

Review article

Substance use disorder and lifetime suicidal behaviour: A scoping review

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ABSTRACT

Background: Suicidal behaviours are prevalent in substance use disorder (SUD) patients. These behaviours have a negative impact on the psychopathological profile of these patients. However, few studies have evaluated suicide as a continuum (i.e. starting with ideation, followed by attempts and ending with death) and its evolution during treatment. The aim of this scoping review was to explore what is known about suicidal behaviour in individuals undergoing clinical treatment for SUD.

Methods: The PsycINFO, Web of Science (Core Collection and MEDLINE), Scopus, and Cochrane Library databases were searched. After screening the records based on eligibility and exclusion criteria, 30 studies were ultimately selected for inclusion.

Results: Most of the studies were conducted in the USA and Europe. Only three studies evaluated suicidal behaviour with a specific instrument. The prevalence of suicidal ideation (SI) in people being treated for SUD ranged from 20 % to 62.2 %, and the prevalence of suicide attempts (SA) ranged from 15.8 % to 52.1 %. Only one study reported death by suicide.

Conclusions: Despite the high prevalence of suicidal behaviours and their harmful consequences, the assessment of this phenomenon is scarce and heterogeneous. There is a need to assess suicidal behaviour with standardized criteria in order to develop tailored SUD treatment.

1. Introduction

Addictive behaviours affect all areas of people's lives. These people not only have a problem with excessive consumption of a substance, but this excessive consumption also causes them problems at work, in their social life, in their relationship with their partner, in their family, in mental health, among others. Therefore, one of the consequences of suffering and hopelessness derived by addictive problems could be suicidal behaviour. Although the presence of suicidal behaviour has been widely observed in patients seeking treatment for substance use problems (Conner and Ilgen, 2011; De Leon et al., 2019; Havens and Young, 2010; López-Goñi et al., 2018; Martínez-Martínez et al., 2023; Vijayakumar et al., 2011; Yuodelis-Flores and Ries, 2015) there appear to be no studies addressing suicidal behaviour in addiction treatment.

Suicidal behaviour has been proposed as a continuum that ranges from suicidal thoughts and includes planning, attempting, and completing suicide (Yuodelis-Flores and Ries, 2015). Recently, the prevalence of suicidal ideation (SI) has ranged from 26.5 % to 50.1 % among patients in treatment for substance use disorder (SUD

(Andersson et al., 2022; Kassie et al., 2022; Muneer et al., 2022; Siria et al., 2022). Moreover, between 25.2 % and 52.1 % of SUD patients reported at least one suicide attempt (SA) (Costanza et al., 2021; Kassie et al., 2022; Muneer et al., 2022). The end of this continuum is death by suicide. In a recent study of SUD patients, Levola et al. (2022) studied the associations of different non-substance-related in-patient psychiatric diagnoses with subsequent all-cause mortality and suicide up to 28 years after entering substance use treatment. They found that 13.2 % of deaths were by suicide. Nevertheless, there are limited studies in which death by suicide is assessed among SUD patients. This may be due to the difficulty of distinguishing suicide deaths from overdose deaths, and the lack of attention paid to studying suicidal behaviour in the SUD population. As a result, few studies have examined suicide as a continuum in the SUD population.

Regarding aspects related to the suicide continuum, previous studies have assessed the relationship between impulsivity and nonsuicidal self-injury (NSSI) (Anestis et al., 2014; Glenn and Klonsky, 2010; Karabulut et al., 2021). NSSI is defined as the deliberate and self-inflicted destruction of body tissue without an observable intent to die

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(American Psychiatric Association, 2013; Karabulut et al., 2021). Thus, NSSI has not been traditionally considered part of the continuum of suicide (Yuodelis-Flores and Ries, 2015). However, the role of this concept in suicidal behaviour is controversial because some studies have reported an association between NSSI and suicidal behaviours (Ferreira-Bruco et al., 2018; Klonsky et al., 2013).

A specific profile has been observed in SUD patients with suicidal behaviour. Specifically, being a woman, having a family history of SA, having a history of adverse childhood experiences, and having suffered lifetime psychological, physical and/or sexual abuse are factors related to suicidal behaviour. Furthermore, this specific profile has also been observed among those with comorbid mental disorders (Andersson et al., 2022; Horigian et al., 2022). Regarding SUD treatment, the dropout rate is higher in SUD patients with suicidal behaviour than in SUD patients without these behaviours (Arribas-Ibar et al., 2017; Fernández-Montalvo et al., 2019; Rodríguez-Cintas et al., 2018). With regard to the severity profile and characteristics of SUD patients with suicidal behaviour, specific personality traits such as introversion, neuroticism and hostility have been observed (Roy, 2001, 2003). In addition, other traits, such as impulsivity, have been shown to be associated with a higher probability of dying by suicide (Klonsky et al., 2013) and a higher risk of substance use problems (Stoltenberg et al., 2011).

In summary, the high prevalence of SI and SA among SUD patients, the clinical relevance of the psychopathological consequences of suicidal behaviour, and the lack of studies assessing the whole continuum of suicide indicate that there is a need to address this gap in research. Therefore, based on the recommendations of the Munn et al. (2018) guidelines, we conducted the following scoping review, which aimed to explore what is known about suicidal behaviour in individuals undergoing clinical treatment for SUD. Specifically, (1) to know what is the prevalence of suicidal behaviour (ideation, attempt and/or death by suicide), (2) to know what type of assessment measures are used and, (3) whether there are variables related to these behaviours or not.

2. Method

In this study, the scoping review methodology proposed by Arksey and O'Malley (2005) and Levac et al. (2010) was used. Specifically, five stages were completed: (1) identifying the research question; (2) identifying relevant studies; (3) selecting studies; (4) charting the data; and (5) collating, summarizing and reporting the results. Moreover, to adjust the methodology to the guidelines for conducting and publishing scoping reviews, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) was followed, and the corresponding 22-item checklist was used in each phase of the process (Tricco et al., 2018).

2.1. Protocol and registration

The protocol of this scoping review was registered on the Open Science Framework (OSF; <https://osf.io/b3nfx>) prior to searching for relevant studies.

2.2. Eligibility criteria

Five eligibility criteria were established to focus the bibliographic search and to limit the breadth of studies that were included: (a) publications in English language; (b) samples composed of adults (above 18 years old) enrolled in treatment for SUD (currently or previously); (c) reported rates of suicidal behaviour (ideation, attempt and/or death by suicide); (d) peer-reviewed scientific articles; and (e) quantitative research. The rationale for these criteria was that English is the main scientific language and that peer-reviewed journals offer a higher guaranteed of quality in the selected studies. The rationale for including articles with specific samples of people in treatment for SUD is that

addiction treatment can be an opportunity to identify, explore and intervene in different problems such as suicidal behaviour. The rest of the criteria are directly related to the main goals of the study. All the studies selected after considering these eligibility criteria were examined in detail for subsequent analysis, comparison, and interpretation.

2.3. Search strategy and information sources

PsycINFO, Web of Science (Core Collection and Medline), Scopus, and Cochrane Library bibliographic databases were included for the literature search. The research strategy included the following key words: "substance use disorder" and "drug addiction" related to SUD and "suicid*" related to suicidal behaviour. These terms were combined with the Boolean operators AND and OR and specific limitations depending on database settings. After determine the combination of words that was better suited for the research, the final and decisive search was conducted on 2 December 2022. The search strategy and the systematic search of the literature were developed with the help of an experienced information technician along with input from the project team. The full electronic search strategy for all databases included in the study is presented in Table 1.

2.4. Study selection and data abstraction

After removing duplicates, two levels of screening for the study selection were established, following the same procedure proposed by Zechen et al. (2019). At level 1 of screening, two independent reviewers from the research team reviewed the titles and abstracts of all papers obtained from the electronic database search. At level 2 of screening, the full texts of the studies were examined. This second level was implemented in those cases in which there was not enough information to make an informed decision from a title or abstract review. As carried out by Zechen et al. (2019), interrater reliability was calculated by Cohen's kappa at both levels of screening. Discrepancies between reviewers were resolved by discussions between reviewers to reach consensus.

Eligible study designs included randomized controlled trials, observational studies (cohort, cross-sectional, case-control), descriptive studies, and mixed methods studies. Two reviewers independently assessed the included articles for quality using criteria based on the Downs and Black (1998) quality assessment checklist for quantitative studies. The following data were extracted: authors, year of publication, sample size, mean age, study setting, study design, percentage of men/women, diagnosis of substance use disorder (both general and specific substance use disorder), type of treatment (outpatient or inpatient), type (ideation, NSSI, attempt and/or death by suicide) and measure of suicidal behaviour and main findings.

As carried out by Bunn et al. (2014), when the results of a study were reported in more than one publication, the articles were combined, and

Table 1
Search strategy in all databases.

Web of Science Platform search words (Core Collection and MEDLINE)	
#3	#1 AND #2 refined by publication year (2000-2022) and English Language
#2	TI= (suicid*)
#1	TI= ("substance use disorder" OR "drug addiction")
PsycINFO search words	
#1	TI ("substance use disorder" OR "drug addiction") AND (suicid*) with the specific limitations of English language, publication year (2000-2022), adult population (above 18 years old) and academic publications
Scopus search words	
#1	(TITLE("substance use disorder" OR "drug addiction") AND TITLE(suicid*) AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "re") OR LIMIT-TO (DOCTYPE, "er"))) AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-TO (PUBYEAR > 2000 AND PUBYEAR < 2022))
Cochrane Library search words	
#1	(Record Title "substance use disorder" OR "drug addiction") AND (Record Title suicid*) with the specific limitation of publication year (2000-2022)

the publication was classified with the most complete data as the primary reference; the other publications describing the same study were classified as associated papers.

2.5. Study quality

An early scoping search indicated heterogeneity of study types. As such, the Quality Assessment Tool for Studies with Diverse Designs (Sirriyeh et al., 2012) was chosen to assess risk of bias. The QATSDD assesses studies against 16 criteria, with each criterion rated from 0 (Not at all) to 3 (Complete). This tool has good validity, inter-rater reliability, and test-retest reliability (Sirriyeh et al., 2012). In this case, two criteria were excluded as no qualitative studies were included in the review. Therefore, 14 criteria were evaluated to assess the quality of the 30 studies included in this scoping review. Two of the 14 criteria were never met: evidence of sample size considered in terms of analysis and evidence of user involvement in design. The criterion referring to Statistical assessment of reliability and validity of measurement tool(s) was not always met. Finally, the remaining 11 criteria were met in all

studies, varying between 1 (very slightly) and 3 (complete).

The maximum score was 42 (100%). The scores for each criterion in each study were added and the percentage of 100% was calculated. For the interpretation of the results, cut-points were applied as follow: lower than 60% (low quality), between 60% and 80% (moderate quality), and higher than 80% (high quality) (Orr et al., 2021; Wolff et al., 2022). Two authors independently assessed each study, and any disagreements (n = 9) were resolved by discussion.

3. Results

3.1. Included studies

The flow diagram of the study selection is presented in Fig. 1. A total of 197 studies were identified through the database searches. After removing duplicates, 131 records remained. After level 1 of screening (title and abstract review), 87 studies were excluded, and 44 studies remained for level 2 of screening (full-text review). Of these, 14 studies were excluded for the following reasons: did not include individuals in

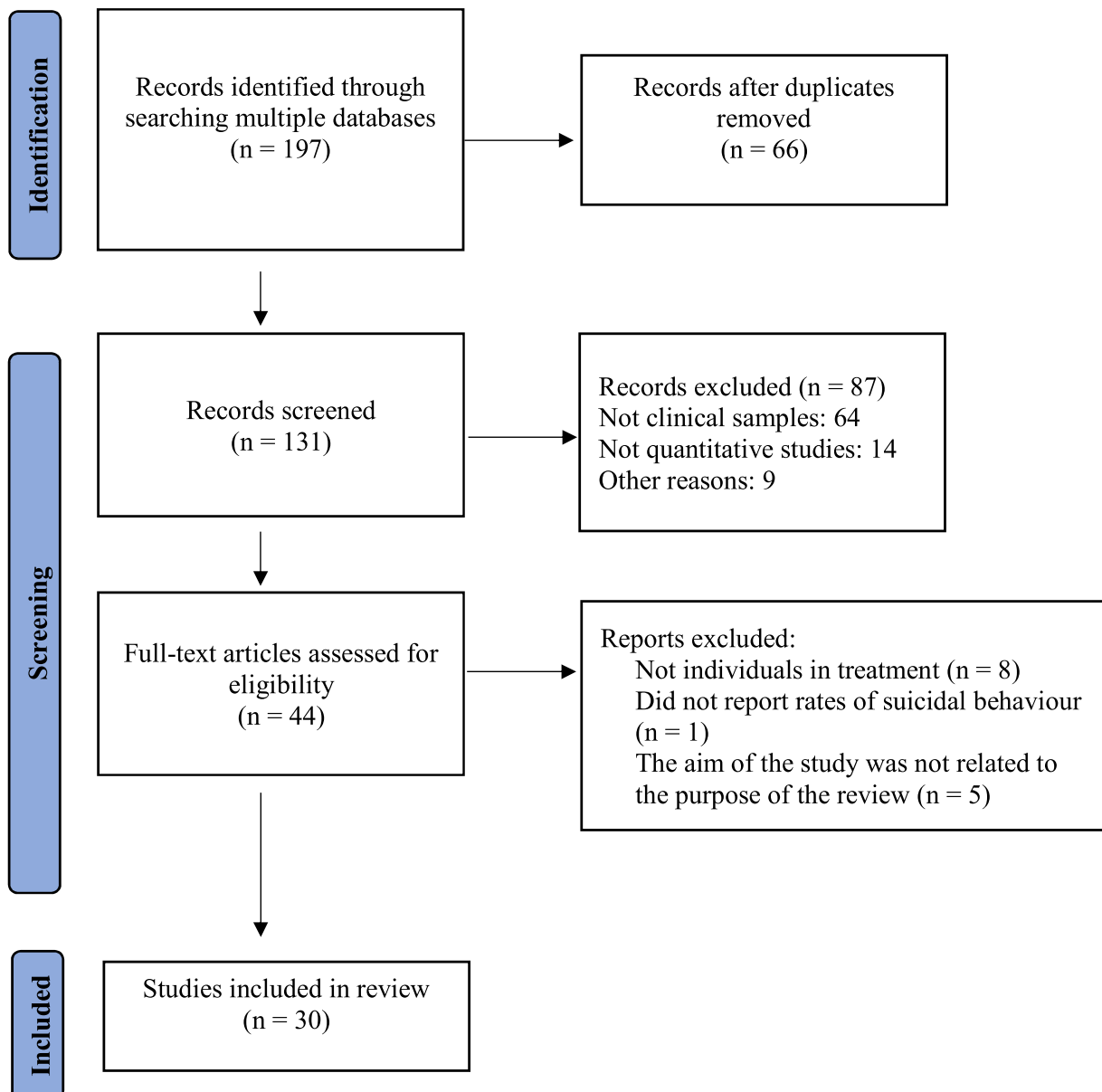


Fig. 1. Flow diagram.

treatment for SUD (n = 8); did not report rates of suicidal behaviour (n = 1); and other reasons (n = 5). Ultimately, 30 studies were eligible for inclusion. The interrater reliability (Cohen's kappa statistic) for level 1 of screening was 0.80, and for level 2 of screening, it was 0.83.

3.2. Characteristics of the included studies

Most of the studies were carried out in the USA (43.3 %; n = 13) and Europe (40.0 %; n = 12), followed by Australia (6.7 %; n = 2), Japan (3.3 %; n = 1), Dubai (3.3 %; n = 1) and Ethiopia (3.3 %; n = 1). The majority of the studies included both men and women (93.3 %; n = 28); two studies included only men (6.7 %; n = 2), and none of them included only women. Most of the studies were cross-sectional [1, 2, 3, 5, 6, 7, 8, 11, 12, 13, 17-30] (80.0 %; n = 24). Regarding the race/ethnicity, 19 studies (63.3 %) did not specify it while 11 studies (36.7 %) specified it. All the studies that specified the race/ethnicity were carried out in USA. In all of the studies the majority were white, except in one study, where the majority were African-American.

The sample sizes ranged from 48 to 34,251 participants. Seventeen studies assessed general SUD, and 13 studies assessed specific types of SUD. Eleven studies indicated the instrument on which they based their diagnosis. Regarding the type of treatment programme for SUD, half of the studies included both outpatient and inpatient samples (50.0 %; n = 15); seven studies included only outpatient treatment (23.3 %; n = 7); five studies included only inpatient treatment (16.7 %; n = 5); and three studies did not specify the type of treatment programme (10.0 %; n = 3) (Table 2).

Regarding the quality assessment of the studies, 53.3 % (n = 16) were assessed as moderate quality [1, 3, 4, 8, 10, 11, 13, 15, 20, 21, 22, 23, 24, 27, 28, 29]; 43.3 % (n = 13) as low quality [2, 5, 6, 7, 12, 14, 16, 17, 18, 19, 25, 26, 30] and only one (3.3 %) as high quality [9].

3.3. Suicidal behaviour: prevalence and assessment measures

Based on the results of the selected articles, the prevalence of SI in people in treatment for SUD ranges from 20 % to 62.2 % [1, 7, 8, 9, 17, 18, 20, 23, 26, 27, and 28]. The prevalence of SA in patients in the treatment of SUD ranges from 15.8 % to 52.1 % [2, 4, 5, 6, 7, 8, 11, 16, 18, 20, 21, 23, 26, 27, 28, and 30]. Only one study reported that the cause of death in SUD patients was suicide in the 13.2 % of the cases [22].

SI as the main outcome variable was used in three studies [1, 9, 17]. Ten studies assessed only SA [5, 11-16, 21, 24, 30], and three also

assessed NSSI [2, 3, 19]. Ten studies evaluated SI and SA [4, 7, 8, 10, 18, 20, 23, 27-29]. Other aspects of suicidal behaviour were evaluated by four studies: suicidality (history of self-harm or suicide attempts and thoughts of self-harm or suicide) [6], suicide risk (risk for committing suicide) [25, 26] and death by suicide [22] (Table 3).

The assessment of suicidal behaviour was performed using several measures (Table 3). Most of the studies assessed SI and/or SA by using specific suicidal-related items of a semistructured interview that assessed SUD: six studies [1, 9, 14, 15, 29, 30] used the Addiction Severity Index (McLellan et al., 1980), and five studies [8, 23, 24, 27, 28] used the European version of the ASI (Kokkevi and Hartgers, 1995). Seven studies created ad hoc questions to evaluate several variables related to suicidality [4, 5, 7, 13, 16, 18, 19]. Three studies used specific questionnaires that assessed suicidal behaviour: one study [2] used the Lifetime Suicide Attempts Self-Injury Interview (Linehan et al., 2006); one study [3] used the Deliberate Self-Harm Inventory (Gratz, 2001) and the Lifetime Parasuicide Count (Linehan et al., 2006); and one study [26] used Ask Suicide-Screening Questions (Horowitz et al., 2020). Eight studies [6, 10-12, 17, 20, 21, 25] used different items related to suicidality from unspecific assessment instruments (Table 3). Finally, one study assessed death by suicide and obtained data from the Official Statistics of Finland [22].

3.4. Association between substance use disorder and suicidal behaviour

3.4.1. Variables related to suicidal ideation (SI)

Regarding sociodemographic variables, those patients who reported SI were more likely to have a lower annual income [17], being single [27, 29], being younger, white, and unemployed [29] than those who did not reported SI. Regarding sex, being women was highly associated with the presence of SI [1, 7, 27, and 29].

A more severe SUD profile [23] and other variables related to SUD has been associated with the presence of SI: opiate use disorder [1], polysubstance use disorder [1], having more days of heavy alcohol and marijuana use [17], cocaine use disorder [27] or sedative use disorder [27], polysubstance use disorder [27] and alcohol use [20]. In addition, a younger age of substance use onset, a younger admission age [1], and a perceived stigma related to SUD [20] were related to higher prevalence of SI. Moreover, having suffered a traumatic experience such as history of physical or sexual childhood abuse or intimate partner violence [8, 17, 18 and 27], or a partner physical aggression was significantly associated with a higher presence of SI [17, 18].

Related to mental health, the factors associated with SI were family history of mental illness, comorbid mental illness, or psychopathological symptoms [7, 20, 23], as major depressive disorder, attention-deficit/hyperactivity disorder, borderline personality disorder or higher presence of depressive symptoms, and a greater motor impulsivity [27].

3.4.2. Variables related to suicide attempt (SA)

Regarding the individual characteristics associated with SA, people in treatment for SUD who have attempted suicide were more likely to be a woman [7, 11, 12, 16, 20, 21, 27], to be younger [21] and to have a family history of suicide [20]. They also had higher levels of impulsivity and aggression [5] and engaged in a greater number of risk-taking behaviours such as binge drinking, dangerous driving, extreme sports, gambling and risky sexual behaviours [5, 29].

In terms of SUD-related characteristics, those who had made at least one SA had a profile of greater severity of addiction in all areas of life (substance consumption, employment, health, psychopathological problems, etc.) [23], longer duration of SUD [21], higher overdose rates [10] and a history of delirium tremens [24]. With regard to the main substance, several studies associated SA to different substance use such as nicotine (particularly in men) [11, 12], sedatives (particularly in women) [12], cocaine [4, 15, 29], alcohol [4, 29] or khat [20]. Others associated it to increased alcohol consumption [13, 14, and 15].

Psychopathological symptomatology was another factor related to

Table 2
Characteristics of included studies (N = 30).

Characteristics	Number of studies (%)
Place	
USA	13 (43.3)
Europe	12 (40.0)
Australia	2 (6.7)
Asia	2 (6.7)
Africa (Ethiopia)	1 (3.3)
Gender	
Only men	2 (6.7)
Only women	0
Both	28 (93.3)
Type of study	
Cross-sectional	24 (80.0)
Longitudinal	6 (20.0)
Sample type	
General SUD population	17 (56.7)
Specific SUD population	13 (43.3)
Type of SUD treatment	
Outpatient	7 (23.3)
Inpatient	5 (16.7)
Both	15 (50.0)
No specified	3 (10.0)

Table 3
Characteristics of the studies included in the final review.

No.	Authors and year	Country	Sample size Age Study setting	Men and Women (%)	SUD diagnosis (general or specific) Type of treatment (outpatient or inpatient)	Type of lifetime suicidal behaviour and measure	Objective/Main findings/Conclusion
1	Andersson et al., (2022)	Norway	N= 563 Mean age 35	M = 71.6 % W = 28.4 %	AUD, OUD, CUD, SedUD, StiUD and PUD Inpatient	SI One item of the ASI	A total of 50.1 % of the total sample reported lifetime SI. The SI rate was significantly higher among women.
2	Anestis et al., (2014)	USA	N = 93 Mean age 36.25	M = 55 % W = 45 %	General SUD Inpatient	NSSI and SA SASII	The prevalence of at least one suicide attempt during life was 25.8 %. A total of 33.3 % of the participants reported at least one prior episode of NSSI. Suicidal behaviour may not be a direct manifestation of impulsivity.
3	Baer et al., (2020)	USA	N = 203 Mean age 34.53	M = 49.3 % W = 50.7 %	AUD, CUD, SedUD, StiUD, OUD, CoUD, HUD and PUD Inpatient	NSSI and SA DSHI and LPC	The prevalence of lifetime suicide attempt was 22.2 %. NSSI was reported by 36.5 %. There is an important link between NSSI methods and SA among patients with SUD.
4	Britton and Conner, (2010)	USA	N = 2,996 Mean age 33.6	M = 64.4 % W = 35.6 %	CoUD, OUD and AUD Inpatient and outpatient	SI and SA Ad hoc items	The prevalence of lifetime SA was 18.5 %. In the 12 months following treatment, 2.6 % reported SA. Cocaine use disorder in particular is highlighted as a focus of suicide prevention
5	Costanza et al., (2021)	Switzerland	N = 48 Mean age 39.8	M = 60.4 % W = 39.6 %	AUD, CUD, CoUD, OUD, HUD and PUD No specified	SA Ad hoc items	The prevalence of at least one SA was 52.1 %. The history of lifetime SA was significantly associated with higher levels of impulsivity, aggression and a higher number of RTBs in the same individual.
6	Dore et al., (2012)	Australia	N = 253 Mean age 37.29	M = 66.8 % W = 33.2 %	AUD, OUD, StiUD, CUD and BUD Inpatient	Suicidality PsyCheck screening instrument	A total of 36.8 % of the sample had a history of self-harm or attempted suicide, and 25.3 % had recent thoughts of self-harm or suicide. Women were more likely to have a history of self-harm or attempted suicide and to have had recent thoughts of self-harm or suicide. The relevance of assessing suicidality in SUD populations is highlighted.
7	Embree et al., (2017)	USA	N = 107 Mean age 39.64 Deaf population	M = 58.9 % W = 41.1 %	General SUD Outpatient	SI and SA Ad hoc items	The prevalence of past SA and past SI in the sample was 42.1 % and 50.5 %. Women were more likely to report both past SA and SI. Variables significantly associated with SA included past mental health diagnosis.
8	Fernández-Montalvo et al., (2019)	Spain	N = 82 Mean age 37.4	M = 45.1 % W = 54.9 %	General SUD Inpatient and outpatient	SI and SA Two items of the EuropASI	The prevalence of SI was 62.2 %, with 12.2 % presenting SI in the past 30 days. The prevalence of SA was 30.5 % and 1.2 % in the past 30 days. No significant differences between men and women were found. The relationship between previous traumatic experiences and suicidal behaviours is highlighted.
9	Haynes et al., (2021)	Australia	N = 956 Mean age 41.23	M = 69.3 % W = 30.3 %	General SUD Inpatient	SI in the previous 30 days One item of the ASI	At baseline, the prevalence of SI in the previous 30 days was 22.4 %. At follow-up, this prevalence was reduced to 13.3 %. Of those who have responded yes to experiencing SI at baseline, 26 % also experienced SI at follow-up. A statistically significant reduction occurred in the proportion of participants experiencing SI from baseline to 3-month follow up.
10	Horigian et al., (2022)	USA	N = 2,541 Mean age 39.4	M = 67.4 % W = 32.6 %	General SUD Inpatient and outpatient	Suicidality CHRT-SR	Only the 4.8 % of the sample was categorized as suicidal at baseline. Of those participants who reported suicidal thoughts and intent, 4.9 % had an overdose event. Lifetime heroin use was associated with an increased likelihood of an overdose event.
11	Icick et al., (2017)	France	N = 433 Mean age (no specified)	M = 77 % W = 23 %	OUD, CoUD, AUD, SedUD, CUD and PUD Outpatient	SA Suicide section of the DIGS	The prevalence of SA in the sample was 32 %. A total of 59 % of those who reported SA were serious SA. Women had higher prevalence of lifetime SA.
12	Icick et al., (2018)	France	N = 433 Mean age (no specified)	M = 77 % W = 23 %	OUD, CoUD, AUD, SedUD, CUD and PUD Outpatient	SA Suicide section of the DIGS	The 32 % of the sample had ever-attempted suicide. A total of 61 % of whom reported two or more attempters. Both single and recurrent SA were significantly more frequent in women than in men.
13	Ilgen et al., (2004)	USA	N = 2,099 Mean age 42.6	M = 100 %	AUD, SUD or AUD-SUD Inpatient	SA Ad hoc items	The prevalence of SA in the past 3 months was 6.7 %. The group of SA showed greater severity at baseline in the variables evaluated.
14	Ilgen et al., (2005)	USA	N = 1,930 Mean age 47.51	M = 92 % W = 8 %	General SUD Inpatient and outpatient	Recent SA (30 days before baseline) One item of ASI	Greater reduction of symptoms during the different periods of treatment in the group of SA. The prevalence of recent SA in the sample was 4 % at the baseline. A significant interaction between baseline SA and treatment setting was found. Better response to inpatient treatment for those patients with SA.

(continued on next page)

Table 3 (continued)

No.	Authors and year	Country	Sample size Age Study setting	Men and Women (%)	SUD diagnosis (general or specific) Type of treatment (outpatient or inpatient)	Type of lifetime suicidal behaviour and measure	Objective/Main findings/Conclusion
15	Ilgen et al., (2007a)	USA	N = 8,807 Mean age 47	M = 96 % W = 4 %	AUD, SUD or AUD-SUD Outpatient and inpatient	Recent SA (30 days before follow-up) One item of ASI	A total of 4 % of patients reported SA within 30 days in the 1 year follow up assessment. Severity of suicidal/psychiatric symptoms, alcohol problems and cocaine use are risk factors to attempt suicide 1 year after entering SUD treatment.
16	Ilgen et al., (2007b)	USA	N = 3,733 Mean age 33	M = 64 % W = 36 %	AUD, SUD or AUD-SUD Outpatient and inpatient	SA Ad hoc items	A total of 26 % of patients reported a lifetime SA and a 55 % presented multiple SA. A total of 4 % of patients reported a lifetime SA in 1-year follow up. There were two factors associated with a lower risk of SA: being at inpatient treatment compared with outpatient treatment and having received a longer SUD treatment. A total of 33 % of the patients reported SI in the past two weeks.
17	Ilgen et al., (2009)	USA	N = 488 Mean age 35.9	M = 76.3 % W = 23.7 %	General SUD Outpatient and inpatient	SI One item of PHQ-9	The current depressed affect is an important factor that explain the relationship between partner physical aggression and a higher presence of SI.
18	Ilgen et al., (2010)	USA	N = 3,733 Mean age 32	M = 72 % W = 28 %	General SUD Outpatient and inpatient	SI and SA Ad hoc items	A total of 20 % of the patients reported serious SI, and 23 % of the sample reported at least one SA. A presence of history of violence (physical or sexual abuse and engaging in prior violence) is more common among those who presented SI or SA compared with those who did not.
19	Karabulut et al., (2021)	Turkey	N = 132 Mean age (no specified)	M = 100 %	AUD and OUD Inpatient	SA Ad hoc items	NSSI, anger and nonplanning impulsivity predicted a history of SA. NSSI have a mediation role between borderline personality disorder and history of SA.
20	Kassie et al., (2022)	Ethiopia	N = 408 Mean age 31	M = 86.3 % W = 13.7 %	General SUD Outpatient and inpatient	SI SA Two item of the CIDI	A total of 48.5 % of the patients reported SI, and 28.9 % reported SA. Factors that were associated with both SI and SA were presented a family history of mental illness and a comorbid mental illness.
21	Landheim et al., (2006)	Norway	N = 260 Mean age 38.6	M = 71 % W = 29 %	AUD and PUD Outpatient and inpatient	SA One item of the CIDI	A total of 47 % of the sample had attempt suicide at least once in their life. Variables associated with SA were onset of SUD before 18 years old, being a woman and more than 15 years of duration of SUD.
22	Levola et al., (2022)	Finland	N = 10,605 Mean age (no specified)	M = 67.2 % W = 32.8 %	General SUD Outpatient and inpatient	Dead by suicide Data from the Official Statistics of Finland	The cause of dead in SUD patients was suicide in the 13,2 % of the cases. Suicide was more common among women with SUD than men with SUD.
23	López-Goñi et al., (2018)	Spain	N = 375 Mean age 37.3	M = 78.7 % W = 21.3 %	General SUD Outpatient and inpatient	SI and SA Four items of the EuropASI	A total of 43.7 % of the sample reported lifetime SI. A total of 17.7 % of the sample reported lifetime SA. A more severe SUD, more psychopathological symptoms, and the presence of lifetime psychological, physical, or sexual abuse were variables that differentiate patients with SI and SA from those without SI and SA.
24	López-Goñi et al., (2019)	Spain	N = 149 Mean age 37.6	M = 73.8 % W = 26.2 %	Patients with SI and general SUD Outpatient and inpatient	SA One item of the EuropASI	The prevalence of SA was 39.6 %. There were three variables that were related to SA among patients with SI: having experience delirium tremens, having been hospitalized for psychological problems, and having a greater severity in the psychiatric scale of the EuropASI.
25	Matsumoto et al., (2012)	Japan	N = 1420 Mean age 50.5	M = 78.4 % W = 21.6 %	General SUD Outpatient	Recent SR (in the last 30 days) Six items of the Japanese version of the MINI	A total of 34.9 % of the sample present severe SR. The variables associated with severe SR were younger age, being a woman, current depression, and polysubstance abuse.
26	Muneer et al., (2022)	Dubai	N = 103 Mean age 29.3	M = 92.2 % W = 7.8 %	General SUD Outpatient and inpatient	SI, SA and SR ASQ	The rate of SI was 31 %, and the prevalence of SA was 25.2 %. Risk factors that were more prevalent among those patients with SR were: exposure to domestic family violence, exposure to bullying at school/home/work, recent break up of a family relationship, and the presence of a major financial problem.
27	Rodríguez-Cintas et al., (2018)	Spain	N = 696 Mean age 41.78	M = 72.8 % W = 27.2 %	General SUD Outpatient	SI and SA Three items of the EuropASI	A total of 50 % of the sample reported SI, and 29.2 % reported at least one SA. SI and SA were both independently associated with: being woman, suffering violence (maltreatment -SA- or sexual abuse -SI-), PUD, borderline personality disorder, higher presence of depressive symptoms.
28	Siria et al., (2022)	Spain	N = 404 Mean age 38.1	M = 78.7 % W = 21.3 %	General SUD Outpatient and inpatient	SI and SA Two items of the EuropASI	The rate of SI was 26.5 %. A total of 7.4 % of the sample reported one SA, 8.4 % of whom reported two or more SAs. Patients with multiple SA showed higher rates of anxiety, psychopharmacological treatments, physical abuse, and sexual abuse than the patients with SI.

(continued on next page)

Table 3 (continued)

No.	Authors and year	Country	Sample size Age Study setting	Men and Women (%)	SUD diagnosis (general or specific) Type of treatment (outpatient or inpatient)	Type of lifetime suicidal behaviour and measure	Objective/Main findings/Conclusion
29	Tiet et al., (2006)	USA	N = 34,251 Mean age no specified	M = 97.1 % W = 2.9 %	General SUD Not specified	Recent SI and SA (30 days before baseline) Two items of the ASI	The variable related to having more than one SA was reporting greater severity in the psychiatric domain of the EuropASI. A total of 16 % of the patients reported SI in the past 30 days. A history of a SA was the main variable that discriminate those that committed a recent SA than those who did not (among patients with SI). Patients with difficulty in controlling violent behaviour presented higher risk of committing a recent SA. A total of 35.3 % of the sample reported a history of SA. Those patients with SA were younger, presented greater severity of addiction in employment, family/social and psychiatric domains.
30	Waller and Berry, (2016)	USA	N = 170 Mean age no specified HIV/AIDS population	M = 61.2 % W = 38.8 %	CoUD and OUD Patients with VIH Not specified	SA Two items of the ASI	

Note: AUD = Alcohol use disorder; OUD = Opiate use disorder; CUD = Cannabis use disorder; SedUD = Sedative use disorder; SHUD = Stimulant use disorder; CoUD = Cocaine use disorder; PUD = Polysubstance use disorder; HUD = Hallucinogens use disorder; BUD = Benzodiazepine use disorder; ASI = Addiction Severity Index; EuropASI = European version of ASI; L-SASI = The Lifetime Suicide Attempts Self-Injury Interview; DSHI = The Deliberate Self-Harm Inventory; LPC = The Lifetime Parasuicide Count; CHRT-SR = Concise Health Risk Tracking Self-Report; DIGS = Diagnostic Interview for Genetic Studies; PHQ-9 = Patient Health Questionnaire; CIDI = Composite International Diagnostic Interview; NIHWS = National Institute for Health and Welfare; MINI = Mini International Neuropsychiatric Interview; ASQ = Ask Suicide-Screening Questions; USA = United States of America; SI = Suicidal ideation; SA = Suicidal attempts; NSSI = Nonsuicidal self-injury; SR = Suicide risk.

SA [13, 14, 15, 23, 24, 27 and 28]. Studies found higher levels of psychotic symptoms and distress [13], elevated suicidal symptoms [15] and depressive symptoms [27] among others. In addition, comorbidity with other psychiatric disorders was an important factor to consider [7, 20, 21 and 27]. For example, the comorbidity with eating disorders, anxiety disorders, major depression and psychotic disorders.

Several studies associated a history of violence with an increased risk of SA [18, 23 and 27]. In particular, experience of psychological, physical and/or sexual abuse, in addition to SUD, was found to increase the risk of a lifetime SA.

Finally, regarding the characteristics of the type of treatment for SUD, several studies highlighted that inpatient modality was more effective in people with SUD and SA than outpatient modality [14 and 16]. Specifically, in terms of consumption, those in inpatient treatment reported less problematic use of alcohol and other drugs at the follow-up than those in outpatient treatment. In addition, those with a recent SA were more likely to remain abstinent if they received inpatient treatment. In terms of suicidal behaviour, people in inpatient treatment were less likely to have attempted suicide again than those in outpatient treatment. Furthermore, the duration of treatment was also pointed as a relevant aspect to be taken into account in SUD patients with suicidal behaviours. In particular, a longer treatment episode was significantly associated with a reduction risk of a post-treatment SA in this specific population.

3.4.3. Non suicidal self-injury (NSSI)

The prevalence of NSSI among SUD patients was between 33.3 %–36.5 % [2, 3]. NSSI, anger and nonplanning impulsivity predicted a history of SA [19] and cutting was the only NSSI method significantly associated with the presence of SA [3]. On the other hand, other study found that impulsivity variables showed no significant differences between patients with and without suicidal behaviours [2].

3.4.4. Other suicidal related classifications

Four of the studies included in this review focused on another type of suicidal behaviour such as suicide risk [25, 26], suicidality [6] and death by suicide [22]. Several factors were identified that were associated with suicide risk: younger age, being a woman, exposure to domestic family violence, exposure to bullying at school/home/work, recent breakup of a family relationship and current depression among others [25, 26].

Another suicidal related classification mentioned in the studies was having a history of suicidality [6]. Women were more likely to have a history of self-harm or attempted suicide and to have had recent thoughts of self-harm or suicide than men.

Regarding death by suicide, only one of the included studies addressed this issue [22]. These authors found that suicide was one of the causes of death among people with SUD and that it was more common among women than men.

3.4.5. Specific populations

Related to specific populations, one study was carried out with a deaf population [7]. The prevalence of past SI and past SA was 50.5 % and 42.1 %, respectively. Regarding gender, women were more likely to report both past SI and past SA. The presence of a past mental health diagnosis was associated with past suicidal behaviour, past SI, and past SA.

Other study was carried out with patients with HIV/AIDS [30]. A total of 35.3 % of the sample reported a history of SA. Those patients who had attempted suicide were younger and presented more employment, family, social and psychiatric problems.

One study [8] recruited a specific sample of SUD patients and who reported a history of lifetime sexual and/or physical abuse. The prevalence of suicidal behaviours was 62.2 % for lifetime SI, with 12.2 % presenting SI in the past 30 days, and 30.5 % for lifetime SA, with 1.2 % attempted in the past 30 days. There were no significant differences between men and women. In addition, among patients reporting lifetime

SI, almost half reported an SA (49 %), and among those who had attempted suicide, 44.5 % had more than one SA.

3.4.6. Main conclusions of the included studies

The main conclusions of the studies included in this scoping review were as follow: 1) There are several factors that appear to increase the risk of development of suicidal behaviour in patients with SUD. Therefore, these factors should be taken into account in both the assessment and treatment of these specific patients [1, 5, 11, 12, 17, 18, 20, 27, 28, and 29]. 2) In relation to the first conclusion, the need for more specific assessment and intervention for suicidal behaviour in SUD treatment is highlighted [4, 8, 9, 10, 11, 15, 21, 23, and 26]. 3) Finally, the need for further research into treatment response in patients with suicidal behaviour and SUD is highlighted [7, 13, and 24].

4. Discussion

This is the first scoping review addressing the existing evidence about the presence of suicidal behaviours in people undergoing treatment for SUD. Taking into consideration the inclusion criteria that were established, 30 publications were included in the final decision. Despite the large number of studies that address the relationship between SUD and suicidal behaviour, no research has been found that considers suicide as a continuum. This is one of the main findings of the current review.

A previous traumatic experience such as physical, sexual or psychological abuse and intimate partner violence has also been associated with SI [8, 17, and 27] and SA [7, 23, 27, and 28]. In fact, in one of the studies in this review, half of the sample who had a lifetime history of abuse and reported SI had attempted suicide [8]. These results are consistent with a study that evaluated the differential profile of patients in treatment for SUD with and without a history of physical and/or sexual abuse. In fact, this study showed that those with a history of abuse had a higher prevalence of lifetime suicide attempts and a higher number of attempts compared to those without a history of abuse (Haro et al., 2021). In addition, general population studies have shown that the specific type of abuse suffered in intimate partner violence is associated with higher rates of lifetime SI (Wolford-Clevenger et al., 2016) and SA (Puig-Amores et al., 2022). And when substance use comes into play, the risk of engaging in behaviours such as self-harm, SI or SA increases (Sumami et al., 2019). This shows the high impact of having suffered a traumatic experience in this specific population and the need for SUD treatments to address this aspect.

Furthermore, in terms of gender, there is a higher prevalence of both having a history of abuse (physical, emotional and/or sexual) and being a survivor of intimate partner violence among women. This makes them more likely to end up developing suicidal behaviour (Devries and Seguin, 2013; McManus et al., 2022; Tabb et al., 2018). In fact, women have shown a greater risk of presenting any of these behaviours (SI, SA and death by suicide), which are part of the suicide continuum [1, 6, 7, 11, 12, 21, 22, and 27]. This finding is directly related to the results of other studies, which have shown that women with SUD have a higher severity profile than men (El Habiby et al., 2020; Fernández-Montalvo et al., 2017; McHugh et al., 2018). Therefore, being a survivor of violence should be considered as a factor that affects suicidal risk in SUD patients.

Another characteristic associated with SI and SA is the presence of mental health problems (family mental health problems and/or a comorbid mental health problem) [7, 20, 23, 27, 28, 30]. This finding is in line with a recent study on the prevalence of family mental health problems in a specific SUD population. This study showed that women with SUD who had had family mental health problems had higher rates of SA compared to women with SUD without these problems (López-Goñi et al., 2023). Related to the psychopathological profile, SUD patients with SA present a greater severity of addiction in terms of duration and early onset, among others [21, 23, and 30]. This highlights

that suicidal behaviour exacerbates the symptomatology of this specific population, underlining the importance of implementing its assessment and treatment in SUD treatment programmes.

Related to SUD treatment setting, two studies suggest that inpatient modality is more effective for people with SUD and SA compared to outpatient modality. This statement might be overly broad because inpatient and outpatient are treatment settings rather than specific therapeutic modalities. Therefore, it would be necessary to assess whether the specific type of treatment carried out in each addiction treatment programme influences suicidal behaviour. In any case, addiction treatment presents an opportunity to address not only substance use problems but also associated issues like adverse childhood experiences (Leza et al., 2021), intimate partner violence (Fernández-Montalvo, Arteaga, et al., 2019), and trauma intervention (López-Goñi et al., 2021). Treatment for SUD should consider integrated trauma-focused approaches to decrease SI and SA among women exposed to violence. Two recent studies have tested preventive interventions for suicidal behaviour in addiction treatment, yielding limited yet promising results (Ilgen et al., 2023; Ries et al., 2022). Further exploration of such experiences is essential for comprehensive attention to issues linked with addictive behaviours.

Our review shows that the phenomenon of NSSI (including the presence/absence of NSSI and the method used) could play a role in suicide attempts [2, 3, 19, and 29]. Only two studies that have included this behaviour have reported prevalences of 33.3 % and 36.5 % [2, 3]. In addition, a possible link between NSSI methods, impulsivity and SA has been proposed [19, 29]. However, the inclusion of NSSI in the continuum of suicide remains controversial (Ferreira-Bruco et al., 2018; Klonsky et al., 2013).

The results should be interpreted cautiously due to the following limitations. First, the inclusion criterion of patients in treatment with SUD diagnosis instead of using a broader concept of substance consumption might have limited the results of this scoping review. Some studies could have been overlooked, so additional research could address this limitation. Second, there is no a single criterion to evaluate suicidal behaviour. To address this problem, some studies use few items from instruments that are not focused on suicidal behaviour evaluation. Other studies employed items ad hoc without previous validation. In fact, only 3 studies had evaluated it with a standardised and specific instrument. A more rigorous evaluation of suicidal behaviour is needed. Third, most of the studies were cross-sectional. This prevents an accurate assessment of the suicide continuum, as only a single assessment was made at baseline. A single measure makes it impossible to follow-up suicidal behaviour during treatment. For its adequate evaluation, it is important to conduct several measures over time, so longitudinal studies are recommended. In addition, most studies focused exclusively on one aspect, such as SA and/or SI. None of them considered the whole continuum. Thus, a comprehensive approach to the evolution of suicidal behaviour during treatment in this population and the address of the different manifestations of suicidal behaviour is needed. This is an important line of future research. The cross-sectional design of most of the studies included in this review also makes it difficult to establish firm conclusions regarding the factors related to suicidal behaviour in SUD population, what would also be addressed by carrying out longitudinal studies. Fourth, SUD treatment characteristics and modality are variables that have been little studied. The modality of addiction treatment (outpatient or inpatient) can play a role in suicidal behaviour research. Inpatients used to have a higher addiction severity profile than outpatients (Andersson et al., 2022; López-Goñi et al., 2017; López-Goñi et al., 2018). Unlike the procedure of most of the studies selected, it could be interesting to compare patients from both modalities in terms of prevalence, evolution, and severity of suicidal behaviour. A better comprehension of these variables in suicidal behaviour could contribute to the development of tailored addiction treatment programmes.

Finally, the study of NSSI and its relationship with suicidal behaviour should be addressed. Although it was not the aim of this study, a

potential new line of research can be highlighted. It would be interesting for future studies to further explore the role that NSSI plays in suicidal behaviour in SUD population.

5. Conclusion

This scoping review has highlighted the high prevalence of suicidal behaviour in patients being treated for SUD. People in treatment for SUD with suicidal behaviours are a particularly vulnerable group and are at risk of dying by suicide. Therefore, it is important for clinicians and researchers to have a strong understanding of the existing research so that they can better support these individuals during treatment. In this way, the treatment of addictive behaviours is an opportunity to explore and address suicidal behaviours. The main risk factors for suicidal behaviour in people with SUD are: being women, having a previous traumatic experience (physical, psychological and/or sexual abuse and intimate partner violence) and having a history of mental health problems (family mental health problems or comorbid mental health disorders). Despite the harmful consequences of this problem, the main gap found in this review is the failure to consider suicide as a continuum, which begins with ideation and may continue with planning, attempt and/or death. The assessment of this continuum is important in this specific population due to the high prevalence of these behaviours. In fact, it seems that the severity of the addiction increases as the severity of suicidal behaviour increases. In addition, and related to the previous gap, another gap found is the heterogeneity in the assessment of suicidal behaviours and the limited use of specific instruments. Due to the preventable nature of suicidal behaviour, the scarce recommendation of prevention strategies focused on reducing the progression of these behaviours along the continuum of suicide is worrisome. Therefore, there is a need for future research in which suicide is considered as a continuum as well as a need for professionals to assess these behaviours in SUD patients with standardized criteria. These measures will facilitate the development of tailored treatments that take into account the specific needs of each patient.

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CRediT authorship contribution statement

Leire Leza: Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **Begoña Haro:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **José J. López-Goñi:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Javier Fernández-Montalvo:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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