-label study, atomoxetine treated ADHD symptoms and reduced the intensity, frequency and length of cravings in recently abstinent adults with SUD and comorbid ADHD [42]. Atomoxetine administration in relatively heavy compared with light or nondrinkers was associated with more side effects; however, no serious adverse events nor evidence of impaired liver functioning emerged in the heavy drinkers in these relatively short-term trials [43]. Although these data in abstinent alcoholics appear promising, results should be tempered against a recent study in currently using adolescents with SUD. In this study, 70 adolescents with ADHD and at least one active non-nicotine SUD received motivational interviewing/CBT in addition to atomoxetine or placebo for 12 weeks [31]. No differences emerged in the use of substances or ADHD scores between treatment groups during this study.

The aforementioned findings together with an older meta-analysis of ten studies suggest that medications used in ADHD populations with comorbid SUD only have a minor effect on ADHD and have little effect on substance use, cigarette use or cravings [44]. In two recent studies where there was some abstinence from substances prior to treating ADHD, improvement in both the ADHD and SUD were reported [41,42]. It may be that treatment of comorbid ADHD and SUD improves ADHD symptoms as has been reported for other conditions (e.g., unstable mood) [45,46] or alternatively, that by nature of the brief abstinence, these patients are different than groups who have not been able to maintain any sobriety. Future studies examining sequential treatments compared with parallel treatments of ADHD and SUD are necessary to better understand the extent and mechanism of change.

Misuse & diversion

There is continued interest in diversion and misuse of stimulants prescribed for ADHD (for a review see [47]). While the vast majority of adolescents and adults treated for ADHD appropriately use their medication [22,47–49], a number have also reported being pressured into giving away or selling their medication [50]. A series of survey studies by McCabe *et al.* and Teeter *et al.* have indicated that approximately 5% of college students have misused stimulants [48,49]. This practice is more common in competitive colleges where the stimulants are more often misused for their procognitive effects than euphoria [49]. A minority of college students 'scam' local practitioners for stimulants whereas the bulk of college students who misuse stimulants obtain them from friends [51]. Stimulant misuse is often in context with substance abuse [52] and delinquency [22,47].

Specific stimulant preparations may impact misuse and diversion [7,18] with lower likeability and less misuse of extended-release stimulants, compared with immediate-release stimulants reported in preclinical [53–55], clinical [22,56] and epidemiological reports [57]. While misuse and diversion are clearly to be monitored in SUD, interestingly, studies of treating SUD in ADHD seem to suggest the relative safety of stimulants. For instance, Winhusen and colleagues [58] re-examined two large multisite studies of OROS MPH in adolescents with mixed SUD and ADHD [30] and adults with cigarette smoking and ADHD [36] to evaluate its overall 'risk' in these populations. These authors found that compared with placebo, subjects did not significantly misuse OROS MPH or experience differences in cravings for their medication or other substances. There was a greater euphorgenic effect of OROS MPH compared with placebo that was not linked to the severity of SUD. The authors concluded that the stimulant could be used safely in subjects with mixed SUD.

Conclusion & future perspective

Adolescents and adults with ADHD and SUD are increasingly presenting for diagnosis and treatment in both clinical practices managing ADHD and in SUD-oriented treatment centers. A growing literature highlights the importance of recognizing both disorders [59]. In specifically accessing the treatment needs of these patients, adolescents and adults with ADHD and SUD require multimodal intervention incorporating addiction and mental health treatment. While not directly tested, a host of studies strongly suggest that CBT may be effective in both ADHD and SUD [28–31]. The data seem to suggest that treating ADHD individuals with active SUD pharmacologically is not particularly useful to treat either condition, and clinicians should pay particular attention to these findings over the next decade. Based on older guidelines, if possible, substance use should be stabilized prior to initiating pharmacotherapy [25]. Choice of nonstimulants or extended-release stimulants should be considered to treat those with recent addictions or those at high risk to misuse or divert their medications. Given the high prevalence and major morbidity of ADHD and SUD, studies of sequential and parallel multimodal treatment strategies addressing SUD and ADHD are necessary.

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