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Risk factors for revictimization during treatment in patients with co-occurring SUD and PTSD

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ABSTRACT

Introduction: A host of cross-sectional studies have identified problematic substance use and post-traumatic stress symptoms as risk factors for repeated interpersonal violence (revictimization) in college samples. However, it remains unclear which factors are associated with revictimization for patients who meet diagnostic criteria for both substance use disorder (SUD) and post-traumatic stress disorder (PTSD). The identification of factors associated with revictimization is an important step towards preventing violence against people with psychiatric disorders and can inform treatment.

Method: Data were based on the Treatment of PTSD and Addiction (TOPA) study, a randomized controlled trial including $N=209$ patients that received inpatient and outpatient treatment for SUD and PTSD. We selected participants who had experienced interpersonal victimization at baseline ($N=203$) and assessed revictimization across the 9-month follow-up period. Revictimization included: physical violence, violence with a gun, sexual violence, and 'other unwanted sexual experience'. The risk factors we investigated were severity of PTSD, severity of alcohol and drug use disorder, interpersonal difficulties, sex, and age. We analysed the data using logistic regression analyses with multiple imputation for missing data.

Results: Physical violence was the most common type of revictimization during the study period (26.0%), closely followed by 'other unwanted sexual experience' (20.0%). The severity of PTSD and age were univariate predictors for revictimization; however, only age was robustly related to revictimization while accounting for other study variables. We conducted sensitivity analyses with complete cases and observed data.

Discussion: Approximately two in five individuals experienced revictimization across the 9-month follow-up period, underscoring it as a clinically relevant issue. Since age emerged as the only risk factor for revictimization in our sample, future research should focus on identifying modifiable factors associated with age, e.g. impulsivity and novelty seeking. These factors may be addressed in interventions aimed at reducing the risk of revictimization.

Factores de riesgo de revictimización durante el tratamiento en pacientes con TUS y TEPT concurrente

Introducción: Diversos estudios transversales han identificado el uso problemático de sustancias y síntomas de estrés postraumático como factores de riesgo para violencia interpersonal repetida (revictimización) en muestras universitarias. Sin embargo, aun no está claro qué factores se asocian con la revictimización de los pacientes que reúnen los criterios diagnósticos tanto para trastorno por uso de sustancias (TUS) como para trastorno de estrés postraumático (TEPT). La identificación de los factores asociados con la revictimización es un paso importante hacia la prevención de la violencia contra personas con diagnósticos psiquiátricos.

Método: Los datos se basaron en el estudio Tratamiento del TEPT y Adicción (TOPA), un ensayo controlado aleatorizado que incluyó $N=209$ pacientes que recibieron tratamiento hospitalario y ambulatorio para TUS y TEPT. Se seleccionaron participantes que habían experimentado victimización interpersonal al inicio ($N=203$) y se evaluó la revictimización a lo largo de los 9 meses de seguimiento. La revictimización incluyó: violencia física, violencia con armas de fuego, violencia y otras experiencias sexuales no deseadas. Se analizaron los datos utilizando análisis de regresión logística con imputación múltiple para los datos faltantes.

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HIGHLIGHTS

- In patients who received treatment for substance use disorder (SUD) and post-traumatic stress disorder (PTSD), 42.5% experienced revictimization within nine months of treatment onset.
- The most common types of revictimization were physical violence and unwanted sexual experiences, followed by sexual violence, and violence with a gun.
- The severity of PTSD and age were univariate risk factors for revictimization; however, only age was robustly related to revictimization while accounting for the other study variables. Younger age was associated with a higher risk for revictimization.

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Resultados: La severidad del TEPT y edad fueron predictores univariados para la revictimización durante el tratamiento; sin embargo, solo la edad se asoció de forma independiente con la revictimización. La violencia física fue el tipo de revictimización más frecuente durante el periodo del estudio (26.0%), seguida de cerca por otras experiencias sexuales no deseadas (20.0%).

Discusión: Aproximadamente dos de cada cinco individuos experimentaron revictimización durante el periodo de seguimiento de 9 meses, lo que lo convierte en un problema clínico relevante. Dado que la edad se identificó como el único factor de riesgo de revictimización en nuestra muestra, las investigaciones futuras deberían focalizarse en la identificación de los factores modificables asociados a la edad para fundamentar intervenciones orientadas a la reducción del riesgo de revictimización en personas más jóvenes.

People diagnosed with a psychiatric disorder are at increased risk of experiencing interpersonal violence, defined as physical assault, sexual assault, or threat of assault (Christ et al., 2020; de Waal et al., 2017; Dean et al., 2018; Khalifeh et al., 2016; Maniglio, 2009; Teasdale et al., 2014). According to an epidemiological study in the Netherlands, individuals with a severe psychiatric disorder were 14 times more likely to be the victim of interpersonal violence than the general population (Kamperman et al., 2014). The repeated exposure to interpersonal violence such as physical assault, sexual assault, or threat of assault is called revictimization. Revictimization can occur during the same developmental period (e.g. physical and sexual assault during childhood) or across multiple developmental periods (e.g. physical assault in childhood and sexual assault in adulthood). Revictimization has been associated with psychiatric disorders such as post-traumatic stress disorder (PTSD) and substance use disorder (SUD; Grundmann et al., 2018; Messman-Moore et al., 2009).

PTSD is a salient psychiatric disorder in the context of (re-)victimization, as its diagnosis in the DSM-5 requires the symptoms of PTSD to be the consequence of exposure to life-threatening circumstances such as physical/sexual violence, threat of violence, or serious illness (American Psychiatric Association, 2013). Studies in community and veteran samples have indicated that the severity of PTSD symptoms and female gender were associated with an increased risk for revictimization (Jaffe et al., 2019; Scoglio et al., 2022; Ullman, 2016). Further evidence for the role of PTSD symptoms as risk factors for revictimization has been summarized in several recent systematic reviews (Fereidooni et al., 2024; Kühner, Verdaasdonk, et al., 2025; Scoglio et al., 2021). Conversely, one systematic review has shown that the odds of revictimization were the highest in the group that experienced revictimization as compared to revictimization as compared to the group that experienced victimization (Cividanes et al., 2019). However, the systematic review by Cividanes et al. (2019) included

mostly cross-sectional studies (8/9), meaning that we cannot conclude whether PTSD was a consequence or risk factor for revictimization. Taken together, these studies suggest the possibility of a bidirectional relationship between exposure to interpersonal violence (victimization/revictimization) and the development of PTSD, potentially resulting in a vicious cycle for survivors. A potential pathway linking PTSD (symptoms) and revictimization is a diminished ability to detect danger cues that can result from continuous hyperarousal or normalization of dangerous behaviours through previous experiences (DePrince, 2005). Several studies have indicated that emotion dysregulation is associated with both PTSD and revictimization indicating that emotion dysregulation may be a shared vulnerability for both PTSD and revictimization (Walker & Wamser-Nanney, 2023). Another study in adult survivors of childhood maltreatment, a majority of whom met criteria for probable PTSD, indicated that self-blame and shame were mediators for the pathway between childhood maltreatment and adulthood revictimization (Langer & Neuner, 2021).

Importantly, PTSD frequently co-occurs alongside SUD with 46% of people with PTSD also meeting diagnostic criteria for SUD (Pietrzak et al., 2011) and 37% of people with SUD also meeting diagnostic criteria for PTSD (Gielen et al., 2012). People with comorbid SUD/PTSD present with a more severe and complex clinical profile than people with stand-alone SUD or PTSD (Schäfer & Najavits, 2007). Moreover, people with comorbid SUD/PTSD show less symptom improvement and shorter time to relapse in response to treatment (Najavits et al., 2010; Roberts et al., 2015). Multiple theoretical accounts have been proposed to explain the high rates of co-occurring SUD and PTSD. The self-medication hypothesis posits that people with PTSD use substances to seek relief from the PTSD symptoms such as intrusions, nightmares, negative changes in mood and cognitions (Khantzian, 1997). Alternatively, the shared factors theory proposes that the development of PTSD and

SUD can be traced to a shared vulnerability for these disorders (McLeod et al., 2001). The susceptibility hypothesis suggests that people who use substances have a higher chance of developing PTSD when exposed to a potentially traumatic event (Chilcoat & Breslau, 1998). Lastly, the high-risk hypothesis proposes that substance use itself brings people into high-risk situations which increases the chance to encounter a potentially traumatic event and consequently develop PTSD (Windle, 1994). Given the substantial co-occurrence and increased impairments, it is important to examine how both PTSD and SUD may contribute to increased risk for revictimization.

Multiple studies have demonstrated an association between problematic substance use and risk for sexual revictimization in college women (Anderson et al., 2020; Cusack et al., 2021; Messman-Moore et al., 2009; Messman-Moore et al., 2013) and college men (Charak et al., 2019). Studies have revealed complex interactions between symptoms of PTSD and SUD that cumulatively increase the risk of revictimization in non-clinical samples. Specifically, PTSD symptoms were associated with problematic substance use which was in turn associated with sexual revictimization (Ullman et al., 2009; Walsh et al., 2014). In another study in female college students, adult sexual revictimization was associated with concurrent PTSD symptoms and problematic alcohol use as well as future drinking to regulate problems, and alcohol problems (Hannan et al., 2017). Further evidence suggests that both substance use and post-traumatic stress symptoms were associated with adult sexual/intimate partner violence revictimization after childhood maltreatment in a female college sample (Walker et al., 2024). In sum, problematic substance use and symptoms of PTSD have been associated with revictimization in a number of studies. However, most studies were conducted in female college samples, leaving a gap regarding the risk factors for revictimization in clinical populations with SUD/PTSD who may be at even higher risk for revictimization. These results underline the importance of conducting longitudinal research on risk factors for revictimization in individuals with co-occurring SUD and PTSD to establish temporal precedence and disentangle risk factors from consequences of revictimization.

One of the characteristics of patients with co-occurring SUD and PTSD are interpersonal problems (Back et al., 2009). Interpersonal problems, such as interpersonal aggression and need for social approval, have been associated with increased risk for victimization in persons with psychiatric disorders (Stepp et al., 2012). Moreover, in a sample of SUD patients who also met criteria of at least one other psychiatric disorder, interpersonal problems were associated with victimization (de Waal et al., 2018). However, little is known about the longitudinal association between

interpersonal problems and revictimization in individuals with co-occurring SUD and PTSD. Thus, there is evidence that patients with SUD/PTSD experience problems in interpersonal relationships and only one study has examined whether interpersonal problems are associated with victimization in patients with SUD (de Waal et al., 2018). Therefore, it is important to examine whether interpersonal problems may be a risk factor for revictimization in patients with SUD/PTSD.

Additionally, female gender is one of the most well-established risk factors for (re-)victimization in people diagnosed with psychiatric disorders (de Waal et al., 2018; Grundmann et al., 2018). In a cohort study of survivors of childhood sexual abuse (CSA), female gender was associated with sexual revictimization (Papalia et al., 2021). In the same study, male gender was associated with violence revictimization (i.e. physical assault, assault with a weapon) and non-violence revictimization (i.e. property crime/theft; Papalia et al., 2021). A recent systematic review has summarized evidence that female gender is a risk factor for adulthood revictimization after CSA (Scoglio et al., 2021). Male gender on the other hand was associated with a higher risk of physical revictimization in a population-based study (Amstadter et al., 2011). Another demographic factor associated with a higher risk for (re-)victimization was lower educational background (Bellot et al., 2024; de Waal et al., 2018). Moreover, younger age was associated with an increased risk for victimization (de Waal et al., 2018) but not revictimization (Christ et al., 2022) in two clinical samples. The scarcity of research on age as a risk factor for revictimization in clinical samples underlines the importance of investigating this association.

Most studies in the field of revictimization to date have focused on the retrospective assessment of sexual revictimization in college women (Fereidooni et al., 2024; Scoglio et al., 2021; Walker et al., 2019). As a result, much less is known about (a) risk factors for other types of revictimization, (b) risk factors for revictimization in clinical samples, specifically during and shortly after treatment, and (c) the directionality of the associations between potential risk factors and revictimization. Knowledge of these factors and associations is relevant to inform future interventions to diminish the chances of revictimization.

Against this background, we investigated the prevalence and baseline predictors for revictimization in patients who received treatment for SUD and PTSD. We hypothesized that PTSD-severity, problematic alcohol use, problematic drug use, and interpersonal problems, all measured at the start of treatment, would predict revictimization during and shortly after treatment for PTSD. We also expected that female gender and lower age would be associated with a higher risk of revictimization during and

shortly after treatment for PTSD. To test our hypotheses, we analysed data from a randomized controlled trial on treatment for co-occurring SUD and PTSD. The occurrence of revictimization was measured during the study period of nine months. Potential risk factors for revictimization were assessed at baseline.

1. Method

1.1. Design of the RCT

This study used data of the Treatment of PTSD and Addiction (TOPA) study, a Dutch Randomized Controlled Trial (RCT) conducted at two departments of Jellinek, a SUD treatment centre. Jellinek offers both inpatient and outpatient care, delivered through one of three evidence-based treatment modalities: cognitive behavioural therapy (CBT), acceptance and commitment therapy (ACT), and 12-step care (Minnesota model). Participants in this trial ($N = 209$) were SUD treatment seeking patients with co-occurring PTSD. The RCT had a single blind 6-armed design, consisting of two treatment timings (simultaneous vs. sequential treatment of PTSD) each consisting of 3 arms of PTSD treatment types (Prolonged Exposure vs. Eye Movement Desensitization and Reprocessing vs. Imagery Rescripting). In addition to the treatment as usual for their SUD, participants either received simultaneous PTSD treatment (within two weeks of the start of their SUD treatment) or sequential PTSD treatment (3 months after the start of their SUD treatment). PTSD treatment consisted of a maximum of 12 sessions delivered within a period of three months. SUD treatment was not modified for the purpose of this trial and followed treatment-as-usual procedures, typically comprising approximately three months of

primary treatment followed by three to six months of aftercare. The study was approved by the Medical Ethical Committee of the Amsterdam Academic Medical Centre (AMC) and registered at the 'Netherlands Trial Register' (NTR L7885). For more details about the study design, we refer to the published study protocol article (Lortye et al., 2021).

1.2. Current study design

For the purposes of the current study, participants were included if they reported having experienced interpersonal victimization during their lifetime at baseline, as indicated by the LEC-5 ($N = 203$). The 6-armed design of the original RCT was collapsed into a single cohort, as treatment assignment was not relevant to the investigation of baseline risk factors for revictimization. We included baseline data with regard to PTSD-severity, SUD-severity, and interpersonal problems. In addition, we used sociodemographic variables such as age, sex, educational level, and treatment setting (inpatient vs. outpatient care) of their addiction treatment. Additionally, we used data on revictimization, collected at all three follow-up timepoints.

1.3. Participants and procedures

During the regular intake procedure at Jellinek, all patients filled in a 4-item PTSD screener specifically designed for SUD-patients based on DSM-criteria of PTSD(J-PTSD; van Dam et al., 2013). Patients with a positive J-PTSD were invited for an interview to determine a diagnosis of PTSD, using the clinician-administered PTSD scale (CAPS-5; Weathers et al., 2018). Patients who met diagnostic criteria for PTSD were informed about the study and received written study information containing the study's background and purpose, procedures (including treatment and assessments) and data handling and confidentiality. Written informed consent was obtained, confirming that participants had read and understood the information, agreed to voluntary participation and potential withdrawal, and provided permission for data use. After receiving informed consent, participants were invited for an inclusion interview by our junior researchers (MSc in Psychology). In this inclusion interview, patients were screened for the inclusion and exclusion criteria of the trial through a structured interview. Potential participants were invited for a baseline assessment (T0) approximately 2 weeks before the start of their SUD treatment. Baseline assessment consisted of a combination of a clinician administered structured interview and self-report questionnaires. In total, participants of the trial had four assessments: a baseline assessment and three follow-up assessments at 3-months, 6-months and 9-months after the

Table 1. Descriptives for the sample at baseline ($N = 203$).

	N	%
Mean age M (SD)	37.5 (12.0)	
Female Sex	96	47.3
Country of birth		
Kingdom of the Netherlands	174	85.7
Other European country	9	4.4
Other country (outside Europe)	20	9.9
Income		
Paid work	104	51.2
No paid work	99	48.8
Educational background		
No degree, primary school, secondary school lower level	51	25.1
Secondary school, higher level	85	41.9
Post-secondary	64	31.5
Other	3	1.5
Primary substance use disorder (SUD)		
Alcohol	96	47.3
Cannabis	68	33.5
Cocaine	20	9.9
Sedating substances (e.g. benzodiazepines)	7	3.4
Other	12	5.9

Note: Kingdom of the Netherlands includes (former) Dutch countries of the Netherlands, Suriname, Curacao, Aruba, and Sint Maarten.

baseline. After completing the baseline assessment, participants were randomly allocated to one of six conditions (simultaneous/sequential * 3 types of PTSD treatment: Prolonged Exposure/EMDR/Imagery Rescripting).

Inclusion criteria of the RCT were (a) aged 18 years or older; (b) SUD(s) according to the DSM-5 (SCID-5-S, American Psychiatric Association, 2018), with a primary diagnosis involving one of the following substances: alcohol, cannabis, cocaine (snorting), amphetamine, benzodiazepine, opioid; (c) PTSD according to the DSM-5 criteria; (d) sufficient understanding of the Dutch language to be able to fill out Dutch questionnaires and follow therapy in Dutch (Lortye et al., 2021). Exclusion criteria were: (a) acute psychotic disorder; (b) intellectual disability or cognitive impairment (estimated IQ < 70); and current (c) physical or sexual abuse or death threats; (d) acute suicidal behaviour (high suicide risk and suicide attempt in the last 3 months); (e) life threatening self-injury; (f) homelessness; (g) involvement in a compensation case or legal procedures concerning admission or stay in the Netherlands, (h) involvement in legal procedures regarding the index trauma, (i) engagement in any other current PTSD treatment.

Table 1 shows the description of the study sample at baseline ($N = 203$). Participants, men and women, were between 20–67 years old. Most participants were born in the Netherlands and near half of them had paid work. Alcohol use disorder (47.3%) and cannabis use disorder (33.5%) were most commonly reported as the primary SUD. Data were available for $n = 161$ at timepoint 1 (three months after baseline), $n = 145$ at timepoint 2 (six months after baseline), and $n = 149$ at timepoint 3 (nine months after baseline). Across all three follow-up timepoints, $n = 27$ participants had missing data on all timepoints, $n = 25$ had missing data for one timepoint, $n = 24$ had missing data for two timepoints, and $n = 127$ had complete data for all time points.

1.4. Measures

PTSD-severity. To establish a PTSD diagnosis and assess the severity of PTSD symptoms, the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5) was used (Boeschoten et al., 2018). The CAPS-5 is a structured interview following the PTSD diagnostic criteria of the DSM-5, targeting symptom onset and duration as well as subjective distress and impairment. It consists of 30 items, with scores ranging from 0 ('Absent') to 4 ('Extreme'). A total symptom severity score is calculated by summing the scores from item 1 to 20, resulting in a range from 0–80 ascending in severity. The psychometric properties of the Dutch translation of the CAPS-5 have been found to be adequate in a sample of Dutch individuals with diverse trauma

backgrounds (Boeschoten et al., 2018; Weathers et al., 2018). The internal consistency of the symptom severity scale was acceptable ($\alpha = .73$) in the current sample.

Alcohol and drug use related problems. To assess problems related to alcohol use, the Dutch version of the Alcohol Use Disorder Identification Test (AUDIT) was used, and the Dutch version of the Drug Use Disorders Identification Test (DUDIT) was used to assess problems related to drug use. Both instruments were developed by the World Health Organization (WHO) as parallel instruments to measure problems related to alcohol and drug use. The AUDIT consists of 10 questions covering three domains: hazardous alcohol use, dependence symptoms and harmful alcohol use in the past year. Each item is scored on a scale from 0 to 4. A total severity score is calculated by summing the item scores, resulting in a range from 0–40, with higher scores indicating more severe alcohol use and related problems (Babor et al., 2001). A systematic review demonstrated that the AUDIT possesses good psychometric properties across diverse samples and contexts (de Meneses-Gaya et al., 2009). Specifically, the Dutch version has shown to be a reliable screening instrument (Hildebrand & Noteborn, 2015). In the current sample, the internal consistency of the total severity scale was excellent ($\alpha = .94$). The DUDIT consists of 11 items measuring drug use and related problems over the past year. Nine items are scored on a 5-point scale (0–4), while two items are scored on a 3-point scale with values of 0, 2, and 4. The total severity score is a sum score of all items, ranging from 0 to 44, with higher scores indicating more severe drug use and related problems (Hildebrand, 2015). The Dutch version of the DUDIT has also been found to be a reliable screening instrument (Hildebrand & Noteborn, 2015). In the current sample, the internal consistency of the total severity scale was excellent ($\alpha = .93$).

Interpersonal Problems. The Inventory of Interpersonal Problems – Short Form (IIP-32) is a brief version of the original IIP and assesses interpersonal difficulties across two domains: behaviours participants find difficult to engage in (e.g. 'join in groups') and behaviours they tend to overdo (e.g. 'get irritated'). The instrument comprises 32 items rated on a 5-point scale (0–4), with higher scores indicating greater interpersonal problems. Items are grouped into eight subscales representing different types of interpersonal problems: domineering/controlling, vindictive/self-centred, cold/distant, socially inhibited, non-assertive, overly accommodating, self-sacrificing, and intrusive/needy. The IIP-32 has demonstrated good internal consistency and test–retest reliability (Bailey et al., 2018; Horowitz et al., 1988). The

Dutch translation of the IIP-32 has also shown acceptable psychometric properties, in both a clinical sample and a college sample (Vanheule et al., 2006). Considerable correlations were found between the IIP-32 subscales in our sample, with correlations ranging from $r = .689$ to $r = -.042$. Due to several high interscale correlations and a risk of multicollinearity, a principal component analysis (PCA) with Varimax rotation on all 32 items of the IIP-32 was performed. Based on the screen plot, three independent factors were found: a subassertiveness factor (IIP Factor 1), a submissiveness/pleasing factor (IIP Factor 2) and a factor of social dysfunction with aggressive features (IIP Factor 3). All factors have an eigenvalue of >2.5 and the total explained variance of the factors was 46.0%. Creating four or five factors did not result in a substantially higher amount of variance explained and the eigenvalues of those factors were substantially lower. Items were included in a factor if they loaded >0.45 on that factor and loaded $<.035$ on other factors. The three factors are displayed in Appendix 1, including factor loadings and the original subscales of the items. The score of each IIP-32 factor is calculated as the mean score of all the items in that factor. The internal consistency of the factors was ranging from acceptable to good (Factor 1 $\alpha = .78$; Factor 2 $\alpha = .83$; Factor 3 $\alpha = .74$). Correlations between the new subscales were moderate, with the highest correlations found for Factor 1 and Factor 2 ($r = .43$) and Factor 1 and Factor 3 ($r = .34$).

Revictimization. Victimization at the baseline assessment, and revictimization at follow-up assessments, were assessed based on data from the Life Events Checklist for DSM-5 (LEC-5). The LEC-5 is a standardized self-report measure designed to assess exposure to a range of potentially traumatic events across the lifetime (Weathers et al., 2013). The LEC-5 includes 17 items related to different types of potentially traumatic events and has demonstrated good reliability and validity in various populations. For the purposes of this study, we specifically focused on four items (items 6 through 9) from the LEC-5 related to the experience of interpersonal trauma. These items regard to the experience of physical assault, assault with a weapon, sexual assault and other unwanted or uncomfortable sexual experiences. At the baseline assessment, participants who answered 'yes' to one or more of these items were classified as having experienced victimization in their lifetime and were included in the current study. At the follow-up assessments, we used an adapted version of the LEC-5 to assess participants' exposure to interpersonal victimization in the past three months. Participants who answered 'yes' to one or more of the items (6 through 9) assessing interpersonal victimization were classified as having experienced

revictimization in the past 3 months at that follow-up time point. Subsequently, the data were consolidated into a single binary outcome variable indicating whether the participant had been revictimized at any timepoint (3, 6 and/or 9-month follow-up) during the study follow-up period.

1.5. Statistical analysis

Analyses were conducted in R version 4.2.2., $p < .05$ was chosen as a threshold for statistical significance. All reported p -values are two-tailed. Given our dataset with $N = 203$ and a two-sided alpha of .05, we had 80% power to detect a medium effect size of $r > .19$. Therefore our study was underpowered to detect small effect sizes.

Baseline data were complete, and thus data on the predictor variables were complete. Data on the outcome variable revictimization (at one or more follow-up timepoints) were missing for 37.3% of participants. Missing data were assumed to be missing at random (MAR) for the purposes of our primary analyses and were imputed using multivariate imputation by chained equations (MICE) in R. Data on revictimization were imputed separately for each follow-up time point (3-month, 6-month, 9-month), using a stepwise approach. For imputation at 3-month follow-up, only baseline variables were included as predictors. For 6-month follow-up, baseline variables and revictimization at 3-month follow-up were used. For 9-month follow-up, the imputation model included baseline variables as well as revictimization data from both 3-month follow-up and 6-month follow-up.

Using the R package mice version 3.15.0, we created 25 multiple imputed datasets with 20 iterations. Selection of predictor variables for the imputation model was based on their relation to either missingness or to the imputed variable. To assess the robustness of our findings, we conducted two sensitivity analyses. First, we performed a complete case analysis, including only participants with available revictimization data at all three follow-up assessments. Second, we conducted an analysis using the observed (non-imputed) data, in which revictimization outcomes were based solely on available follow-up assessments. Participants were included if they had data on revictimization for at least one follow-up assessment.

For the analyses, we started with an examination of the relationships between the predictor variables with a correlation matrix. Since data was complete at baseline, the correlation matrix was based on the observed data. Only the severity of PTSD and Factor 1 of the IIP-32 showed a normal distribution. Therefore, we conducted Pearson correlations between these variables and Spearman's rho between the other study variables. After this point, we conducted all analyses

in both our primary analysis strategy (based on multiple imputation) and our sensitivity analyses (complete case analysis and observed data). Model assumptions were examined and met for all analyses. First, we conducted separate univariate logistic regression analyses to examine the association between each predictor and revictimization. Subsequently, all predictors were entered simultaneously into a multivariate logistic regression model to assess their unique contributions while adjusting for the effects of the other variables. Potential confounding variables were examined, and based on theoretical relevance and data inspection, educational level and treatment setting (inpatient vs. outpatient addiction care) were selected as covariates for all analyses. Results of the logistic regressions were pooled using Rubin's rules in the primary analysis. To assess model fit, we performed the Hosmer–Lemeshow goodness-of-fit test ($g = 10$) and calculated the pseudo R^2 statistic for all regression analyses.

2. Results

2.1. Clinical characteristics of the sample

Table 2 shows the clinical characteristics of the sample at baseline. All participants met diagnostic criteria for PTSD, based on the CAPS-5, with a mean severity score of $M = 37.4$, $SD = 9.3$, and SUD according to DSM-5 criteria assessed during intake. We chose to describe the median and interquartile range (IQR) for variables that did not show a normal distribution.

2.2. Correlation of study variables at baseline

The predictors shared small to moderate correlations, see Table 3.

2.3. Incidence of revictimization

We examined the incidence of any new endorsement of revictimization (yes/no) across timepoints for the

Table 2. Clinical characteristics of the sample at baseline ($N = 203$).

	Median	IQR
PTSD-severity M , SD	37.4	9.3
Problematic alcohol use	13.0	3.0–27.0
Problematic drug use	19.0	2.0–29.0
Number of SUDs M , SD	1.6	0.8
IIP Factor 1	10.0	5.0–13.0
IIP Factor 2	14.0	10.0–18.0
IIP Factor 3	5.0	3.0–8.0

Notes: SD = standard deviation, IQR = interquartile range, SUD = substance use disorder. The mean PTSD-severity was based on the CAPS-5 score (range 0–80), the median problematic alcohol use was based on the AUDIT score (range 0–40), the median problematic drug use was based on the DUDIT score (range 0–44). Based on the PCA, Factor 1 of the IIP contains items measuring subassertiveness, Factor 2 contains items measuring submissiveness/pleasing, and Factor 3 contains items measuring social dysfunction with aggressive features.

(a) imputed estimates across all $m = 25$ datasets, (b) observed data, and (c) complete cases, see Table 4. The main outcome parameters are the pooled estimates based on the imputed datasets. At timepoints 1 and 2, the most prevalent revictimization incident was physical violence. At timepoint 3, other unwanted sexual experience was the most prevalent revictimization incident. The highest rates of revictimization are observed at timepoint 1 after which they decrease throughout the study period.

2.4. Prediction of revictimization

The main analysis was conducted on the $m = 25$ imputed datasets and all results are pooled estimates. Table 5 shows that in the univariate logistic regression analyses, the severity of PTSD and age were associated with revictimization during the study period. Notably, a higher severity of PTSD was associated with an increased risk of revictimization ($OR = 1.05$). A higher age was negatively associated with the risk of revictimization ($OR = 0.94$). In the multiple regression model, age remained the only factor that was (negatively) associated with the risk for revictimization ($OR = 0.95$). The Hosmer-Lemeshow test indicated goodness of fit for all univariate and the multiple regression model. Adjusted R^2 (McFadden) values ranged from .07 to .13 in the univariate regression models and was .19 in the multiple regression model. In both sensitivity analyses (complete cases and observed data), Factor 1 of the IIP (subassertiveness) was a significant predictor of revictimization. In the observed data, the severity of PTSD also significantly predicted revictimization. Across all analyses (MI and sensitivity analyses), age was a significant predictor for revictimization, see Appendix 2 for an overview of the sensitivity analyses.

3. Discussion

This study aimed to examine revictimization rates during and shortly after treatment in patients with co-occurring SUD and PTSD, and identify baseline factors that predict revictimization. We used data from a large randomized controlled trial (RCT) that included three follow-up assessments after the initial baseline measurement across a 9-month period. Revictimization was assessed at each follow-up using self-report questionnaires. Due to missing data at follow-up, multiple imputation was performed in R to handle missing values and ensure more robust estimates. Our results showed a revictimization rate of 42.5% across the follow-up time period of the study (9 months). In line with our hypothesis, greater PTSD symptom severity and younger age were significantly associated with revictimization in the univariate analyses. Importantly, other hypothesized predictors,

Table 3. Correlation matrix of baseline predictors based on $N = 203$.

	1	2	3	4	5	6	7
1. PTSD-severity	–						
2. Problematic alcohol use	–.10 ^b	–					
3. Problematic drug use	.25 ^{b***}	–.28 ^{b***}	–				
4. IIP Factor 1	.25 ^{b***}	–.01 ^b	.08 ^b	–			
5. IIP Factor 2	.21 ^{b***}	–.05 ^b	.16 ^{b*}	.43 ^{b***}	–		
6. IIP Factor 3	.29 ^{b***}	–.06 ^b	.21 ^{b**}	.34 ^{b***}	.07 ^b	–	
7. Age	–.15 ^{b*}	.20 ^{b**}	–.20 ^{b**}	.10 ^b	.10 ^b	.04 ^b	–

Notes: ^a = Pearson correlation, ^b = Spearman's rho. Significant p -values were denoted as * $p < .05$, ** $p < .01$, and *** $p < .001$.

such as alcohol and drug use problems, biological sex and interpersonal problems, did not reach statistical significance. Notably, in the multiple regression model, age alone remained a significant predictor of revictimization, suggesting that younger patients may be particularly vulnerable to revictimization. We conducted several sensitivity analyses, which revealed slight differences in the results (see Appendix 2). This suggests that the imputation process for revictimization incidence had a substantial impact on the observed associations. In the remainder of the discussion, we will focus primarily on the findings from the main analyses based on the MI-dataset, while also reflecting on how these results compare with those obtained from the sensitivity analyses.

First, regarding the incidence of revictimization, approximately 42.6% of our patients with co-occurring SUD and PTSD experienced revictimization during the nine-month study period. More specifically, during the first three months after baseline 24.1% of patients were revictimized. At the second follow up, 6 months after the baseline assessment, 20.1%

of patients were revictimized in the past 3 months. In the final 3 months of the study period, 19.2% of patients were revictimized. Our findings contribute to the existing body of evidence demonstrating high rates of revictimization among individuals undergoing psychological treatment (Christ et al., 2022), and more specifically in individuals with substance use disorder (de Waal et al., 2017). By including a sample of patients with SUD irrespective of specific substance type, including patients with polysubstance use, we expand upon previous research that focused predominantly on individuals with alcohol use disorder (AUD) or opioid use disorder (Grundmann et al., 2018; Peirce et al., 2016). This broader inclusion enhances the generalizability of our findings and underscores the relevance of revictimization as a significant clinical concern across the full spectrum of SUD populations. These high rates highlight the importance of adapting treatment modalities to specifically target revictimization. It is essential to emphasize that perpetrators are solely responsible for violence. Nonetheless, from a clinical and preventive perspective, the present study

Table 4. Type and incidence of revictimization per timepoint.

	Sexual violence N (%)	Other unwanted sexual experience N (%)	Physical violence N (%)	Violence with a gun N (%)	Any revictimization N (%)
Imputed data (pooled)					
Timepoint 1 (3 months after baseline)	11.4 (5.4%)	21.4 (10.3%)	29.1 (13.9%)	10.1 (4.8%)	49.0 (24.1%)
Timepoint 2 (6 months after baseline)	10.8 (5.2%)	13.7 (6.5%)	17.8 (8.5%)	9.8 (4.7%)	40.8 (20.1%)
Timepoint 3 (9 months after baseline)	13.8 (6.6%)	15.4 (7.4%)	14.6 (7.0%)	13.3 (6.4%)	38.9 (19.2%)
Across timepoints	30 (14.4%)	41.8 (20.0%)	54.4 (26.0%)	29.7 (14.2%)	88.8 (43.7%)
Complete cases					
Timepoint 1 (3 months after baseline)	4 (3.1%)	11 (8.7%)	17 (13.4%)	4 (3.1%)	24 (18.9%)
Timepoint 2 (6 months after baseline)	1 (0.8%)	4 (3.1%)	7 (5.5%)	1 (0.8%)	11 (8.7%)
Timepoint 3 (9 months after baseline)	2 (1.6%)	4 (3.1%)	3 (2.4%)	1 (0.8%)	7 (5.5%)
Across timepoints	7 (5.5%)	17 (13.4%)	26 (20.5%)	6 (4.7%)	36 (28.3%)
Observed data					
Timepoint 1 (3 months after baseline)	6 (3.7%)	15 (9.3%)	21 (13.0%)	4 (2.5%)	29 (18.0%)
Timepoint 2 (6 months after baseline)	1 (0.7%)	4 (2.8%)	7 (4.8%)	1 (0.7%)	11 (7.6%)
Timepoint 3 (9 months after baseline)	2 (1.3%)	4 (2.7%)	3 (2.0%)	1 (0.7%)	7 (4.7%)
Across timepoints	9 (5.1%)	21 (11.9%)	30 (17.0%)	6 (3.4%)	41 (23.3%)

Notes: At timepoint 1 75% of the sample had received parallel treatment for SUD/PTSD and 25% had received SUD treatment, at timepoint 2 100% of the sample had received treatment for SUD and PTSD. The observed data was based on $N = 161$ at T1, $N = 145$ at T2, $N = 149$ at T3, and $N = 176$ 'across timepoints'. The complete cases were based on $N = 127$. These respective N were used to compute the % for each timepoint. The imputed data was pooled across the $m = 25$ imputed datasets, each containing data for $N = 203$ participants.

Table 5. Pooled results of the univariate and multiple logistic regression analyses on $m = 25$ datasets.

	OR	95% UL-LL	p	R^2 M (Range)	Hosmer-Lemeshow test Median (IQR)
Univariate Regression					
PTSD-severity	1.05	1.01–1.09	.019*	.09 (.06–.15)	.436 (.369–.619)
Problematic alcohol use	0.99	0.96–1.02	.430	.07 (.04–.10)	.473 (.330–.624)
Problematic drug use	1.02	1.00–1.05	.107	.08 (.06–.11)	.427 (.326–.685)
IIP Factor 1	0.96	0.90–1.03	.278	.07 (.04–.10)	.524 (.401–.727)
IIP Factor 2	1.00	0.94–1.06	.893	.06 (.04–.10)	.376 (.229–.516)
IIP Factor 3	1.06	0.97–1.16	.207	.07 (.05–.11)	.729 (.392–.838)
Sex	1.07	0.55–2.08	.841	.06 (.04–.10)	.616 (.509–.875)
Age	0.95	0.92–0.98	<.001***	.12 (.08–.16)	.729 (.518–.865)
Multiple Regression					
Overall model				.17 (.12–.23)	.468 (.232–.699)
PTSD-severity	1.04	0.99–1.08	.125		
Problematic alcohol use	1.00	0.97–1.04	.908		
Problematic drug use	1.01	0.97–1.04	.697		
IIP Factor 1	0.93	0.84–1.03	.139		
IIP Factor 2	1.02	0.94–1.10	.699		
IIP Factor 3	1.07	0.96–1.21	.216		
Sex	0.88	0.40–1.92	.743		
Age	0.95	0.91–0.98	.004**		

Notes: OR = odds ratio, 95% UL – LL refers to the upper and lower limits of the 95% confidence interval of the OR, respectively. We controlled for educational background (low, medium, high) and setting of the addiction treatment (inpatient vs outpatient) in all analyses. Significant p -values were denoted with * $p < .05$, ** $p < .01$, *** $p < .001$. The R^2 value refers to McFadden R^2 and the Hosmer-Lemeshow provides an overview of the median p -value and associated interquartile range (IQR) of p -values across all $m = 25$ imputed datasets.

focuses on modifiable risk factors among survivors who present for treatment, with the aim of reducing vulnerability to future revictimization. Examining risk factors associated with revictimization can inform the development or alteration of interventions aimed at reducing future trauma in vulnerable populations. Qualitative research suggests that interventions should also focus on common themes in survivors of revictimization, such as normalization of abuse, learned helplessness, dysfunctional coping mechanisms, (re-)constructing a sense of identity and trust (Girard et al., 2024; Rogers et al., 2023). Identifying baseline factors associated with revictimization can help determine which patients are most likely to benefit from adapted or targeted interventions aimed at preventing future trauma. To best address our research question, we utilized multiple logistic regression to examine which baseline factors independently predicted revictimization, while controlling for the influence of other variables and potential confounders. In line with our hypothesis and earlier research (e.g. Walton et al., 2002; Williams & Guerra, 2008), age showed to be a significant and robust predictor of revictimization, both in the MI analyses and in the sensitivity analyses. Our results suggest younger individuals to be more vulnerable to revictimization during and shortly after treatment of SUD and PTSD. We found an odds ratio of 0.95 for age, meaning that a 10-year age difference across individuals with co-occurring SUD and PTSD can result in a 40% reduction in odds of revictimization. This suggests age can be a clinically useful factor in identifying higher-risk groups for targeted prevention or intervention, especially in the population of patients with co-occurring SUD and PTSD with a broad age range. Unfortunately, age is a static, non-changeable factor for interventions to target. It is

important for future research to focus on identifying non-static changeable protective factors that contribute to the decreased risk of revictimization in older individuals as potential targets for intervention. It is possible that younger individuals may engage in more impulsive and risky behaviours, compared to older individuals (Konnert & Wong, 2015), possibly resulting in exposure to more high-risk situations of revictimization. Examples of potential targets could be reduced exposure to high-risk environments, more adaptive coping mechanisms, greater interpersonal competence (e.g. assertiveness, boundary setting), more stable social networks and living situations, and decreased impulsivity, novelty-seeking and reactive aggression (Kühner, Verdaasdonk, et al., 2025; Messman-Moore et al., 2010; Walklate & Clay-Warner, 2016). Interventions that target these age-related modifiable mechanisms, such as safety planning, assertiveness training, interventions aimed at improving emotion regulation and impulse control and efforts to strengthen and diversify social networks, may help reduce revictimization risk among younger patients (Perlick et al., 2017; Sabri et al., 2022; Wardany et al., 2022). In our univariate analyses, baseline PTSD-severity was also significantly associated with revictimization, consistent with findings from earlier studies (e.g. de Waal et al., 2018; Fereidooni et al., 2024). PTSD-severity showed an odds ratio of 1.05, suggesting that for each one-point increase on the CAPS-5, the odds of experiencing revictimization increase by 5%. Although this may appear modest, it becomes clinically meaningful when considering the full range (0–80) of the CAPS-5. For example, a 10-point increase in PTSD-severity would correspond to an approximately 63% increase in the odds of revictimization. In the sensitivity analysis on the observed

data, PTSD-severity was significantly associated with revictimization both in the univariate analysis and in the multiple regression. These findings highlight the importance of closely monitoring individuals with higher PTSD-severity, as they may be at increased risk for further revictimization. It suggests that early intervention targeting PTSD-symptoms could be critical not only for symptom reduction, but also for enhancing safety and preventing future harm. Still, PTSD-severity did not remain significant in the multiple logistic regression. This discrepancy may be explained methodologically by shared variance between age and PTSD-severity, with age potentially absorbing part of PTSD's effect in the combined model. Additionally, multiple models require greater statistical power, which may result in smaller effects, such as the effect of PTSD-severity not reaching significance. From a more theoretical perspective, age may represent a more structural risk factor for revictimization, whereas PTSD-severity might be more dynamic in nature and could be influenced by treatment interventions, possibly making it a less robust risk factor at baseline for revictimization. The influence of treatment on PTSD-severity was not explicitly modelled in the present analysis. Future research should examine (a) the effects of treatment on PTSD and the extent to which treatment-related symptom change is associated with revictimization risk, and (b) the impact of revictimization occurring during treatment on treatment effectiveness of PTSD. Examining these associations may contribute to a better understanding of the reciprocal relationships between treatment outcomes and revictimization. Regarding SUD-severity, no significant associations were observed in either the MI analyses or the sensitivity analyses. This finding suggests that SUD-severity at baseline may not predict revictimization during and shortly after treatment for co-occurring SUD and PTSD. However, several alternative explanations for this null finding are noteworthy. First, the instruments used to assess SUD-severity, the AUDIT and DUDIT, may be too general to capture specific consequences of SUD that might increase vulnerability to revictimization, such as polysubstance use, homelessness, or engagement in survival sex (DiGiuseppi et al., 2020; Tyler et al., 2013; Ullman et al., 2006). Moreover, these measures do not directly account for the pattern or context of substance use, such as binge episodes, blackouts or intoxication during high-risk situations, which might be more predictive of revictimization than overall severity scores (Anderson et al., 2020; Valenstein-Mah et al., 2015). Second, substance use itself may pose an immediate risk for revictimization, whereas retrospectively measured SUD-severity may not adequately reflect momentary vulnerability (Teasdale et al., 2014). Finally, given the dynamic nature of SUD-severity and its potential responsiveness to

treatment interventions, baseline SUD-severity may not accurately represent risk levels throughout the study period. Since the aim of our study is to identify baseline predictors of revictimization, we did not include changes in SUD severity during the study period. Future research should therefore investigate whether changes in SUD severity during treatment may act as risk or protective factors for revictimization, in addition to examining more specific SUD-related characteristics as potential risk factors.

Contrary to our hypothesis, we did not find a significant association between interpersonal difficulties and revictimization in our MI analyses. Results from both sensitivity analyses indicated that subassertiveness (IIP Factor 1) was significantly associated with revictimization, suggesting that higher levels of subassertiveness may increase the vulnerability to revictimization. The association between subassertiveness and revictimization may be sensitive to how missing data are handled, with MI potentially modestly attenuating some associations through the smoothing of extreme outcomes, resulting in more conservative estimates. Still, previous research offers mixed evidence on this association. For example, Classen et al. (2001) found that recently revictimized women with a history of childhood sexual abuse reported greater interpersonal problems compared to non-revictimized women. Revictimized women especially reported more difficulties with socially-inhibited, non-assertive and self-sacrificing types of interpersonal problems. Methodological differences may partly explain the discrepancy with our findings. While Classen et al. (2001) examined the original eight subscales of the IIP-32 separately, we conducted a factor analysis, which grouped items into broader dimensions. This approach, especially the inclusion of items from the overly accommodating subscale across two factors related to subassertive (Factor 1) and self-sacrificing interpersonal problems (Factor 2), may have diluted the specific effects that certain interpersonal styles have on revictimization risk. Another notable difference lies in the study design. Classen et al. employed a retrospective approach, whereas our longitudinal design prospectively assessed revictimization. Alternatively, individuals with co-occurring SUD and PTSD may differ substantially from individuals with PTSD alone in how interpersonal problems relate to revictimization. Chronic experiences of marginalization, stigma, and social exclusion commonly associated with SUD may lead individuals to internalize or normalize dysfunctional interpersonal patterns (Luoma et al., 2007; Room, 2005; Schomerus et al., 2011). As a result, these individuals might not perceive their interpersonal difficulties as problematic or distressing, which could contribute to lower self-reported scores on the IIP, despite the presence of clinically relevant interpersonal dysfunction. The study by de Waal

et al. (2018) employed a methodology more closely aligned with the present study, namely a factor-analytic approach to the IIP-32, and was conducted in a more comparable sample of dual diagnosis patients (i.e. individuals with SUD and at least one other mental disorder). They identified positive associations between violent victimization and both a self-sacrificing/overly accommodating interpersonal style and a domineering/controlling style. Given that our operationalization of revictimization was more narrowly focused on interpersonal revictimization, we might have expected to find similar or even stronger associations. Contextual differences in study populations, such as homelessness, may have contributed to divergent results in addition to slight differences in the factor structure of the IIP-32. Future studies should further investigate the association between interpersonal difficulties and revictimization, while considering the influence of environmental and demographic variables.

Although previous studies do show sex differences in (re-)victimization and index trauma (e.g. de Waal et al., 2018; Faber et al., 2025; Grundmann et al., 2018), we did not find biological sex to be a significant predictor of revictimization. One explanation could lie in our operationalization of revictimization. Men and women may be exposed to different types of interpersonal violence or victimization. For example, men may experience more physical trauma by strangers in a public setting, while women may be more likely to be exposed to sexual trauma or physical trauma by their (ex-)partner or relative in an intimate setting (Christ et al., 2022; Faber et al., 2025). By aggregating across types of interpersonal violence, our analysis may have obscured these nuanced patterns. Differences in sample characteristics across studies may also help explain the inconsistent findings regarding sex. While some studies have focused on individuals with depression, alcohol use disorder, or broader dual diagnoses, our sample specifically included patients with co-occurring SUD and PTSD (including polysubstance use). Such differences in diagnostic profiles and clinical contexts may influence how sex is associated with revictimization risk. Further research in this specific population is needed to better understand the role of biological sex, and to more fully explore how gender identity and related social factors may contribute to vulnerability for revictimization.

Finally, discrepancies between the main analyses using multiple imputation (MI) and the sensitivity analyses warrant consideration. Revictimization rates were substantially lower in the observed- and complete cases data, and both sensitivity analyses identified subassertiveness (IIP Factor 1) as a significant predictor of revictimization while the MI results showed no significant association. Analyses on the observed data also showed PTSD-severity to be a

significant predictor. These differences may reflect the smoothing of extreme outcomes in MI, which can modestly attenuate some associations. At the same time, higher PTSD-severity and subassertiveness were plausibly related to missing follow-ups, supporting the missing-at-random assumption and the appropriateness of MI. By incorporating these variables into the imputation model, the MI approach accounted for systematic missingness and thereby increased the validity and precision of the estimated associations and the incidence of revictimization. Overall, age remained a significant predictor across all analyses, highlighting its consistent and robust association with revictimization.

4. Strengths and limitations

Our study has several strengths. First and foremost, while most revictimization studies have relied on non-clinical samples (e.g. college samples), our study utilized a clinical sample of patients who met the full diagnostic criteria for both SUD and PTSD. In addition, patients were receiving treatment during the study period, which allowed us to examine revictimization in the context of active treatment, providing insights not captured in studies of general or retrospective samples. The longitudinal design of the study also allowed a clear establishment of temporal precedence between risk factors and revictimization, offering stronger evidence than cross-sectional approaches. In addition, we used a mixed-sex sample, adding to existing literature on mainly females. We also included broader types of revictimization incidents, building on existing data on sexual revictimization alone. We made use of the gold standard clinician administered assessment of PTSD-severity. Finally, we employed an imputation process to address the substantial amount of missing data and conducted two sensitivity analyses to assess the robustness of our findings.

Our study also has several limitations. First, a non-validated adaptation of the LEC-5 was used to assess incident trauma exposure, although this approach is comparable to methods employed in prior revictimization research (Kühner, Emmelkamp, et al., 2025). This approach did allow us to measure newly occurring revictimization experiences, without the risk of delayed recall of pre-baseline events when using a non-adapted LEC-5. Second, revictimization was analysed as a binary outcome (any vs. none), combining multiple forms of victimization (physical, sexual, weapon-related, and unwanted sexual experiences). This approach did not allow us to account for poly-revictimization or to examine the frequency or severity of revictimization events during the study period. As a result, potentially meaningful differences between types of revictimization may have been obscured, as

distinct risk factors may differentially predict specific forms or repeated occurrences of revictimization (e.g. gender, PTSD-severity, or interpersonal patterns). Future research should consider disaggregating revictimization by type, frequency, and severity to better capture these nuances and clarify risk mechanisms. Third, while our study had sufficient power to detect medium and large effect sizes, smaller effects may have gone undetected despite their potential clinical relevance. Fourth, although multiple imputation was used to address missing data, the relatively small sample size and the extent of missingness limited our ability to examine revictimization across specific timepoints or in relation to treatment timing, type, or symptom change over time. Consequently, potential effects of treatment exposure or dynamic changes in symptoms could not be modelled. While convergence diagnostics suggested that the chosen number of imputations was adequate, differences between the imputed and complete case models underscore the need for cautious interpretation of the findings. Finally, by measuring biological sex rather than gender, our study is limited in its capacity to explore the potential relevance of gender identity as a meaningful characteristic within the population and its association to revictimization.

5. Conclusion

Our study contributes to the existing literature on revictimization by examining its incidence in a clinical sample of individuals with co-occurring substance use disorder (SUD) and post-traumatic stress disorder (PTSD). During the relatively short nine-month study period, as much as two in five individuals in this group experienced revictimization, underscoring it as a clinically relevant issue. In our sample, age was a robust risk factor for revictimization, underlining that revictimization continues to be a poorly understood phenomenon. Future research should focus on identifying modifiable factors associated with age to inform interventions aimed at reducing the risk of revictimization among younger individuals. Potential targets for intervention could include impulsivity and novelty seeking.

Disclosure statement

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Ethical approval

The study obtained ethical approval from the medical ethical committee at the Amsterdam University Medical Centers.

Informed consent

All participants signed a written informed consent form before data collection.

Data availability statement

Meta-data and code can be obtained from the corresponding author(s) upon reasonable request.

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