

Substance Use Disorder Severity Among Patients with and Without ASRS-Based Probable Adult ADHD in Rehabilitation Settings in Nairobi, Kenya

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Abstract

Adult Attention-Deficit/Hyperactivity Disorder (ADHD) frequently co-occurs with Substance Use Disorders (SUDs) and has been associated with greater substance-related severity. Evidence comparing SUD severity according to ADHD screening status among treatment-seeking adults in Kenya remains limited. A cross-sectional analytical study was conducted among adults aged 18–65 years receiving SUD treatment in six rehabilitation centres in Nairobi, Kenya. Of 390 eligible patients, 322 participated (82.6%). Adult ADHD was screened using the Adult ADHD Self-Report Scale Version 1.1 (ASRS v1.1), while alcohol- and drug-related severity were assessed using the Alcohol Use Disorders Identification Test (AUDIT) and Drug Abuse Screening Test-10 (DAST-10), respectively. Mean severity scores were compared between participants with and without ASRS-based probable adult ADHD, with mean differences, 95% confidence intervals (CIs), and Hedges' g reported. Ninety participants (28.0%) met the study criteria for ASRS-based probable adult ADHD. Mean AUDIT scores were higher among participants with probable ADHD than among those without probable ADHD (28.81 vs. 21.88; mean difference = 6.93, 95% CI [4.52, 9.34]; Hedges' g = 0.70; $p < .001$). Mean DAST-10 scores were also higher (6.59 vs. 4.09; mean difference = 2.50, 95% CI [1.77, 3.23]; Hedges' g = 0.77; $p < .001$). ASRS-based probable adult ADHD was associated with greater alcohol- and drug-related SUD severity among adults receiving treatment in Nairobi. The findings support further evaluation of the clinical utility of ADHD screening and comprehensive assessment within Kenyan SUD treatment settings.

Key words: Adult Attention-Deficit/Hyperactivity Disorder (Adult ADHD), Substance use disorder (SUD), Substance use severity, Rehabilitation centers, Kenya.

Introduction

A growing body of research has demonstrated an association between adult Attention-Deficit/Hyperactivity Disorder (ADHD) and greater severity of Substance Use Disorders (SUDs) (Ameringer et al., 2013; Ilbegi et al., 2018; Levy et al., 2014; Miranda et al., 2016). Individuals with co-occurring ADHD and SUD have been reported to experience greater substance dependence, more complex patterns of substance use, and poorer clinical outcomes than individuals with SUD alone. These findings suggest that ADHD may be clinically relevant not only to the co-occurrence of SUDs but also to the severity of substance-related problems. Longitudinal studies provide evidence that ADHD is

associated with persistent and adverse substance-use outcomes. Breyer et al. (2014) followed 219 young adults with persistent childhood ADHD, remitted ADHD, and no ADHD and found higher rates of alcohol, marijuana, and nicotine dependence among those with persistent ADHD. Nicotine dependence, for example, affected 66–71% of participants with persistent ADHD compared with 37–43% of controls. Similarly, Levy et al. (2014), in a study of 232 adults with childhood ADHD and 335 non-ADHD controls, reported greater risks of adolescent SUDs and adult alcohol and drug dependence among individuals with ADHD. Ilbegi et al. (2018) further found that persistent ADHD was associated with a substantially increased risk of SUD (HR = 4.56, 95% CI [1.17, 17.81]) and higher nicotine dependence compared with controls. Together, these findings indicate that persistent ADHD is associated with greater vulnerability to problematic substance use across adolescence and early adulthood.

Clinical and treatment-based studies have similarly identified greater substance-related burden among individuals with ADHD. Ohlmeier et al. (2011) found that more than half of adults attending a specialised ADHD clinic met criteria for alcohol and/or substance dependence, with substance-dependent participants frequently reporting complex patterns of substance use. Among young adults in Spain, Miranda et al. (2016) reported significantly higher rates of alcohol, tobacco, and marijuana use among participants with childhood ADHD than controls. However, substance-use problems were more strongly associated with co-occurring externalising difficulties than with ADHD symptom severity alone, suggesting that the relationship between ADHD and substance use may be influenced by additional behavioural characteristics. In a treatment-seeking Norwegian sample, Vold et al. (2023) also identified a high burden of ADHD symptoms among adults receiving opioid agonist therapy, with frequent cannabis and stimulant use associated with higher ADHD symptom scores. These findings demonstrate that the association between ADHD and substance-related problems is also evident in high-risk clinical populations.

Specific ADHD-related behavioural characteristics may help explain differences in SUD severity. Hyperactivity/impulsivity, impaired self-regulation, and emotional dysregulation have been associated with more problematic substance use (Abdel-Fadeel et al., 2023; Rohner et al., 2023; Song et al., 2021). Daurio et al. (2018), for example, found that ADHD symptom severity was associated with alcohol dependence and that dimensions of impulsivity, particularly positive and negative urgency, partially mediated the association between ADHD-related difficulties and alcohol dependence severity. These findings suggest that difficulties regulating behaviour in response to strong emotional states may be relevant to the greater substance-related severity observed among some individuals with ADHD. Such mechanisms are also consistent with theoretical perspectives emphasising behavioural disinhibition and the use of substances to regulate distressing ADHD-related symptoms.

Despite this growing international literature, evidence from African treatment settings remains limited. In South Africa, Regnart et al. (2019) assessed 30 adults using the Adult ADHD Self-Report Scale (ASRS v1.1) and reported higher rates of SUDs, cannabis use, and polysubstance use among participants who screened positive for ADHD than among those who screened negative. In Kenya, existing studies have primarily examined ADHD symptoms or probable ADHD prevalence (Jenkins et al., 2015; Oigara, 2022), leaving limited evidence directly comparing the severity of alcohol- and drug-related problems between adults with and without probable ADHD receiving SUD treatment. Findings from other regions may not necessarily generalise to Kenyan rehabilitation settings because

patterns of substance use, treatment access, and clinical characteristics may differ across populations and healthcare contexts.

The present study therefore compared alcohol- and drug-related SUD severity between adults with and without ASRS-based probable adult ADHD receiving treatment in selected rehabilitation centres in Nairobi, Kenya. Alcohol-related severity was assessed using the Alcohol Use Disorders Identification Test (AUDIT), and drug-related severity was assessed using the Drug Abuse Screening Test (DAST-10).

Theoretical Framework

The present study was informed by two complementary theoretical perspectives: the Self-Medication Hypothesis (SMH) (Khantzian, 1985) and the Behavioral Disinhibition Hypothesis (BDH) (Faraone et al., 2009; Young & Sedgwick, 2015). Together, these perspectives provide a framework for understanding the observed association between adult ADHD and greater substance-use severity.

The SMH proposes that individuals may use psychoactive substances in an attempt to alleviate distressing symptoms or difficulties associated with ADHD, including inattention, restlessness, emotional dysregulation, impulsivity, and sleep disturbances (Young & Woodhouse, 2021). Neurobiological research has also implicated alterations in dopaminergic reward pathways in both ADHD and substance-use behaviours (Barbuti et al., 2023; Volkow et al., 2009). From the perspective of the SMH, repeated use of substances for perceived symptom relief may be associated with continued or increasingly problematic substance use. This framework therefore provides one potential explanation for greater alcohol- and drug-related severity among individuals with co-occurring ADHD and SUD.

The BDH provides a complementary explanation by emphasising characteristics such as impulsivity, impaired inhibitory control, novelty seeking, and executive-functioning difficulties (Faraone et al., 2009; Young & Sedgwick, 2015). These characteristics may make it more difficult for some individuals with ADHD to regulate substance-use behaviours and may therefore be associated with greater substance-related impairment and severity.

Together, the SMH and BDH provide complementary perspectives for interpreting differences in substance-use severity according to ADHD screening status. The SMH emphasises substance use in relation to perceived symptom regulation, whereas the BDH emphasises difficulties with behavioural regulation and inhibitory control. In the present study, these perspectives informed the comparison of AUDIT and DAST-10 severity scores between adults with and without ASRS-based probable adult ADHD. However, the mechanisms proposed by these theories were not directly measured; therefore, they are used as interpretive frameworks rather than as mechanisms tested by the study.

Methodology

Study Design and Setting

This study employed a cross-sectional analytical design to compare substance use disorder (SUD) severity between adults with and without ASRS-based probable adult Attention-Deficit/Hyperactivity Disorder (ADHD). The study was conducted in six drug and alcohol rehabilitation centres in Nairobi County, Kenya, selected from 14 facilities licensed by the

National Authority for the Campaign Against Alcohol and Drug Abuse (NACADA) at the time of the study. The centres were purposively selected because they provided structured addiction treatment programmes for adults, maintained adequate patient records, and granted permission for study participation. The participating centres and participant recruitment across sites are presented in Table 1.

Table 1

Eligible Population and Participant Recruitment Across the Participating Rehabilitation Centres

Rehabilitation centre	Eligible patients, n	Participants recruited, n
Asumbi Treatment Centre	70	58
Dove Mental Health Hospital	120	94
Eden House Rehabilitation Centre	50	43
Nairobi Place Specialized Medical Centre	40	39
New Chapter Place Counselling and Rehabilitation Centre	50	37
The Optimum Center for Specialized Treatment	60	51
Total	390	322

Data were collected between 10 January and 30 March 2026. To minimise the potential influence of acute intoxication and withdrawal symptoms on self-reported ADHD symptoms and substance-use severity, data collection was undertaken after participants had completed the initial detoxification phase of treatment, approximately two weeks following admission.

Participants and Sampling

The study population comprised adults aged 18–65 years receiving treatment for SUDs in the six selected rehabilitation centres. A total enumeration approach was used within the selected centres, whereby all eligible patients available during the study period were invited to participate. Participants were eligible if they were aged 18–65 years, were receiving treatment for a SUD, had completed the initial detoxification phase, were clinically stable to complete the study questionnaires, and were able to provide informed consent. Individuals with severe cognitive impairment or acute psychiatric symptoms that compromised their ability to provide informed consent or meaningfully complete the questionnaires were excluded.

During the study period, 390 patients met the eligibility criteria and were invited to participate. Of these, 44 declined participation and 24 returned incomplete questionnaires and were excluded from the analysis. The final analytical sample comprised 322 participants, representing a response rate of 82.6%. Participants were classified according to ADHD screening status as having ASRS-based probable adult ADHD (n = 90) or no ASRS-based probable adult ADHD (n = 232).

Measures

Data were collected using a socio-demographic questionnaire and three standardised instruments: the Adult ADHD Self-Report Scale Version 1.1 (ASRS v1.1), the Alcohol Use Disorders Identification Test (AUDIT), and the Drug Abuse Screening Test-10 (DAST-10). The socio-demographic questionnaire collected participant characteristics used to describe the study sample.

The ASRS v1.1 is an 18-item self-report screening instrument assessing symptoms corresponding to the inattentive and hyperactive–impulsive domains of adult ADHD. For the present study, participants were classified as having ASRS-based probable adult ADHD if they endorsed four or more Part A screening items according to the recommended ASRS scoring algorithm and reported symptom onset before 12 years of age. Participants who did not meet these criteria were classified as not having ASRS-based probable adult ADHD. The resulting classification represents probable ADHD based on screening rather than a clinically confirmed ADHD diagnosis. The ASRS v1.1 demonstrated excellent internal consistency in the present sample (Cronbach's $\alpha = .95$).

The AUDIT is a 10-item instrument developed by the World Health Organization to assess hazardous and harmful alcohol use and symptoms of alcohol dependence. Total scores range from 0 to 40, with higher scores indicating greater alcohol-related severity. In the present study, the total AUDIT score was analysed as a continuous measure of alcohol-related SUD severity. The AUDIT demonstrated good internal consistency in the study sample (Cronbach's $\alpha = .89$).

The DAST-10 is a 10-item screening instrument assessing drug-related problems, excluding alcohol and tobacco. Total scores range from 0 to 10, with higher scores indicating greater drug-related severity. In the present study, the total DAST-10 score was analysed as a continuous measure of drug-related SUD severity. The DAST-10 demonstrated good internal consistency in the study sample (Cronbach's $\alpha = .89$).

Data Collection Procedures

Questionnaires were administered between 10 January and 30 March 2026 after eligible participants had completed two weeks of detoxification and were considered clinically stable to participate. Following written informed consent, participants completed the questionnaires independently, with trained research assistants available to provide clarification where required. Research assistants followed standardised administration procedures across the participating centres to minimise variation in data collection. Completed questionnaires were reviewed for completeness before data entry. Participants were assigned unique identification codes, and no personally identifying information was included in the analytical dataset.

Study Variables

The primary grouping variable was ASRS-based probable adult ADHD screening classification, categorised as probable ADHD or no probable ADHD. The primary outcome variables were alcohol-related SUD severity, measured using the total AUDIT score, and drug-related SUD severity, measured using the total DAST-10 score. Both

severity measures were analysed as continuous variables, with higher scores indicating greater alcohol- or drug-related severity, respectively.

Statistical Analysis

Data were entered, cleaned, and analysed using IBM SPSS Statistics Version 27. Participant characteristics were summarised using frequencies and percentages for categorical variables and means and standard deviations for continuous variables, as appropriate. AUDIT and DAST-10 scores were summarised separately according to ASRS-based probable adult ADHD screening classification.

Mean AUDIT and DAST-10 scores were compared between participants with and without ASRS-based probable adult ADHD using independent-samples *t*-tests. Homogeneity of variance was assessed using Levene's test. Group differences were reported as mean differences with 95% confidence intervals (CIs), and Hedges' *g* was calculated to quantify the standardised magnitude of the differences between groups. All statistical tests were two-sided, with statistical significance evaluated at $\alpha = .05$. Analyses were based on participants with complete data for the variables required for each comparison.

Ethical Considerations

Ethical approval was obtained from the United States International University–Africa Institutional Scientific and Ethics Review Committee (ISERC No. USIU-A/ISERC/US1209-2025), and research authorisation was granted by the National Commission for Science, Technology and Innovation (NACOSTI Permit No. 855839). Written informed consent was obtained from all participants before enrolment. Confidentiality and anonymity were maintained through the use of unique identification codes and secure storage of study data. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki (World Medical Association, 2013).

Results

Participant Characteristics

Of the 390 eligible patients invited to participate, 322 completed the study and were included in the analysis, representing a response rate of 82.6%. Forty-four eligible patients declined participation, while 24 returned incomplete questionnaires and were excluded from the analysis. Among the 322 participants included in the analysis, 90 (28.0%) met the study criteria for ASRS-based probable adult ADHD, while 232 (72.0%) did not.

Table 2

Demographic and Clinical Characteristics of Participants (N = 322)

Characteristic	n	%
Age group (years)		
18–25	56	17.4
26–35	142	44.1
36–45	83	25.8
46–55	22	6.8
≥56	19	5.9
Sex		
Male	218	67.7%
Female	104	32.3%
Marital status		
Single	187	58%
Married	86	27%
Separated	27	8%
Divorced	18	6%
Widowed	4	1%
Highest level of education		
Postgraduate	54	16.8%
Undergraduate	111	34.5%
College Level	99	30.7%
Secondary	55	17.1%
Primary	2	0.6%
No Formal Education	1	0.3%
Employment status		
Employed Full Time	127	39%
Employed Part Time	15	5%
Self-employed	80	25%
Unemployed	69	21%
Student	30	9%
Other	1	1%
Previous treatment for SUD		
Yes	150	46.6
No	172	53.4
Age at first substance use (years)		
≤15	104	32.3
16–20	149	46.3
21–25	51	15.8
>25	18	5.6

Substance Use Disorder Severity According to ADHD Screening Classification

Alcohol- and drug-related SUD severity was compared between participants with and without ASRS-based probable adult ADHD using total AUDIT and DAST-10 scores,

respectively. Participants with probable ADHD had higher mean scores on both measures than participants without probable ADHD (Table 2). The mean AUDIT score among participants with probable ADHD was 28.81 (SD = 9.04), compared with 21.88 (SD = 10.19) among participants without probable ADHD. The mean between-group difference was 6.93 points (95% CI [4.52, 9.34]). Levene's test did not indicate a statistically significant violation of the homogeneity of variance assumption, $F(1, 320) = 3.73$, $p = .054$; therefore, the equal-variances independent-samples t-test was interpreted. Participants with probable ADHD had significantly higher AUDIT scores than those without probable ADHD, $t(320) = 5.65$, $p < .001$. The standardised mean difference was moderate to large (Hedges' $g = 0.70$).

Similarly, the mean DAST-10 score among participants with probable ADHD was 6.59 (SD = 2.83), compared with 4.09 (SD = 3.38) among participants without probable ADHD. The mean between-group difference was 2.50 points (95% CI [1.77, 3.23]). Levene's test indicated unequal variances between groups, $F(1, 320) = 18.10$, $p < .001$; consequently, Welch's t-test was interpreted. Participants with probable ADHD had significantly higher DAST-10 scores than those without probable ADHD, Welch's $t(191.53) = 6.72$, $p < .001$. The standardised mean difference was moderate to large (Hedges' $g = 0.77$).

Table 3

Alcohol- and Drug-Related Severity According to ASRS-Based Probable Adult ADHD Screening Classification

Outcome	No probable ADHD (n = 232), M (SD)	Probable ADHD (n = 90), M (SD)	Mean difference (95% CI)	Test statistic	p	Hedges' g
AUDIT	21.88 (10.19)	28.81 (9.04)	6.93 (4.52–9.34)	$t(320) = 5.65$	$< .001$	0.70
DAST-10	4.09 (3.38)	6.59 (2.83)	2.50 (1.77–3.23)	Welch's $t(191.53) = 6.72$	$< .001$	0.77

Note. Mean differences were calculated as probable ADHD minus no probable ADHD. AUDIT = Alcohol Use Disorders Identification Test; DAST-10 = Drug Abuse Screening Test-10; CI = confidence interval. Higher scores indicate greater substance-related severity.

Discussion

The present study found that adults with ASRS-based probable ADHD receiving treatment for Substance Use Disorders (SUDs) had greater alcohol- and drug-related severity than those without probable ADHD. Participants with probable ADHD had a mean AUDIT score of 28.81 compared with 21.88 among those without probable ADHD, representing a mean difference of 6.93 points (95% CI [4.52, 9.34]). Drug-related severity showed a similar pattern, with mean DAST-10 scores of 6.59 and 4.09, respectively, and a mean difference of 2.50 points (95% CI [1.77, 3.23]). The standardised differences were moderate to large for both alcohol-related (Hedges' $g = 0.70$) and drug-related severity (Hedges' $g = 0.77$). Taken together, these findings indicate that positive ADHD screening

status was associated with meaningfully greater substance-related severity across both alcohol and drug measures within this treatment-seeking population.

The findings are consistent with previous evidence demonstrating greater substance-related burden among individuals with co-occurring ADHD and SUD. Seitz et al. (2013), in a multisite study of 385 adults receiving treatment for alcohol dependence in Switzerland, found that participants screening positive for ADHD experienced greater alcohol craving, more severe withdrawal symptoms, greater psychiatric distress, and higher rates of use of several other substances than participants without ADHD. Similarly, Young et al. (2015), in a study of 489 adults receiving treatment for SUDs in Australia, reported that participants with ADHD demonstrated more problematic patterns of alcohol and other substance use. Although differences in study populations, measures, and definitions of substance-use severity limit direct comparison, the present findings are consistent with this broader evidence by demonstrating greater alcohol- and drug-related severity among participants screening positive for probable ADHD.

The observed differences may also be considered in relation to the Behavioral Disinhibition Hypothesis (BDH) and Self-Medication Hypothesis (SMH). From a BDH perspective, ADHD-related difficulties involving impulsivity, inhibitory control, and behavioural regulation may be associated with difficulty controlling substance-use behaviours. The SMH provides a complementary perspective whereby some individuals may use substances in an attempt to manage difficulties associated with ADHD, such as inattention, restlessness, or emotional dysregulation. Repeated or sustained substance use in these contexts could plausibly be associated with greater substance-related severity. However, the present study did not directly assess impulsivity, inhibitory control, motives for substance use, or self-medication behaviour. The observed differences in AUDIT and DAST-10 scores should therefore be regarded as consistent with these theoretical perspectives rather than as evidence confirming the mechanisms proposed by either theory.

Limitations and Generalisability

Several considerations are important when interpreting these findings. First, the cross-sectional design prevents determination of temporal sequence or causality. Although participants with probable ADHD demonstrated greater SUD severity, the study cannot establish that ADHD contributed to greater substance-use severity. The relationship may be bidirectional or influenced by other factors not examined in the present analysis. Second, ADHD classification was based on the ASRS v1.1 rather than a structured clinical diagnostic interview. The findings therefore relate specifically to ASRS-based probable adult ADHD and should not be interpreted as comparisons based on clinically confirmed ADHD diagnoses. Although data were collected after the initial detoxification phase to reduce the potential influence of acute intoxication and withdrawal, some overlap between ADHD symptoms and symptoms associated with SUD or other psychiatric conditions may have remained.

The findings should also be considered in relation to the study setting and population. Participants were adults receiving treatment for SUDs in six purposively selected rehabilitation centres in Nairobi and may represent individuals with more substantial substance-related difficulties than those with SUDs who do not seek or receive residential or structured treatment. The findings may therefore not be directly generalisable to community populations, individuals with less severe substance-use problems, or treatment

populations outside Nairobi. In addition, purposive selection of the participating rehabilitation centres may limit the representativeness of the sample. Nevertheless, recruitment across six treatment centres and the inclusion of 322 participants provide evidence of differences in alcohol- and drug-related severity according to ADHD screening status within this specific treatment-seeking population.

Overall, adults with ASRS-based probable ADHD demonstrated greater alcohol- and drug-related SUD severity than those without probable ADHD, with moderate-to-large standardised differences observed for both outcomes. These findings suggest that positive ADHD screening status may identify a subgroup of adults receiving SUD treatment with greater substance-related clinical burden. Consideration of ADHD screening within rehabilitation settings may therefore be useful for identifying individuals who warrant further comprehensive clinical assessment. Longitudinal studies using structured ADHD diagnostic assessments and more diverse treatment and community samples are needed to determine the temporal nature of the association and establish whether similar differences are observed across other populations and settings.

Conclusion

Adults with ASRS-based probable adult ADHD receiving treatment for Substance Use Disorders demonstrated greater alcohol- and drug-related severity than those without probable ADHD. The differences were observed across both AUDIT and DAST-10 scores, with moderate-to-large standardised differences between the two groups. These findings indicate that positive ADHD screening status is associated with greater substance-related severity within this treatment-seeking population. Given the cross-sectional design and use of a screening instrument rather than a clinical ADHD diagnosis, the findings should not be interpreted as demonstrating a causal relationship between ADHD and SUD severity. Nevertheless, they contribute context-specific evidence on the clinical relevance of ADHD symptoms among adults receiving SUD treatment in Nairobi.

Practical Implications

The findings suggest that ADHD symptoms may warrant greater clinical attention within SUD treatment settings. Adults who screen positive for probable ADHD may represent a subgroup with greater alcohol- and drug-related clinical burden and may therefore benefit from further comprehensive assessment. Where clinically appropriate and resources permit, incorporating ADHD screening as part of broader psychiatric assessment within rehabilitation services may assist clinicians in identifying individuals who require further diagnostic evaluation and potentially more individualised treatment planning. Screening results should not, however, be considered equivalent to a clinical ADHD diagnosis, particularly because ADHD symptoms may overlap with substance-related and other psychiatric presentations.

Recommendations

Rehabilitation services may consider strengthening clinicians' capacity to recognise possible adult ADHD among individuals receiving treatment for SUDs and to refer patients who screen positive for comprehensive clinical assessment where appropriate. Rather than supporting universal implementation of ADHD screening on the basis of the present findings alone, further research should evaluate the feasibility, acceptability,

diagnostic accuracy, and clinical utility of systematic ADHD screening within Kenyan SUD treatment settings.

Future studies should include larger and more geographically diverse samples, structured diagnostic assessments for ADHD, and longitudinal designs to clarify the temporal relationship between ADHD and SUD severity. Research examining whether identification and appropriate management of co-occurring ADHD are associated with treatment retention, relapse, and other clinical outcomes would also help determine the potential value of integrated ADHD assessment within SUD treatment services in Kenya.

References

- Abdel-Fadeel, N. A., Kamal, A. M., Abdel Naem, M. M., & Abdel Hafeez, M. H. (2023). Prevalence and effect of attention-deficit hyperactivity disorder on the pattern and severity of substance use disorders. *Egyptian Journal of Psychiatry*, 44(2), 90–97. doi: 10.21608/EJPSY.2024.340973
- Ameringer, K. J., & Leventhal, A. M. (2013). Associations between attention deficit hyperactivity disorder symptom domains and DSM-IV lifetime substance dependence. *The American Journal on Addictions*, 22(1), 23–32. <https://doi.org/10.1111/j.1521-0391.2013.00325.x>
- Barbuti, M., Maiello, M., Spera, V., Pallucchini, A., Brancati, G. E., Maremmanni, A. G. I., Perugi, G., & Maremmanni, I. (2023). Challenges of treating ADHD with comorbid substance use disorder: Considerations for the clinician. *Journal of Clinical Medicine*, 12(9), 3096. <https://doi.org/10.3390/jcm12093096>
- Breyer, J. L., Lee, S., Winters, K. C., August, G. J., & Realmuto, G. M. (2014). A longitudinal study of childhood ADHD and substance dependence disorders in early adulthood. *Psychology of addictive behaviors: journal of the Society of Psychologists in Addictive Behaviors*, 28(1), 238–246. <https://doi.org/10.1037/a0035664>
- Daurio, A. M., Aston, S. A., Schwandt, M. L., Bukhari, M. O., Bouhlal, S., Farokhnia, M., Lee, M. R., & Leggio, L. (2018). Impulsive personality traits mediate the relationship between adult attention-deficit/hyperactivity symptoms and alcohol dependence severity. *Alcoholism: Clinical and Experimental Research*, 42(1), 173–183. <https://doi.org/10.1111/acer.13538>
- Faraone, S. V., Kunwar, A., Adamson, J., & Biederman, J. (2009). Personality traits among ADHD adults: Implications of late-onset and subthreshold diagnoses. *Psychological Medicine*, 39(4), 685–693. <https://doi.org/10.1017/S0033291708003917>
- Ilbegi, S., Groenman, A. P., Schellekens, A., Hartman, C. A., Hoekstra, P. J., Franke, B., & Buitelaar, J. K. (2018). Substance use and nicotine dependence in persistent, remittent, and late-onset ADHD: A 10-year longitudinal study from childhood to young adulthood. *Journal of Neurodevelopmental Disorders*, 10(1), 42. <https://doi.org/10.1186/s11689-018-9260-y>
- Jenkins, R., Othieno, C., Onger, L., Ogutu, B., Sifuna, P., Mboroki, J., & Omollo, R. (2015). Attention deficit hyperactivity disorder symptom self-report in adults in Kenya and its associated risk factors: An analysis from a household survey in a demographic surveillance site. *Global Mental Health (Cambridge, England)*, 2, e14. <https://doi.org/10.1017/gmh.2015.14>

- Khantzian, E. J. (1997). The self-medication hypothesis of substance use disorders: A reconsideration and recent applications. *Harvard Review of Psychiatry*, 4(5), 231-244. <https://doi.org/10.3109/10673229709030550>
- Levy, S., Katusic, S. K., Colligan, R. C., Weaver, A. L., Killian, J. M., Voigt, R. G., & Barbaresi, W. J. (2014). Childhood ADHD and risk for substance dependence in adulthood: a longitudinal, population-based study. *PloS one*, 9(8), e105640. <https://doi.org/10.1371/journal.pone.0105640>
- Miranda, A., Colomer, C., Berenguer, C., Roselló, R., & Rosello, B. (2016). Substance use in young adults with ADHD: Comorbidity and symptoms of inattention and hyperactivity/impulsivity. *International Journal of Clinical and Health Psychology*, 16(2), 157–165. <https://doi.org/10.1016/j.ijchp.2015.07.002>
- Ohlmeier, M. D., Goseberg, E., Roy, M., Dillo, W., Kordon, A., & Prox-Vagedes, V. (2011). Alcohol and drug dependence in adults with attention deficit/hyperactivity disorder: Data from Germany. *The European Journal of Psychiatry*, 25(3), 139–150. <https://doi.org/10.4321/S0213-61632011000300005>
- Oigara, L. O. (2022). *Prevalence of attention-deficit hyperactivity disorder symptoms among adults seeking treatment for substance use disorders in Nairobi County* (Master's thesis, United States International University-Africa). eRepo. <http://erepo.usiu.ac.ke/11732/7655>
- Regnart, J., Truter, I., Zingela, Z., & Meyer, A. (2019). A pilot study: Use of the Adult Attention-Deficit/Hyperactivity Disorder Self-Report Scale in a South African patient population. *The South African journal of psychiatry: SAJP: the journal of the Society of Psychiatrists of South Africa*, 25, 1326. <https://doi.org/10.4102/sajpsychiatry.v25i0.1326>
- Rohner, H., Gaspar, N., Philipsen, A., & Schulze, M. (2023). Prevalence of attention populations: Meta-analysis. *International Journal of Environmental Research and Public Health*, 20(2), 1275. <https://doi.org/10.3390/ijerph20021275>
- Seitz, A., Wapp, M., Burren, Y., Stutz, S., Schläfli, K., & Moggi, F. (2013). Association between craving and attention deficit/hyperactivity disorder symptoms among patients with alcohol use disorders. *The American Journal on Addictions*, 22(3), 292–296. <https://doi.org/10.1111/j.1521-0391.2012.12000.x>
- 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, 04009. <https://doi.org/10.7189/jogh.11.04009>
- Vold, J. H., Halmøy, A., Chalabianloo, F., Pierron, M. C., Løberg, E.-M., Johansson, K. A., & Fadnes, L. T. (2023). Attention-deficit/hyperactivity disorder (ADHD) symptoms and their relation to diagnosed ADHD, sociodemographic characteristics, and substance use among patients receiving opioid agonist therapy: A Norwegian cohort study. *BMC Psychiatry*, 23(1), 479. <https://doi.org/10.1186/s12888-023-04980-w>
- Volkow, N. D., Wang, G.-J., Kollins, S. H., Wigal, T. L., Newcorn, J. H., Telang, F., Fowler, J. S., Zhu, W., Logan, J., Ma, Y., Pradhan, K., Wong, C., & Swanson, J. M. (2009). Evaluating dopamine reward pathway in ADHD: Clinical implications. *JAMA*, 302(10), 1084–1091. <https://doi.org/10.1001/jama.2009.1308>
- World Health Organization (WHO). (2024). *Global Report on the Health of Adolescents and Young People: Addressing Substance Use and Mental Health Disorders*. Geneva: WHO.
- Young, J. T., Carruthers, S., Kaye, S., Allsop, S., Gilsenan, J., & Degenhardt, L. (2015). Comorbid attention deficit hyperactivity disorder and substance use

- disorder complexity and chronicity in treatment-seeking adults. *Drug and Alcohol Review*, 34(6), 683–693. <https://doi.org/10.1111/dar.12249>
- Young, S., & Sedgwick, O. (2015). Attention deficit hyperactivity disorder and substance misuse: An evaluation of causal hypotheses and treatment considerations. *Expert Review of Neurotherapeutics*, 15(9), 1005–1014. <https://doi.org/10.1586/14737175.2015.1059756>
- Young, S., & Woodhouse, E. (2021). Assessment and treatment of substance use in adults with ADHD: A psychological approach. *Journal of Neural Transmission*, 128(8), 1099–1108. <https://doi.org/10.1007/s00702-020-02277-w>