



SYSTEMATIC REVIEW

Internalizing Disorder among Individuals with Substance Use Disorders: A Systematic Review

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PAPER INFO	ABSTRACT
<p>Received: November 22, 2021</p> <p>Accepted: February 25, 2022</p> <p>Online: March 01, 2022</p> <p>Keywords: Associated Factors, Co-Occurrence, Internalizing Disorders, Interventions Prevalence, Substance Use Disorders</p> <p>*Corresponding Author: mafia.mahak@yahoo.com</p>	<p>A strong bidirectional relationship exists between substance use disorders (SUDs) and depression, with several factors contributing to their co-occurrence. The systematic review was conducted from June 2021 to December 2021, covering a span of five years and comprised search on PsycINFO, EMBASE, Google Scholar, MEDLINE, PubMed, Web of Science, Science Direct, Clinical Trials.gov, and OvidSP. Out of the initial 314 studies that were identified, a total of 41 (13%) underwent a comprehensive full-text assessment. Among 30 studies, 16 (53 %) were conducted in USA, 4 (13%) in France, 2 (7%) in Canada, and 1(3%) each in Spain, India, China, Egypt, Greece, Ghana, Italy, and Norway. The studies indicated that individuals with depression were more likely to have a co-occurring substance use disorder or vice versa. This systematic review provides evidence of the substantial impact of internalizing disorder on individuals with SUDs, emphasizing the significance of integrated interventions addressing both mental health and substance use concerns.</p>

Introduction

Substance Use Disorder (SUD) is a chronic and multifaceted condition characterized by the recurrent use of substances despite the negative consequences that ensue (Tai & Volkow, 2013). It is a significant public health concern, affecting individuals across various age groups, socioeconomic backgrounds, and cultures. Substance use disorders encompass a wide range of substances, including cannabis, opioids, stimulants, alcohol, tobacco, and other illicit drugs (Hayley et al., 2017). The consequences of SUD extend beyond individual health, impacting families, communities, and society as a whole. The prevalence of substance use disorders is alarmingly high worldwide (Liebschutz et al., 2010). In 2020, the World Health Organization (WHO) reported that approximately 275 million individuals engaged in drug use at least once, while 36.3 million people experienced drug use disorders. The impact of SUD on individuals and society is far-reaching, leading to health complications, impaired social functioning, economic burdens, and increased rates of crime and violence (Gaur et al., 2019). Substance use disorders often emerge during adolescence or early adulthood when individuals are particularly vulnerable to experimentation and peer influence. However, SUD can develop at any stage of life influenced by a complex interplay of Psychological, genetic, and environmental factors. The development and persistence of substance use disorders, or vice versa, can be influenced by psychological factors such as stress, trauma, psychiatric comorbidities, and maladaptive coping strategies (Lin et al., 2019).

Internalizing disorders encompass a broad range of mental health conditions characterized by the inward expression of distress, affecting an individual's emotional,

cognitive, and behavioral functioning (Gaur et al., 2019). These disorders, including depression and related conditions, are prevalent worldwide and those affected experience a notable impact on their well-being and overall quality of life. Internalizing disorders are highly prevalent across diverse populations and age groups. As per the World Health Organization (WHO), depression is highly prevalent, with an estimated 322 million people experiencing depression in 2020 (Cao et al., 2020). The impact of internalizing disorders extends beyond individual suffering, affecting interpersonal relationships, occupational functioning, and overall societal well-being. These disorders often emerge during adolescence or early adulthood, a critical developmental period when individuals face numerous challenges and transitions. Left untreated, internalizing disorders can lead to long-term impairments, increased risk of other mental health conditions, and even contribute to physical health problems such as substance use disorder. Individuals may resort to substance use as a form of self-medication to cope with stress, alleviate emotional distress, or enhance positive emotions. However, the temporary relief provided by substances often leads to a vicious cycle of dependence, tolerance, and worsening psychological distress (Hakulinen et al., 2020).

The co-occurrence of internalizing disorders and substance use disorders (SUDs) is a complex and significant issue within the field of mental health (Couwenbergh et al., 2006). Depression, an internalizing disorder, is characterized by emotional experiences directed inwardly, including a feeling of worthlessness, excessive worry, fear, or sadness. Substance use disorders, on the other hand, involve the *persistent use of substances despite negative consequences* (Hulvershorn et al., 2015). Multiple studies have indicated a considerable prevalence of internalizing disorders among individuals who have substance use disorders. Consistent research findings highlight that individuals with substance use disorders (SUDs) are at a higher likelihood of experiencing symptoms of depression in comparison to the general population. For instance, a study found that among individuals seeking treatment for substance use, approximately 40% met the diagnostic criteria for comorbid anxiety disorders, while 30% met the criteria for comorbid depressive disorders. Furthermore, individuals with internalizing disorders may turn to substance use to alleviate distressing symptoms or vice versa (Regnart et al., 2017). However, this strategy often exacerbates symptoms in the long run, leading to a worsening of both disorders.

In conclusion, the simultaneous presence of internalizing disorders and substance use disorders poses a notable clinical challenge. Addressing the complex interplay between these conditions requires a comprehensive understanding of their prevalence, risk factors, and underlying mechanisms. By identifying individuals with comorbid substance use disorders and internalizing disorders, clinicians can provide tailored interventions that address both the emotional and addictive components

Material and Method

This review specifically examined empirical studies published within the past five years, without considering the significance of studies published prior to 2017. The focus was placed solely on recent research findings to inform the analysis and conclusions.

Search Strategy

This comprehensive review study conducted an extensive search for relevant literature across multiple databases, including PubMed, Google Scholar, PsycINFO, Scopus, Science Direct, Web of Science, MEDLINE, and OvidSP. The search was focused on articles published between 2017 and 2021, covering a period of five years. The inclusion criteria were limited to studies conducted in the English language and involving adolescent participants. Additionally, a follow-up search was carried out between June 2021 and December 2021 to ensure the inclusion of any newly published research.

Search Terms

The search terms used for this study included two sets of keywords:

- "Substance abuse*" OR "Addiction*" OR "SUD*" OR "Drug addiction*" OR "Substance dependency*" OR "Substance use*".
- "Internalizing disorder*" OR "Depression disorder*" OR "Depressive features*".

Steps in Systematic Review Process

The systematic review followed the following procedures:

- Examination of existing reviews.
- Formulation of the review question.
- Development of inclusion and exclusion criteria.
- Identification of relevant research.
- Selection of research for inclusion based on the criteria.
- Compilation of data from the selected studies.
- Assessment of the risk of bias in the included studies.
- Analysis of the results and evaluation of the quality of evidence.

Inclusion and Exclusion Criteria

The present review exclusively included studies that fulfilled the following criteria:

- Articles published in the English language.
- Studies investigating the relationship between substance use and depression.
- Both qualitative and quantitative studies were considered.

However, studies were excluded if they met any of the following conditions:

- Incomplete access to the studies.
- Studies not published in English.
- Studies involving non-human subjects or exclusively focused on the LGBTQ+ community.

Selection Process

During the search process, the references were initially collected and imported into EndNote and subsequently into Excel. The evaluation of articles for eligibility was conducted by screening the titles and abstracts according to the predefined criteria for inclusion and exclusion. The selection procedure is visually presented in Figure 1.

Data Extraction

From each study, the following details were gathered and recorded:

- Sample size or description of the participants
- Age and gender of the participants

- Country where the study was conducted
- Assessment of parenting
- Study type or design
- Presence of internalizing disorders
- Substance use details

The researcher incorporated studies encompassing various types of substances, including stimulants, depressants, hallucinogens, and others. However, the primary focus of this review was to investigate the relationship between substance use and internalizing disorders, specifically depression. The analysis specifically targeted the association between these two factors.

The review encompassed both experimental studies and randomized controlled trials (RCTs) that explored substance use disorders (SUDs) in adolescents and adults. These studies were published in peer-reviewed English-language journals. Both qualitative and quantitative research approaches were considered, and the selected studies provided data pertaining to individuals diagnosed with SUDs based on the DSM-5 criteria.

Quality Assessment

To assess the quality of the research and identify potential threats to validity (both internal and external), a checklist was employed. Each study underwent evaluation based on specific criteria, including the study's population characteristics, descriptive basis, data collection methods, generalizability of findings, interpretation of results, study completion, and analysis techniques.

Information Analysis

Within this review, the inclusion of studies on substance use, psychological difficulties, and internalizing disorders was limited to both clinical and non-clinical samples. The results of each study were independently analyzed and categorized based on the relationship between constructs, such as substance use, and internalizing disorders, specifically depression. This approach allowed for a comprehensive examination of the interplay between these factors.

Result and Discussion

Table 1
Studies describing the relationship of Depression and Substance Use Disorder

Title	Study Ref	Country	Study Type/Design	Sample Characteristics	Conclusion
Adverse childhood experience patterns, major depressive disorder, and substance use disorder in older adults	(Kim et al., 2021)	USA	Epidemiologic Survey	N = 11,386 Age=55 or older years M _{age} = 33.9 SD= 0.17	The results suggest that adverse childhood experiences (ACEs) have a lasting effect on mental health and substance use disorder (SUD) in later stages of life. The significance of integrating trauma-informed care principles into interventions targeting older adults with substance use disorder is emphasized by these findings.
Circadian Functioning and Quality of Life in Substance Use Disorder Patients With and Without Comorbid Major Depressive Disorder	(Hashemzadeh et al., 2021)	Spain	Cross-sectional Survey	N=163 Age=20-64 M _{age} =19.5 SD=12.7	Our findings contribute to the existing knowledge by providing additional evidence that individuals with both substance use disorder (SUD) and major depressive disorder (MDD) experience heightened clinical severity, sleep disturbances, and a

Internalizing Disorder among Individuals with Substance Use Disorders: A Systematic Review

					reduced quality of life compared to those with SUD alone.
Behavioral Inhibition/Activation Systems and Depression Among Females With Substance Use Disorder: The Mediating Role of Intolerance of Uncertainty and Anhedonia	(Xie et al., 2021)	China	Cross-sectional Survey	N=303 Age= 18-57 M _{age} =34.97 SD = 8.52	These findings enhance our understanding of the influence of the Behavioral Activation System (BAS) and Behavioral Inhibition System (BIS) on depression in females with substance use disorder. They suggest that targeting these associations could be beneficial in interventions and treatment approaches.
Association of co-occurring opioid or other substance use disorders with increased healthcare utilization in patients with depression	(Vekaria et al., 2021)	USA	Cross-Sectional Study	N=500 Age=20-45 years M _{age} = 33.9 SD= 0.17	Our main findings revealed that compared to other co-occurring opioid use disorder (OUD) and substance use disorders (SUDs), was linked to significantly greater increases in the utilization rates and likelihood of utilizing substance-use-related services across various settings. This encompasses services that integrate mental health and substance abuse treatments within inpatient and emergency department (ED) settings.
Symptoms of Anxiety, Depression, and Borderline Personality in Alcohol Use Disorder with and without comorbid Substance Use Disorder	(Howe et al., 2021)	USA	Cross-sectional Study	N= 671 young Age= 21-40 M _{age} =28.1 SD = 6.5	Additionally, the findings indicate that a substantial portion of the variation in substance use disorder (SUD) symptoms associated with trait depression and anxiety can be attributed to symptoms of borderline personality disorder (BPD). This indicates that a substantial portion of the internalizing symptomatology observed in individuals with alcohol use disorder (AUD) or other SUDs is associated with the presence of BPD psychopathology.
Effects of depression, anxiety and screen use on adolescent substance use	(Cioffredi et al., 2021)	United States	Cross-sectional Study	N=1701 youth Age= 12 to 17 M _{age} =15 SD= 1.8	The findings revealed a noteworthy correlation between an elevated risk of substance use and factors such as screen time, risk of severe anxiety and depression. Interventions targeting the reduction of screen time and identification of mental health issues could play a crucial role in mitigating the likelihood of adolescent substance use.
ADHD, depression, and substance abuse risk among beginning college students	(Mochrie et al., 2020)	USA	Cross-sectional	N=1,748 students Age=18-25 M _{age} =19.5 SD=12.7	Colleges and universities should implement programs designed to identify students with ADHD who may be prone to developing substance abuse problems and encountering emotional challenges
Applying Network Analysis to Understand Depression and Substance Use in Indian Adolescents	(Wasil et al., 2020)	India	randomized controlled trial	N=13,035 adolescents Age=20-50 M _{age} =13.8 SD=0.84	According to our findings, prevalent symptoms among Indian adolescents include feelings of failure and a melancholic mood. While a sad mood is commonly acknowledged as a primary symptom of depression, as per conventional recognition in Western populations, the perception of feeling like a failure has not been as commonly identified until now.
Assessment of anxiety and depression among substance use disorder patients: a case-control study	(Mohamed et al., 2020)	Egypt.	Descriptive case-control study	N=100 patients Age= 20=60 M _{age} =28.1 SD = 6.5	Substance use disorders (SUDs) are closely linked to elevated levels of anxiety and depression, particularly severe forms of these mental health conditions. It is

					common for individuals with SUDs to experience both depression and anxiety simultaneously, as these conditions often coexist in patients with SUDs.
Prevalence of Alcohol Use Disorders and Their Association with Sociodemographic Determinants and Depression/Anxiety Disorders in a Representative Sample of the Greek General Population	(Bellos et al., 2020)	Greece	Epidemiological Study	N=4894 participant Age=18-70 M _{age} = 33.9 SD= 0.17	Alcohol-related issues are widespread among the general population and are influenced by a combination of shared and distinct factors. By comparing the results of our study with examining studies conducted during or after the period of financial austerity in Greece, we can investigate the potential impacts of shifts in the economic context on the factors influencing alcohol-related problems. This comparative analysis would provide an opportunity to assess how economic conditions may impact the factors contributing to such problems.
Depressive Symptoms and Substance Use: Changes Overtime among a Cohort of HIV-positive and HIV-negative MSM	(Javanbakht et al., 2020)	USA	RCT	N= 534 Age=18 and 45 M _{age} =19.5 SD=12.7	The occurrence of depressive symptoms was found to be significant among men who have sex with men (MSM) categorized as both HIV-negative and HIV-positive in this cohort. The prevalence of depressive symptoms was particularly high among individuals who reported frequent use of methamphetamine.
Depression, Purpose in Life, Loneliness and Anxiety Among Patients with Substance Use Disorders in Ankaful Psychiatric Hospital in Ghana	(Nkyi & Ninnoni, 2020)	Ghana	Cross-sectional Study	N=192 Age=16-45 M _{age} =28.1 SD = 6.5	These findings suggest that individuals diagnosed with substance use disorders (SUDs) often face additional psychological and mental health issues.
Depression and Anxiety Subgroups Across Alcohol Use Disorder and Substance Use in a National Epidemiologic Study	(Rudenshtine et al., 2020)	USA	Cross-sectional Study	N = 43,093 Age=17-65 M _{age} =19.5 SD=12.7	The findings underscore a heightened vulnerability to alcohol and substance use among individuals who experience severe symptoms of anxiety and/or depression, surpassing the risk observed in individuals with milder symptomatology.
Relationships between coping, anxiety, depression and health-related quality of life in outpatients with substance use disorders: results of the SUBUSQOL study	(Ciobanu et al., 2020)	France	Cross-sectional Study	N=244 patients Age= 20-45 M _{age} =19.5 SD=12.7	Significant correlations were discovered between depression, coping strategies, health-related quality of life (HRQoL), and anxiety. Specifically, higher scores on the MCS-12 (Mental Component Summary) were linked to being male, having no anxiety or depression symptoms, and employing effective coping styles. Patients who did not experience depression or anxiety, as well as those without comorbidities, exhibited better HRQoL scores.
Impulsivity Moderates the Relation between Depressive Symptoms and Substance Use across Adolescence	(Felton et al., 2020)	USA	Prospective longitudinal design.	N=247 adolescents SD = 0.90	The findings indicate that impulsivity plays a crucial role in moderating the connection between the relationship between the onset of substance use among adolescents and depressive symptoms.
Anxiety and depression in alcohol use disorder individuals: the role of personality and coping strategies	(Ribadier & Varescon, 2019)	France	Cross-Sectional Study	N=122 AUD Age= 16-65 M _{age} =19.5 SD=12.7	The importance of interventions focusing on targeted coping strategies in individuals with alcohol use disorder (AUD) is underscored by these findings.,

					regardless of the presence of anxiety and/or depression. Such interventions are important for reducing alcohol consumption and preventing relapse.
Substance type moderates the longitudinal association between depression and substance use from pre-treatment through a 1year follow-up	(Anand et al., 2019)	USA	Correlational research	N= 263 Age=25=45 M _{age} =19.5 SD=12.7	The association between comorbid depression and substance use may differ based on the particular substance involved of dependence before treatment. In particular, individuals with opioid dependence may experience particular benefits from addressing both depression and substance use in their treatment approach.
Emotional Availability in Samples of Mothers at High Risk for Depression and With Substance Use Disorder	(Frigerio et al., 2019)	Italy	Cross-sectional Study	N=68 Italian Age= 22-41 M _{age} = 28.56 SD = 5.39	Mothers with substance use disorder (SUD) exhibited lower scores in terms of non-hostility, non-intrusiveness, and sensitivity, there are notable differences between the sample of mothers at high risk and the low-risk comparison group. Similarly, mothers at risk for depression scored lower in sensitivity and non-hostility compared to the low-risk sample. However, no significant differences were observed between mothers with SUD and mothers at risk for depression in these aspects.
Depression and ADHD-related risk for substance use in adolescence and early adulthood: Concurrent and prospective associations in the MTA	(Howard et al., 2019)	Canada	RCT	N= 579 aged 7.0 to 9.9 M _{age} =8.5 SD=.80	The presence of adolescent depression played a moderating role in the relationship between childhood ADHD and adult marijuana use. Additionally, in adulthood, both the diagnosis of depression and the persistence of ADHD independently and additively correlated with an increased risk of substance use.
Longitudinal Associations among Depression, substance Abuse, and Crime.	(Kim et al., 2019)	Washin gton.	Cross-sectional Study	N=808 Age=21 to 33 M _{age} = 28.56 SD = 5.39	The findings suggest that externalizing problems, such as behavioral issues and impulsivity, may play a more significant role in driving the development of depression, rather than the reverse causal relationship where depression leads to externalizing problems.
Anxiety and depression in alcohol use disorder individuals: the role of personality and coping strategies	(Ribadier & Varesco n, 2019)	France	Cross-sectional	N=122 Age=16=47 M _{age} =19.5 SD=12.7	These findings highlight the significance of interventions that focus on specific coping strategies for individuals with alcohol use disorder (AUD), regardless of the presence of anxiety and/or depression. Such interventions are crucial for reducing alcohol consumption and preventing relapse.
Circulating cytokine levels are associated with symptoms of depression and anxiety among people with alcohol and drug use disorders	(Martinez et al., 2018)	Norway	Cross-sectional	N=80 inpatients Age= 20-65 M _{age} = 33.9 SD= 0.17	Significant positive associations were observed between cytokine levels and depression scores, indicating that higher cytokine levels were related to increased depressive symptoms. In individuals with an alcohol use disorder, IL-6 showed positive associations with both depression scores and psychological distress scores. On the other hand, IL-10 displayed a negative association with anxiety scores, suggesting

					that higher levels of IL-10 were linked to lower anxiety symptoms.
Depression and Marijuana Use Disorder Symptoms among Current Marijuana Users	(Dierker et al., 2018)	U.S.	Cross-Sectional Study	N= 28,557 Age=18 and older $M_{age}= 33.9$ SD= 0.17	Depression consistently emerges as a risk factor for symptoms of marijuana use disorder, even when accounting for exposure to marijuana itself. This finding suggests that individuals with depression may form a significant subgroup that would benefit from targeted interventions addressing substance use.
Genetic and Environmental Influences on the Co-development between Borderline Personality Disorder Traits, Major Depression Symptoms, and Substance Use Disorder Symptoms from Adolescence to Young Adulthood	(Bornov alova et al., 2018)	United States	Cross-Sectional Study	N = 1,763 Age: 14–24. $M_{age}=19.5$ SD=12.7	The results suggest that elevated levels of borderline personality disorder (BPD) traits may contribute to an earlier onset and more rapid escalation of symptoms related to alcohol use disorder (AUD) and drug use disorder (DUD). Additionally, substance use problems appear to impede the typical decline in BPD traits over time. These findings indicate a complex relationship between BPD traits and substance use, highlighting the need for targeted interventions addressing both BPD and substance use issues.
Substance Use, Anxiety, and Depressive Symptoms Among College Students	(Walters et al., 2018)	USA	Cross-Sectional Study	1,316 Age=20-64 $M_{age}=19.5$ SD=12.7	The presence of depressive symptoms was found to be linked to utilization of various substances, including tobacco, sedatives, amphetamines, cannabis, hallucinogens, and cocaine. On the other hand, anxiety symptoms did not show a significant relationship with substance use. These findings indicate that depressive symptoms might play a more influential role in substance use compared to anxiety symptoms.
Influence of comorbid alcohol use disorders on the clinical patterns of major depressive disorder: A general population-based study	(Carton et al., 2018)	France	Cross-Sectional Study	N=38,694 Age=24-45 $M_{age}= 28.56$ SD = 5.39	Within a general population sample in France, individuals diagnosed with major depressive disorder (MDD) who also had alcohol use disorders (AUDs) exhibited a more severe clinical profile. This included a broader range of symptoms and a higher prevalence of comorbidities, compared to individuals with MDD but without AUDs.
Relationships between GAT1 and PTSD, Depression, and Substance Use Disorder	(Bountr ess et al., 2017)	USA	Cross-sectional Study	N=486 Age=21–80. $M_{age}= 33.9$ SD= 0.17	The findings suggest preliminary evidence that individuals who have a higher genetic risk on the GAT1 gene are more prone to experiencing post-traumatic stress disorder (PTSD) and major depressive disorder (MDD), as well as PTSD and substance use disorder (SUD), compared to those who are solely at risk for PTSD alone.
Patients With Alcohol Use Disorder Co-Occurring With Depression and Anxiety Symptoms	(Hassan, 2017)	Canada	Cross-sectional Study	N=1232 Age=20-65 $M_{age}= 28.56$ SD = 5.39	Managing patients who have both alcohol use disorder (AUD) and symptoms of depression or anxiety can be a complex task. It is important to address depressive symptoms alongside alcohol use, particularly in patients who are likely to have separate and

					independent disorders. By addressing both aspects concurrently, treatment outcomes are likely to improve.
Depression care among adults with co-occurring major depressive episodes and substance use disorders in the United States	(Han et al., 2017)	USA	Descriptive study	325,800 adults Age=21 to 33 M _{age} =18.56 SD = 4.39	Components that have been recognized as beneficial in depression care include the utilization of antidepressant medications, specialty mental health treatment, and substance use treatment. These interventions were perceived as helpful in addressing depression symptoms and supporting overall mental well-being.
Reexamining Associations between mania, depression, anxiety and substance use disorders: results from a prospective national cohort	(Olson et al., 2017)	USA	Epidemiologic Survey	N=34 653 adults Age= 20-65 M _{age} = 33.9 SD= 0.17	Adults who experience manic episodes have a comparable the relative risk of experiencing episodes of depression and developing anxiety disorders. In other words, the likelihood of developing depression episodes and anxiety disorders is similar among individuals who have experienced manic episodes.

Note: RCT: Randomized controlled trials

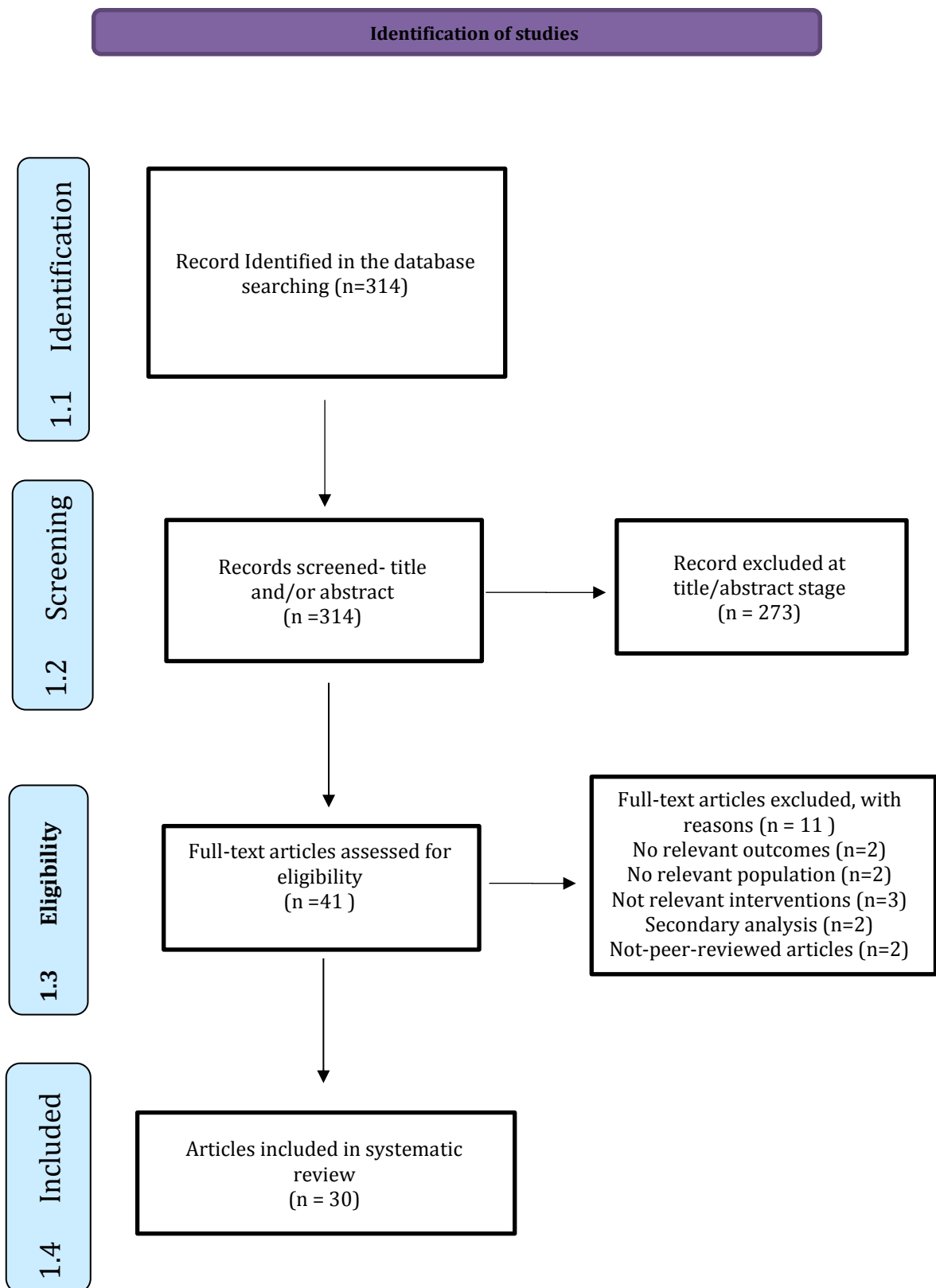


Figure: Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flowchart.

Out of the initial pool of 314 studies, a total of 41 (13%) underwent a comprehensive full-text assessment, resulting in 30 studies that were reviewed and analyzed (see Figure). Among these studies, 16 (53 %) were conducted in the USA, 4 (13%) in France, 2 (7%) in Canada, and 1(3%) each in Spain, India, China, Egypt, Greece, Ghana, Italy, and Norway. All 30 (100%) studies focused on the relationship between internalizing disorders and substance use disorders. Approximately 50% of the studies utilized a cross-sectional design to explore the association between depression and substance use disorder. Among the included studies, 30 reported a significant link between depression and substance use disorder. These consistent findings indicated a higher likelihood of co-occurring substance use disorder among individuals with depression compared to those without depression. The remaining studies employed various research designs and examined significant results while addressing multiple patient variables simultaneously (refer to Tables 1-2). A range of assessment instruments were used to evaluate internalizing disorders and substance use disorders. Prospective studies revealed a common occurrence of depression in substance use disorders, with prevalence rates ranging from 40% to 90% of substance dependence. The term "depression" encompassed major depressive disorder, characterized by a depressed mood or loss of interest or pleasure in nearly all activities persisting for at least two weeks (commonly referred to as major depression or clinical depression).

Among the updated studies included, 5 (16%) provided evidence supporting a positive association between depression and substance use among adolescents. It suggests that adolescents with depression may be more inclined to engage in substance use as a coping mechanism for their depressive symptoms or to seek temporary relief. Furthermore, it is evident that depression and substance use commonly co-occur among adolescents (Cioffredi et al., 2021). Similarly, research indicates an increased likelihood of comorbidity between depression and substance abuse among college students. The presence of depression further elevates the risk of substance abuse, potentially resulting in more severe academic, social, and emotional consequences (Mochrie et al., 2020). Additionally, individuals with alcohol use disorder (AUD) and comorbid substance use disorder (SUD) tend to exhibit more pronounced psychological symptoms such as depression compared to those without SUD. The presence of comorbid SUD contributes to higher psychological distress and impairment in functioning (Howe et al., 2021). Substance use disorder patients commonly experience higher rates of anxiety and depression compared to the general population, with individuals having SUD more likely to exhibit symptoms of anxiety and depression compared to those without SUD (Mohamed et al., 2020). A study highlighted that network analysis can unveil the patterns of symptom interconnections between depression and substance use, identifying specific symptoms that are closely related or influence each other (Wasil et al., 2020).

Conversely, another set of 5 (16%) studies supported the notion that the association between both disorders contributes to additional psychological issues. Similarly, a study affirmed previous findings by demonstrating that comorbid substance use disorder (SUD) and major depressive disorder (MDD) are linked to more severe clinical characteristics, increased sleep problems, and lower quality of life compared to individuals with only SUD (Hashemzadeh et al., 2021). Another study supported the same conclusion, indicating strong correlations between depression and fewer coping strategies among patients with substance use disorders (Ciobanu et al., 2020). Likewise, the findings of another study indicated that patients diagnosed with substance use disorders have additional psychological and mental health concerns (Nkyi & Ninnoni, 2020). The results suggested that impulsivity plays a significant role as a moderator in the relationship between depressive symptoms and the development of substance use during adolescence (Felton et al., 2020). Additionally, the prevalence of depressive symptoms was found to be high, particularly among frequent methamphetamine users, within the cohort of individuals with substance use disorder and HIV-negative and HIV-positive men who have sex with men (Javanbakht et al., 2020).

Likewise, the remaining studies support the notion that multiple factors contribute to the development of both depression and substance use disorder (SUD). These factors can be broadly classified into biological, psychological, and environmental factors. Additionally, another study's findings indicated that elevated levels of psychological traits, specifically borderline personality disorder (BPD) traits, may play a role in an earlier onset and more rapid escalation of symptoms related to alcohol use disorder (AUD) and drug use disorder (DUD) (Bornovalova et al., 2018).

Furthermore, studies indicate that individuals with concurrent depression and substance use disorders, including opioid or other substance use disorders, tend to exhibit higher healthcare utilization compared to those with depression alone (Vekaria et al., 2021). Similarly, research has demonstrated a significant prevalence of comorbidity between major depressive disorder (MDD) and substance use disorder among older adults. The presence of both conditions can synergistically impact overall well-being and quality of life. Integrated treatment approaches that address both mental health and substance use issues may be necessary for individuals with co-occurring MDD and SUD (Kim et al., 2021).

Discussion

In our systematic review, we examined the relationship between internalizing disorders and substance use disorders (SUDs) through an analysis of relevant studies. The findings of the included studies provide valuable insights into this complex association.

Several studies demonstrated a significant co-occurrence of internalizing disorders, particularly depression and anxiety, among individuals with SUDs. For example, Mohamed et al. (2020) revealed a higher likelihood of individuals with substance use disorders (SUDs) exhibiting symptoms of anxiety and depression in comparison to the general population. Similarly, Wu et al. (2008) reported that depressive symptoms were associated with the use of various substances, including Cocaine, tobacco, cannabis, amphetamines, hallucinogens, and sedatives.

Our review findings, supported by Hashemzadeh et al. (2021), demonstrate that individuals with co-occurring substance use disorder (SUD) and major depressive disorder (MDD) experience worse more sleep problems, poorer quality of life, and clinical profiles compared to those with SUD alone. Similarly, Hunt et al. (2020) concluded that individuals with both SUD and MDD face additional challenges, including impaired social functioning, financial instability, and difficulties in educational settings, underscoring the importance of integrated interventions for addressing Concerns regarding mental health and substance use within this population.

In exploring the connection between internalizing disorders and substance use, Xie et al. (2021) investigated how the Behavioral Inhibition System/Behavioral Activation System (BIS/BAS) influences depression in females with substance use disorder. Their findings indicated the potential benefit of targeting these associations in interventions. Similarly, Felton et al. (2020) emphasized impulsivity plays a crucial role as a significant moderator in the association between depressive symptoms and the onset of substance use during adolescence.. This perspective aligns with Kozak et al. (2018), who highlighted the importance of considering trait effects, substance-induced effects, and genetic/environmental factors in understanding impulsivity's role in substance use disorders (SUDs). Implementing a range of measures to assess impulsivity can facilitate better treatment matching and improved outcomes for individuals with SUDs.

Our review identified specific populations that require special attention. Javanbakht et al. (2020) reported a high occurrence of depressive symptoms among men who have sex with men, both HIV-negative and HIV-positive, especially those who frequently use methamphetamine. This emphasizes the need for targeted interventions for these subgroups. Additionally, Abdisa et al. (2021) demonstrated there is a significant prevalence

of depressive symptoms observed among youth living with HIV and emphasized the significance of addressing factors like age, history of opportunistic infection, medication adherence, social support, and stigma to promote their mental well-being.

Overall, our systematic review demonstrates the significant association between internalizing disorders and substance use disorders. The findings underscore the significance of employing integrated approaches that encompass the evaluation, diagnosis, and treatment of both mental health and substance use issues. These insights can inform the development of targeted interventions and improve outcomes for individuals with co-occurring internalizing disorders and substance use disorders.

Conclusion

In conclusion, our systematic review revealed several important findings regarding the relationship between internalizing disorders and substance use disorders (SUDs). Individuals with both SUD and major depressive disorder (MDD) exhibited worse clinical profiles, more sleep problems, and lower overall quality of life compared to those with SUD alone. Impulsivity was identified as a significant factor associated with SUDs, highlighting its role as a vulnerability marker and the importance of addressing co-occurring impulsivity in SUD treatment. Furthermore, specific factors such as the Behavioral Inhibition System/Behavioral Activation System (BIS/BAS) and depressive symptoms were found to influence the relationship between internalizing disorders and substance use. These findings emphasize the need for integrated interventions that address both mental health and substance use concerns in individuals with SUDs. Additionally, studies focusing on specific populations, such as HIV-positive individuals and men who have sex with men, highlighted the high prevalence of depressive symptoms and the importance of addressing associated factors to support their mental well-being. Overall, this systematic review contributes to a better understanding of internalizing disorders among individuals with SUDs and underscores the significance of comprehensive assessment and tailored interventions in this population.

Study Implications

Our systematic review yielded important implications for individuals with co-occurring internalizing disorders and substance use disorders (SUDs). The presence of major depressive disorder (MDD) in individuals with SUDs was associated with worse clinical profiles, sleep problems, and lower quality of life, highlighting the need for comprehensive interventions addressing both mental health and substance use concerns. Impulsivity was identified as a significant vulnerability marker for SUDs, emphasizing the importance of assessing and treating impulsivity in individuals with SUDs. The influence of the Behavioral Inhibition System/Behavioral Activation System (BIS/BAS) on depression among females with SUDs suggests potential benefits in targeting these associations in interventions. Specific populations, such as HIV-negative and HIV-positive men who have sex with men, particularly frequent methamphetamine users, require tailored interventions to address their high prevalence of depressive symptoms. Factors including age, history of opportunistic infection, medication adherence, social support, and stigma significantly impact the mental well-being of HIV-positive youth, highlighting the need to address these factors in supporting their mental health. Overall, comprehensive interventions considering mental health, substance use, impulsivity, and tailored approaches for specific populations can enhance outcomes and improve the quality of life for individuals with co-occurring internalizing disorders and SUDs.

Recommendations

The findings from our systematic review on internalizing disorders among individuals with substance use disorders provide valuable insights. However, there are certain limitations to consider, and future research should address these gaps.

Firstly, the majority of the included studies relied on cross-sectional designs, which limits our ability to establish causal relationships between internalizing disorders and substance use disorders. Future research should employ longitudinal designs to better understand the temporal relationship and potential mechanisms underlying this co-occurrence.

Secondly, the studies varied in terms of assessment measures for internalizing disorders and substance use disorders, making it challenging to compare findings across studies. Standardized assessment tools should be utilized to ensure consistency and facilitate meaningful comparisons.

Additionally, the majority of the studies focused on depression as the primary internalizing disorder, leaving other internalizing disorders such as anxiety disorders underrepresented. Future research should explore the relationships between different internalizing disorders and substance use disorders to gain a comprehensive understanding of their co-occurrence.

Furthermore, the included studies predominantly focused on adult populations, limiting the generalizability of the findings to other age groups, such as adolescents and older adults. Future research should investigate internalizing disorders and substance use disorders across diverse age groups to identify age-specific risk factors and develop targeted interventions.

Lastly, there is a need for more research examining the effectiveness of integrated interventions that address both internalizing disorders and substance use disorders. These findings offer valuable insights for developing comprehensive treatment approaches that effectively address the multifaceted needs of individuals with comorbid disorders.

In conclusion, while our systematic review sheds light on the relationship between internalizing disorders and substance use disorders, further research addressing the aforementioned limitations is necessary. By addressing these gaps, future studies can contribute to a more robust understanding of the interplay between internalizing disorders and substance use disorders and inform the development of effective interventions for this vulnerable population.

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