ADHD and Substance Use Disorders: An Intoxicating Combination

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Overlap between ADHD and SUDs

Overall, 23% of adults with SUD have ADHD (N = 29 studies)*.

Conduct disorder and severe mood dysregulation increases SUD risk in ADHD.

OR = odds ratio.

ADHD Symptoms are Directly Related to Higher Smoking Scores

FTQ = Fagerström Tolerance Questionnaire.

$t = 5.00, P < .001$
A More Complicated Course of SUD is Associated with ADHD

- More severe SUD
- Higher rates of other psychiatric comorbidities (e.g., conduct/antisocial disorders)
- Less remission from SUD
- Longer course of SUD
- Lower retention in SUD treatment

ADHD and Control Adolescents are Similar in that Most Report Continuing to Use Substances for Self-Medication

FIGURE 1. Impulsivity-Related Theories of High-Risk ADHD: Exaggerated Imbalance of Brain Networks. (A) Compared to typically developing controls, (B) individuals with low-risk ADHD have impairments in both the inhibitory control and reward processing brain networks: weaker inhibitory control (reduced macro/microstructure, hypoactive at-rest and during associated tasks) and hyperprimed reward processing (greater macro/microstructure, hyperactive at-rest but hypoactive during associated tasks). High impulsivity is implicated as an important mechanism underlying increased SUD risk in ADHD and corresponds to greater disinhibition, delay discounting and sensation seeking. Impulsivity-related theories of high-risk ADHD suggest these impulsive behaviors stem from a greater degree of impairment (C) in both the inhibitory control and reward processing networks compared to low-risk ADHD, (D) in mainly the reward processing network or (E) in mainly the inhibitory control network.
Early ADHD Treatment Reduces Marijuana Use

Population risk

Stimulant use started prior to 9 years of age

Stimulant use started between 10–14 years

Stimulant use started after 15 years of age

20%  30%  40%  50%  60%

Past Year Use

10 Cohorts of high school seniors 2005 to 2014 (N = 40,358; ~10% with ADHD).

*P < .001 vs controls.

Diagnostic Dilemmas in ADHD and SUD

- Overlap symptoms of SUD in ADHD
  - Intoxication or withdrawal
  - Neuropsychological deficits (transient/permanent)
  - SUD “traits” misinterpreted as ADHD (e.g., impulsive traits/risk-taking, harm avoidance)
- Other comorbidity (e.g., anxiety, disruptive disorders)
- Reliability of retrospective report
- Subthreshold ADHD vs full ADHD
  - Age-of-onset criteria (NOS)
  - Effected domains, inadequate number of symptoms
- Concerns of drug-seeking behavior/rationalization
- Use of rating scales for ADHD helpful (e.g., ASRS)

ASRS = Adult ADHD Self-Report Scale; NOS = not otherwise specified.

SUD in ADHD Adults Presenting for Treatment

- SUD Current (10%)
- SUD History (40%)
- No SUD Hx (50%)

ADHD ADULTS

Double-Blind Studies of Stimulants to Treat Current Substance Abusers with ADHD

• 6 Studies
  – 1 study in adolescent substance abusers administered pemoline
  – 2 studies in adult cocaine abusers administered IR or SR MPH
  – 1 study in adult methadone maintenance patients administered SR MPH or SR-bupropion
  – 1 study in adults with briefly abstinent amphetamine abusers given OROS MPH
  – 1 RCT with high-dose MAS XR showing improvement

• Efficacy (vs placebo)
  – No overall improvement in SUD (trend to improvement in 1 study)
  – 2 studies suggest benefit in reducing ADHD symptoms on some measures but not others
  – 1 study showing improvement in ADHD and SUD (high-dose MAS XR)

• Safety
  – No serious adverse events
  – No worsening of SUD
  – No evidence of diversion

IR = immediate release; MAS XR = mixed amphetamine salts; RCT = randomized controlled trial; SR = sustained release.
Higher Dose MAS XR is Helpful in ADHD and Cocaine Use Disorder

13-week RCT
Diagnosis: Cocaine Use Disorder and ADHD
Treatment: CBT +/- MAS XR

N = 126. *P < .05.

An event ratio of .737 indicates that, relative to patients treated with placebo, atomoxetine-treated patients experienced an approximately 26.3% greater reduction in the rate of heavy drinking. Separation between groups first occurred at day 55.

Abstract

Adolescents and young adults with substance use disorders (SUD) and attention deficit/hyperactivity disorder (ADHD) are increasingly presenting in clinical practice. The overlap and role of treatment for these co-occurring disorders is a rapidly growing area of research. Recent literature highlights evidence suggesting that structured therapies may be effective in treating adolescents and young adults with ADHD and SUD. Further controlled trials evaluating the sequence and effect of structured psychotherapies and/or ADHD pharmacotherapy on SUD relapse in these groups are warranted.

Keywords  Adolescence – Substance use disorders – Attention deficit/hyperactivity disorder – Stimulants comorbidity – Cognitive-behavioral therapy

This article is part of the Topical Collection on Child and Adolescent Disorders

“...Structured therapies may be effective in treating adolescents and young adults with ADHD and SUD...”
Stimulant Misuse and Diversion

- N = 22 studies (N > 113,000 participants); mostly survey studies in college students (80%)
- 10% to 20% prevalence of nonmedical use of stimulants
- 65% to 85% of stimulants diverted from “friends”
  - Majority not “scamming” local doctors
  - Not seen as potentially dangerous
- Motivation typically for concentration/alertness > getting “high”
- Appears to be occurring in substance (ab)users during academic decline
- High rates of full or subthreshold stimulant use disorder in misusers
- High rates of ADHD and neuropsychological dysfunction in stimulant misusers
- More misuse of immediate- vs extended-release stimulant preparations

College Stimulant Misusers Have High Rates of SUD


HR: 2.7; 95% CI: 1.7, 4.2; P < .001
N = 100 stimulant misuser; 198 controls
More Executive Dysfunction in Stimulant Misusers

Subscales of the Self-Report Behavior Rating Inventory of Executive Functioning (BRIEF)

- Organization
- Task Monitor
- Plan/Organize
- Working Memory
- Initiation
- Self Monitor
- Emotional Control
- Shifting
- Inhibition

T-Score from 0–100
Axis formatted to start at a T-score of 40

N = 299. *P < .05
Immediate-Release Stimulants are Misused by College Students with a Stimulant Use Disorder

(n = 39; ~40% have a stimulant use disorder)

SUD Symptoms at Age 35 Years as a Function of Medical and Nonmedical Use of Prescription Stimulants at Age 18 Years

All analyses control for race/ethnicity, sex, truancy, average grade during high school, parental education, geographical region, metropolitan statistical area, cohort year at baseline, annual alcohol use at baseline, annual cannabis use at baseline, and annual other drug use at baseline.

N = 8362.
ADHD and SUD: Clinical Recommendations

• Nonpharmacologic approaches
  – For ADHD/SUD: CBT
  – Family Tx for adolescents and young adults
• Consider non-stimulants for current/recent substance abusers
• Atomoxetine
  – Lacks abuse liability
  – May be useful in comorbid cases (eg, anxiety)
  – Efficacy data in abstinent alcohol + ADHD (for both ADHD and SUD)
  – No adverse effects with alcohol or THC
• Bupropion
  – No known interactions with alcohol or THC
  – Efficacy in cigarette cessation and mood disorders
• Guanfacine, clonidine, modafinil, tricyclics—untested
SUD in ADHD:
Clinical Recommendations Prior to Treatment

• Stimulants
  – Use in substance-abusing patients is complex and controversial
  – Use extended-release formulations of stimulants (eg, lisdexamfetamine, OROS MPH, d-MPH XR, MPH-LA, MAS XR, or MPH SR, MTS/patch)
  – Monitor carefully, pre-discussed “renewal” guidelines

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Impact on Practice

- Since ADHD is a risk factor for cigarette smoking and SUD, teenagers and young adults with ADHD should be queried for both potential problems.
- ADHD should be considered in adolescents and adults who smoke cigarettes and/or have SUD.
- Treating ADHD helps protect against the onset of cigarette smoking, SUD, and SUD-related criminality.
- In context to SUD, ADHD treatment should be considered:
  - If less severe SUD, treat ADHD concomitantly.
  - More severe SUD -> address SUD first.
  - If unable to address SUD -> use CBT, nonstim, extended-release stimulants.