

© 2024 by AMERSA, Inc. (Association for Multidisciplinary Education and Research in Substance use and Addiction). Use is restricted to non-commercial and no derivatives.

Schacht RL, Meyer LE, Wenzel KR, et al. "Stress Exposure and PTSD in a Cross-Sectional Residential Substance Use Treatment Sample." Substance Use & Addiction Journal (May 8, 2024). <https://doi.org/10.1177/29767342241248978>.

<https://doi.org/10.1177/29767342241248978>

Access to this work was provided by the University of Maryland, Baltimore County (UMBC) ScholarWorks@UMBC digital repository on the Maryland Shared Open Access (MD-SOAR) platform.

Please provide feedback

Please support the ScholarWorks@UMBC repository by emailing scholarworks-group@umbc.edu and telling us what having access to this work means to you and why it's important to you. Thank you.

IN PRESS at *Substance Use & Addiction Journal*, April 2024

Stress Exposure and PTSD in a Cross-Sectional Residential Substance Use Treatment Sample

Rebecca L. Schacht ^a

Laurel E. Meyer ^a

Kevin R. Wenzel ^{a, b}

Meghan Mette ^a

Samantha K. Berg ^a

Christa R. Lewis ^a

Jennifer L. Carrano ^b

Marc Fishman ^{b, c}

^aUniversity of Maryland, Baltimore County, 1000 Hilltop Circle, Baltimore, MD, 21043 United States

^bMaryland Treatment Centers, 3800 Frederick Avenue, Baltimore, MD, 21229, United States

^cJohns Hopkins University School of Medicine, 733 N Broadway, Baltimore, MD, 21205, United States

Corresponding author: Rebecca Schacht, PhD
Assistant Professor of Psychology
University of Maryland, Baltimore County
1000 Hilltop Circle
Baltimore, MD 21250
rschacht@umbc.edu
ORCID ID: [0000-0002-2122-8384](https://orcid.org/0000-0002-2122-8384)

Author Contributions. RS was the principal investigator responsible for study development and data collection oversight in consultation with co-investigators KW and MF. RS, LM, MM, SB, and CL assisted with data collection and protocol development. RS and LM analyzed data and created tables with input from KW. RS wrote the first draft of the manuscript with input from LM and KW. All authors reviewed and approved the submitted manuscript.

Funding. This work was supported by a University of Maryland, Baltimore County institutional grant to the first author. The funder had no further role in the study design; data collection, analysis, or interpretation; writing of the report; or the decision to submit the paper for publication.

Abstract

BACKGROUND. Aim 1 of this cross-sectional, observational study with people in residential treatment for substance use disorders was to document stress exposure. Aim 2 was to assess potential sociodemographic and health differences based on probable PTSD status. Aim 3 was to assess relative contributions of DSM-congruent vs. DSM-incongruent stressors (Criterion A vs. non-Criterion A) to mental and physical health. We hypothesized that both types of stressors would significantly contribute to impairment across indicators and that DSM-congruent stressor exposure would be more strongly associated with impairment than DSM-incongruent exposure.

METHODS. We assessed exposure to DSM-congruent traumatic stressors and DSM-incongruent life stressors, PTSD and depressive symptoms, emotion regulation difficulties, substance use recovery capital, and physical/mental health-related quality of life among 136 people in residential SUD treatment who were 64% men, 36% women; 49% white, 41% Black, 11% multiracial/another race; 18% lesbian, gay, or bisexual (LGB+); mean age = 39.82 ($SD = 12.24$) years.

RESULTS. Participants reported experiencing a mean of 9.76 ($SD = 6.11$) DSM-congruent events. Those with probable PTSD were younger and more likely to be LGB+ than those without probable PTSD ($p < .05$). Experiencing higher numbers of DSM-congruent events was associated with more severe PTSD and depressive symptoms, emotion regulation difficulties, and lower physical health-related quality of life ($p < .05$). DSM incongruent stressor exposure was not independently associated with any indicators. Recovery capital was not associated with either type of stress exposure.

CONCLUSIONS. Stressful event exposure among people in residential SUD treatment is very high. Those who are younger or LGB+ in residential SUD treatment may be at greater risk of developing PTSD. DSM-congruent stressors are more consistently associated with mental health indicators than are DSM-incongruent stressors. Prioritizing treatment targets and identifying implementable treatment strategies can be challenging with this complex population.

Highlights

- PTSD Criterion A stressors may be more clinically relevant than non-Criterion A stressors among people in residential substance use care.
- Residential substance use treatment planning should prioritize Criterion A stressors.
- LGB and young people in residential SUD treatment may be at greater risk of developing PTSD.

Keywords: residential treatment, PTSD, substance use disorder, sexual minorities

1. Introduction

Residential treatment for substance use disorders (SUD) is a crucial point in recovery, as patients have suspended daily life to be immersed in a treatment-intensive environment, working to change longstanding life-interfering, life-threatening behavior. People in residential SUD treatment often present with a high burden of impairment and comorbidity.^{1,2}

Posttraumatic stress disorder (PTSD) is common among people in residential SUD treatment. Rates range from 39% to 51% and are associated with greater overall distress, higher rates of mood and anxiety disorders, self-harm, suicidality, and more severe emotion regulation difficulties and physical health concerns.^{3–5} Some reports link less favorable SUD prognoses to PTSD, whereas others reveal no differences based on PTSD symptoms or diagnostic status.^{4–9} Diagnostic and Statistical Manual (DSM) diagnostic criteria for PTSD requires experiencing a Criterion A event, which involves threatened or actual serious injury, death, or sexual violence.¹⁰ Almost all people in residential SUD treatment have experienced at least one such event.^{4,5,7,11} People in residential SUD care also experience high rates of DSM-incongruent life stressors, such as childhood adversity and illness, which may also contribute to distress and impairment.^{12–15}

Assessments of post-stressor sequelae are often based on combining DSM-congruent and incongruent events (i.e., traumatic and life stressors). For example, adverse childhood experiences (ACEs) are typically defined as including both DSM-congruent and incongruent life stressors (e.g., physical assault and neglect). A robust body of evidence links this broad definition of ACEs to the development of SUDs.^{12,13} However, some researchers have noted different developmental effects of threat-based vs. deprivation-based ACEs (e.g., assault vs. neglect).¹⁶ Meta-analytic data suggest that PTSD symptoms are more severe following DSM-congruent compared to DSM-incongruent stressors.¹⁷ Such findings suggest that traumatic vs. life stressors may exert differential effects.

For clinicians creating treatment plans with people reporting histories of both traumatic and life stressors, it may be difficult to determine which events to prioritize in treatment, particularly during a short-term residential treatment episode in which the average length of stay may be fewer than four weeks. People with PTSD benefit most from trauma-focused interventions and show less improvement when treated with generalist approaches.¹⁸ Specialized treatment for PTSD may not be widely available in residential SUD care; therefore, identifying which patients are most likely to benefit from such care can direct limited resources to those who are most likely to benefit.¹⁹ Further, the sequelae of traumatic and life stressors may be exacerbated by socially driven health disparities that have been observed among people with SUD, particularly among racial/ethnic and sexual minoritized individuals.^{20,21} Most data documenting PTSD among people in residential SUD care are based on overwhelmingly white samples, and sexual orientation is rarely reported in samples in residential SUD care, despite the elevated risk of both PTSD and SUD among sexual minorities.^{5-8,11,22}

Aim 1 of this paper was to document exposure to DSM-congruent (Criterion A) and DSM-incongruent (non-Criterion A) stressors among a demographically diverse sample of people in residential SUD treatment. Aim 2 was to compare participants' demographic and health status based on whether they presented with or without probable PTSD. Aim 3 was to evaluate relative contributions of DSM-congruent vs. DSM-incongruent stressors to a range of mental and physical health indicators, including severity of PTSD symptoms, depressive symptoms, emotion regulation difficulties, mental and physical health-related quality of life, and substance use recovery capital. Based on prior reports documenting greater impairment among people in residential SUD care with comorbid PTSD compared to those without PTSD, we hypothesized that both types of stressors would significantly contribute to impairment across indicators and that DSM-congruent stressor exposure would be more strongly associated with impairment than DSM-incongruent stressor exposure.^{4-7,9,22}

2. Methods

2.1. Setting and participants

Data were collected from a convenience sample of 136 people in residential treatment for substance use disorder. Participants were enrolled in either a short- or long-term program affiliated with the same community treatment organization (approximately 28 days; American Society of Addiction Medicine Levels 3.7 and 3.7 Withdrawal Management; or approximately 90 days; ASAM Levels 3.5, and 3.3; respectively). All participants met DSM-5 criteria for moderate or severe substance use disorder at intake to the facility.¹⁰ Over 90% of participants' care was funded through the state Medicaid program.²³ Anyone over the age of 18 years enrolled at the facility were eligible to participate. Participants were enrolled in care for at least two days before participation to avoid acute intoxication effects and allow acclimation to residential care. Procedures were approved by the [BLINDED] Institutional Review Board.

All participants indicated that their gender identity was male or female. Sixty-four percent ($n = 86$) were men. Approximately half (52%; $n = 68$) were Black, multiracial, or another non-white race. One-third (34%; $n = 45$) did not complete high school. Mean monthly income was \$745.58 ($SD = 1106.77$). Most (83%; $n = 109$) were unemployed; 86% ($n = 88$) reported that they had been arrested at least once. Close to one-fifth (18%; $n = 24$) were lesbian/gay, bisexual, or pansexual ($n = 7, 16$, and 1, respectively) (Table 1).

2.2. Procedures

Data collection occurred between February 2021 and August 2022. Participants were recruited via announcements by research and clinical staff at the treatment facility. One-third (33%; $n = 45$) were referred by clinical staff who believed they might be eligible for a separate PTSD treatment study. Participants underwent group informed consent, with the option to be consented in private (no participants chose private consent), followed by completion of paper-and-pencil questionnaires. Interviews were conducted individually in private rooms. If only one participant was recruited on a given

day, consent and data collection procedures occurred individually. Participants received a \$10 gift card for participating.

2.3. Measures

2.3.1. Demographics

A demographics questionnaire assessed age, gender, race, sexual orientation, educational level, income level, and arrest history.

2.3.2. DSM-congruent Criterion A and DSM-incongruent non-Criterion A stressors

An adapted Trauma History Questionnaire (THQ; 27 items) assessed exposure to DSM-congruent and other stressful events in adulthood.²⁴ Three items from the Life Events Checklist were added (committing harm to others, being held in captivity, or being threatened with physical injury).²⁵ The Adverse Childhood Experiences questionnaire (ACEs; 17 items) assessed exposure to 17 stressful events before the age of 18 years, including physical or sexual assault, family violence, and mental illness and substance use among household members.²⁶

2.3.3. PTSD

The PTSD Checklist for DSM-5 (PCL-5; 20 items; possible range 0-80) was administered as a self-report questionnaire. Participants completed the PCL-5 following the THQ and ACEs questionnaire and were asked to respond “keeping the worst event in mind.” The PCL-5 assessed last-month DSM-5 PTSD symptoms on a scale of 0 (not at all bothered) to 4 (extremely bothered).^{27,28} A score of 31 or higher indicates probable PTSD.^{29,30} Internal consistency for the current sample was high (Cronbach’s $\alpha = .96$).

2.3.4. Depression

The Patient Health Questionnaire depression subscale assessed depressive symptoms (PHQ-9; 9 items; possible range 0-27).³¹ Higher scores indicate more severe symptoms. Internal consistency for the current sample was high (Cronbach's $\alpha = .91$).

2.3.5. Emotion regulation

The Difficulties in Emotion Regulation Short-Form (DERS-SF; 18 items; possible range 18-90) assessed difficulties with emotion regulation across six subscales: nonacceptance of emotions, goal-oriented behavior, impulse control, emotional awareness, emotional clarity, and emotion regulation strategies.³² Higher scores indicate more difficulties. Internal consistency for the current sample was high (Cronbach's $\alpha = .91$).

2.3.6. Substance use

The substance use modules of the *M.I.N.I.* Version 7.0.0,³³ a structured diagnostic interview, assessed past-year alcohol (AUD) and drug disorders (DUDs) based on DSM-5 criteria. The Brief Assessment of Recovery Capital questionnaire (BARC-10; 10 items; possible range 10-60) measured psychological, social, and physical resources that support recovery from substance use problems.³⁴ Participants rated items from 1 ("strongly disagree") to 6 ("strongly agree"), with higher scores indicating greater recovery capital. Internal consistency for the current sample was good (Cronbach's $\alpha = .83$).

2.3.7. Quality of life

The Short-Form 12 questionnaire (SF-12; 12 items) assessed health-related quality of life. The SF-12 yields a physical and mental health subscale, with lower scores indicating lower quality of life. Raw scores were transformed to be comparable to population norms of $M = 50$ ($SD = 10$).³⁵

2.4. Data analytic approach

2.4.1. Variable formation

Items on the THQ and the ACEs were classified as DSM-congruent Criterion A or DSM-incongruent non-Criterion A events based on the DSM-5 Criterion A event description (e.g., experiencing or witnessing threatened or actual death, serious injury, or sexual violence; accidental or violent death of a relative or close friend)²⁸ (Table 2). Responses to the THQ question about whether the participant had experienced a serious or life-threatening illness were split into two questions based on whether the participant's description was consistent with a Criterion A event. Sudden or catastrophic illnesses (e.g., overdoses) were coded as Criterion A events, whereas serious chronic or non-catastrophic illnesses (e.g., HIV, infections) were coded as non-Criterion A stressors. This yielded 29 Criterion A events and 16 non-Criterion A events.

2.4.2. Missing data

Of 145 participants who completed the study, nine had more than 25% of data missing on the PCL-5 and were excluded ($N = 136$). Participants with 25% or more missing data on other measures were excluded from analyses using that measure. Participants with any missing items on the SF-12 were excluded from analyses using the measure, per SF-12 scoring instructions.³⁵ Mean or mode (most frequent value) imputation was used for single-item missing data, which was less than 1% of the data set for participants with otherwise complete data.³⁶ Percentages were based on the number of participants with valid data for each analysis.

2.4.3. Analytic strategy

Aim 1 analyses entailed assessing prevalence rates for each stressor on the THQ and ACEs questionnaire. Aim 2 analyses included two-tailed t or chi-squared tests to assess group differences (probable PTSD vs. no probable PTSD). Aim 3 analyses included multiple linear regression to assess the

relative contributions of Criterion A and non-Criterion A stressors in predicting variance in each dependent variable (PCL-5, PHQ-9, DERS-SF, BARC-10, SF-12 physical health, and SF-12 mental health scores). Number of Criterion A and non-Criterion A events were entered in the same step for all models. P-values, betas with 95% confidence intervals, and standardized betas are reported for linear regression models. Alpha was set at 0.05 for all analyses. Data were analyzed using IBM SPSS Statistics, Version 26.0.

 INSERT TABLE 1 HERE

3. Results

3.1 DSM-congruent Criterion A vs. DSM-incongruent non-Criterion A exposure

Criterion A events. Ninety-four percent ($n = 126$) of participants reported experiencing at least one Criterion A event on the Trauma History Questionnaire or Adverse Childhood Experiences survey (THQ or ACEs), with a mean of 9.76 types of events ($SD = 6.11$) overall. Eighty-seven percent ($n = 116$) reported experiencing at least two Criterion A events. Over one-half of participants reported experiencing at least one serious accident (62%; $n = 83$), robbery with force or threat of force (56%; $n = 76$), witnessing death or serious injury (60%; $n = 81$), seeing or handling dead bodies (53%; $n = 71$), violent or accidental loss of a loved one (56%; $n = 75$), or physical assault (63%; $n = 84$). Nearly half (49%; $n = 66$) reported experiencing sexual assault (Table 2).

Non-Criterion A events. Ninety-six percent of participants ($n = 128$) reported experiencing at least one non-Criterion A stressor on the THQ or ACEs, with a mean of 5.94 events ($SD = 3.40$). Over one-half reported experiencing robbery (67%; $n = 90$), receiving news of illness or unexpected death of a loved one (60%; $n = 81$), experiencing childhood emotional abuse (52%; $n = 70$), or living with a household member who had a drinking problem (60%; $n = 82$), used street drugs (52%; $n = 71$), or was mentally ill (51%; $n = 69$) as a child (Table 2).

 INSERT TABLE 2 HERE

3.2. *Participants with and without probable PTSD*

PCL-5 scores for 70% of the sample ($n = 95$) were at or above the cutoff of 31, indicating probable PTSD. Participants with probable PTSD were younger than those without probable PTSD, marginally more likely to be women than men, and more likely to be lesbian, gay, or bisexual than heterosexual ($t[132] = 2.10, p = .038$; $\chi^2 [1, N = 135] = 3.61, p = .057$; $\chi^2 [1, N = 132] = 4.40, p = .036$; respectively) (Table 1). Participants with probable PTSD also reported larger numbers of Criterion A and non-Criterion A events and higher PCL-5, PHQ-9, and DERS-SF scores ($t[132] = 5.53, p < .001$; $t[132] = 4.69, p < .001$; $t[134] = 17.63, p < .001$; $t[131] = 7.60, p < .001$; $t[128] = 6.36, p < .001$); and lower SF-12 mental health subscale scores ($t[116] = 6.65, p < .001$), indicating more severe PTSD, depressive symptoms, difficulties in emotion regulation, and lower mental health-related quality of life compared to participants without probable PTSD (Table 3).

 INSERT TABLE 3 HERE

3.3. *Regression Analyses*

Multiple linear regression was used to test whether number of Criterion A and number of non-Criterion A events reported by participants predicted PCL-5, PHQ-9, DERS-SF, BARC-10, and SF-12 scores (Table 4). The PCL-5 model was significant, $F(2, 130) = 30.67, p < .001$, explaining 32% of variance in PCL-5 scores. Number of Criterion A events significantly predicted PCL-5 scores ($\beta = .42, p < .001$), whereas number of non-Criterion A events did not ($\beta = .18, p = .113$). The PHQ-9 model was also significant, $F(2, 127) = 14.71, p < .001$, and accounted for 19% of variance in PHQ-9 scores. Number of Criterion A events predicted PHQ-9 scores ($\beta = .45, p < .01$), whereas number of non-Criterion A events did not ($\beta = -.02, p = .885$). The DERS-SF model was significant, $F(2, 125) = 11.48, p < .001$, which accounted for 16% of

variance in DERS-SF scores. Numbers of Criterion A events ($\beta = .25, p = .048$) predicted DERS-SF scores, whereas number of non-Criterion A events did not ($\beta = .17, p = .186$). The BARC-10 model was not significant, $R^2 = .03, F(2, 126) = 2.09, p = .128$, with neither number of Criterion A ($\beta = -.22, p = .102$) nor non-Criterion A events ($\beta = .061, p = .648$) predicting BARC-10 scores. Both the SF-12 physical health, $F(2, 112) = 7.52, p < .01$, and mental health models, $F(2, 112) = 12.97, p < .001$, were significant, accounting for 12% and 19% of variance, respectively. Physical health scores were associated with both Criterion A and non-Criterion A events but in opposite directions. Higher numbers of Criterion A events predicted worse physical health scores ($\beta = -.50, p < .001$), whereas higher numbers of non-Criterion A events marginally predicted better physical health scores ($\beta = .27, p = .052$). Higher numbers of Criterion A events predicted marginally worse mental health scores ($\beta = -.24, p = .064$). There was no statistically significant association between non-Criterion A events and mental health scores ($\beta = -.22, p = .097$).

 INSERT TABLE 4 HERE

4. Discussion

Findings from this demographically diverse sample of people in residential SUD treatment revealed nearly universal exposure to DSM-congruent Criterion A events (94%), with a mean of nearly 10 such events, including high rates of interpersonal violence. Exposure to DSM-incongruent life stressors was also nearly universal (96%), with a mean of approximately six types of life stressors, including high rates of adverse childhood events (Aim 1). Participants with probable PTSD were younger, more likely to be lesbian, gay, or bisexual; marginally more likely to be women; and reported more severe PTSD and depressive symptoms, emotion regulation difficulties, and lower mental health-related quality of life compared to those without probable PTSD. There were no differences in SUD diagnosis (alcohol disorder vs. drug use disorder vs. both) or substance use recovery capital based on probable PTSD status (Aim 2). DSM-congruent stressor exposure was more strongly and consistently associated

with mental health indicators, including PTSD, depressive symptoms, emotion regulation difficulties, and physical health-related quality of life, than was DSM-incongruent stressor exposure. Neither type of stress exposure significantly predicted mental health-related quality of life or substance use recovery capital (Aim 3). These findings extend prior work by assessing the relative importance of Criterion A vs. non-Criterion A events to clinical indicators and documenting an association between LGB status and PTSD in a residential SUD sample.^{1,2,4,5,7,11}

4.1. Clinical and research implications

PTSD and other stressor exposure can result in significant disruptions across economic, social, educational, and psychiatric domains. In a high-need clinical population, the urgency of identifying appropriate treatment targets and interventions is clear. DSM-congruent traumatic stressors appear strongly related to a range of PTSD- and non-PTSD-related health indicators, whereas DSM-incongruent life stressors appear less strongly related to these indicators. These findings extend prior knowledge by suggesting that individuals in residential SUD treatment respond differently to DSM-congruent vs. incongruent stressors and support the importance of prioritizing PTSD-specific assessment and treatment among individuals in residential SUD treatment. This is consistent with evidence suggesting that trauma-focused behavioral interventions are most effective for supporting recovery among people with comorbid PTSD and SUD.¹⁸

These data also extend current knowledge by documenting elevated risk of PTSD among LGB+ individuals in residential SUD treatment. Evidence suggests that LGB+ people's substance use trajectories, risk and resilience factors, and clinical needs differ from those of non-LGB+ people.^{20,37–39} Further, LGBTQ+ people in general are at elevated risk of developing PTSD.⁴⁰ However, we were unable to find prior published reports on PTSD among sexual minorities in residential SUD care, which suggests that additional study is needed to understand the PTSD-SUD comorbidity among this population. This

finding is also consistent with recent calls highlighting the importance of considering minoritized identities in substance use research.^{20,21} Differences in likelihood of probable PTSD based on racial identity did not emerge in this sample. Further study is warranted to understand this finding, particularly given evidence of overlap between experiences of racism, PTSD, and SUDs.^{41,42} Finally, younger age also emerged as a correlate of PTSD risk. This contradicts a prior report of no differences in age based on PTSD diagnostic status among people in residential SUD treatment, although typically age has not been assessed as a correlate of PTSD status among residential SUD populations.⁴ Younger individuals and those with co-occurring disorders, including PTSD, are at higher risk of leaving residential treatment early and relapse following residential care.^{43–45} Additional study is warranted to determine how PTSD, age, and substance use recovery are related and identify possible clinical implications of these associations.

Patient preference and timing must be considered when treatment planning with people in residential SUD care who also have PTSD, particularly in the context of potential avoidance of trauma-related content. Patients may express a preference to focus on DSM-incongruent life stressors instead of DSM-congruent traumatic stressors because of concern that directly engaging with PTSD-related content will be too difficult. For the provider, it may be challenging to balance the tension between following patients' inclinations to avoid distress versus unduly reinforcing avoidant behavior. A collaborative, motivational approach that includes validating patient concerns, in tandem with psychoeducation regarding the role of avoidance in perpetuating PTSD symptoms, may be most effective when devising a treatment plan. Flexible use of manualized interventions for PTSD may be indicated, such as offering a limited number of sessions to focus on stressful life events or to build emotion regulation and distress tolerance skills before embarking on a PTSD treatment protocol.^{46,47}

4.2. Limitations

This work is characterized by some important limitations. We used a convenience sample of interested and available participants and did not systematically assess the facility's population. Approximately one-third of the sample was recruited because clinical staff believed they might have had PTSD. Thus, participants with PTSD are likely overrepresented in the sample, yielding higher rates of probable PTSD than might be found in the facility's general population. We did not assess potential mechanisms, such as discrimination, that would provide crucial context for understanding identity-based differences. Our sample was not large enough to assess sexual minority subgroups or potential intersectional effects of multiple minoritized identities. Although we used established questionnaires to assess traumatic event exposure and PTSD symptoms, we did not conduct structured interviews to assess PTSD diagnostic status and could not identify the index event participants were considering when completing the PCL-5. Our findings do not address potential differences based on how many times participants might have experienced each type of stressful event, nor did we directly assess participants' interpretations of the events they experienced, which has long been believed to drive the development and maintenance of PTSD.⁴⁸ We did not evaluate substance use behavior and were limited in our ability to assess substance use severity by the lack of heterogeneity in the sample (i.e., all participants met criteria for moderate to severe SUD). Future work would be strengthened by a more detailed assessment of substance use behavior and follow-up to assess rates of relapse and potential association with other outcomes assessed in this work.

4.3 Conclusions

These findings suggest a considerable burden of lifelong stressors among people in residential SUD treatment that may be magnified among those who also have PTSD. DSM-congruent stressors may be more important than DSM-incongruent stressors to prioritize in residential SUD care. Given the limitations on time, attention, and therapeutic bandwidth available for patients and clinicians in residential treatment, PTSD-specific therapies may be fruitful, targeting the most impactful stressors.

Additional research is needed to understand why LGB+ and younger individuals in residential SUD treatment may be at increased risk for PTSD and how existing treatments might better address the unique needs of these individuals. Finally, clinicians working with patients in residential SUD care would benefit from additional readily implementable tools to assess and address the complex, multifaceted treatment needs of people in residential SUD treatment.

Author Contributions. [First author] was the principal investigator responsible for study development and data collection oversight in consultation with co-investigators [third author] and [final author]. [First, second, fourth, fifth, and sixth authors] assisted with data collection and protocol development. [First and second authors] analyzed data and created tables with input from [third author]. [First author] wrote the first draft of the manuscript with input from [second and third authors]. [Seventh author] provided input on the data analytic strategy and manuscript revision. All authors reviewed and approved the submitted manuscript.

Declaration of Competing Interests. The authors declare that there is no conflict of interest.

Funding. This work was supported by institutional funds made available to the first author.

Compliance, Ethical Standards, and Ethical Approval. This work was approved by the [BLINDED] Institutional Review Board, Protocol #107 Y19RS20190, on September 3, 2020. A written consent for was provided to participants to review before participation began. This research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki.

Data Availability. Data requests can be emailed to the first author.

References

1. Andersson HW, Mosti MP, Nordfjaern T. Inpatients in substance use treatment with co-occurring psychiatric disorders: a prospective cohort study of characteristics and relapse predictors. *BMC Psychiatry*. 2023;23(1):152. doi:10.1186/s12888-023-04632-z
2. Darke S, Campbell G, Popple G. Retention, early dropout and treatment completion among therapeutic community admissions. *Drug Alcohol Rev*. 2012;31(1):64-71. doi:10.1111/j.1465-3362.2011.00298.x
3. Goldstein RB, Smith SM, Chou SP, et al. The epidemiology of DSM-5 posttraumatic stress disorder in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions-III. *Social Psychiatry and Psychiatric Epidemiology*. 2016;51(8):1137-1148. doi:10.1007/s00127-016-1208-5
4. Meshberg-Cohen S, Presseau C, Thacker LR, Hefner K, Svikis D. Posttraumatic stress disorder, health problems, and depression among African American women in residential substance use treatment. *Journal of Women's Health*. 2016;25(7):729-737. doi:10.1089/JWH.2015.5328
5. Reynolds M, Mezey G, Chapman M, Wheeler M, Drummond C, Baldacchino A. Co-morbid post-traumatic stress disorder in a substance misusing clinical population. *Drug and Alcohol Dependence*. 2005;77(3):251-258. doi:10.1016/j.drugalcdep.2004.08.017
6. Dore G, Mills K, Murray R, Teesson M, Farrugia P. Post-traumatic stress disorder, depression and suicidality in inpatients with substance use disorders. *Drug Alcohol Rev*. 2012;31(3):294-302. doi:10.1111/j.1465-3362.2011.00314.x
7. Read JP, Brown PJ, Kahler CW. Substance use and posttraumatic stress disorders: symptom interplay and effects on outcome. *Addict Behav*. 2004;29(8):1665-1672. doi:10.1016/j.addbeh.2004.02.061
8. Robinson LD, Deane FP. Substance use disorder and anxiety, depression, eating disorder, PTSD, and phobia comorbidities among individuals attending residential substance use treatment settings. *J Dual Diagn*. 2022;18(3):165-176. doi:10.1080/15504263.2022.2090648
9. Weiss NH, Tull MT, Viana AG, Anestis MD, Gratz KL. Impulsive behaviors as an emotion regulation strategy: examining associations between PTSD, emotion dysregulation, and impulsive behaviors among substance dependent inpatients. *J Anxiety Disord*. 2012;26(3):453-458. doi:10.1016/j.janxdis.2012.01.007
10. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR)*. American Psychiatric Association Publishing; 2022.
11. Kok T, de Haan H, van der Meer M, Najavits L, de Jong C. Assessing traumatic experiences in screening for PTSD in substance use disorder patients: what is the gain in addition to PTSD symptoms? *Psychiatry Res*. 2015;226(1):328-332. doi:10.1016/j.psychres.2015.01.014

12. Grummitt L, Barrett E, Kelly E, Newton N. An umbrella review of the links between adverse childhood experiences and substance misuse: What, why, and where do we go from here? *Subst Abuse Rehabil.* 2022;13:83-100. doi:10.2147/SAR.S341818
13. Leza L, Siria S, López-Goñi JJ, Fernández-Montalvo J. Adverse childhood experiences (ACEs) and substance use disorder (SUD): A scoping review. *Drug Alcohol Depend.* 2021;221:108563. doi:10.1016/j.drugalcdep.2021.108563
14. Newton-Howes G, Stanley J. Patient characteristics and predictors of completion in residential treatment for substance use disorders. *BJPsych Bull.* 2015;39(5):221-227. doi:10.1192/pb.bp.114.047639
15. Osborne B, Kelly PJ, Larance B, et al. Substance Use and Co-occurring Physical Health Problems: File Review of a Residential Drug and Alcohol Treatment Service. *J Dual Diagn.* 2020;16(2):250-259. doi:10.1080/15504263.2019.1704960
16. McLaughlin KA, Sheridan MA. Beyond Cumulative Risk: A Dimensional Approach to Childhood Adversity. *Curr Dir Psychol Sci.* 2016;25(4):239-245. doi:10.1177/0963721416655883
17. Larsen SE, Pacella ML. Comparing the effect of DSM-congruent traumas vs. DSM-incongruent stressors on PTSD symptoms: A meta-analytic review. *J Anxiety Disord.* 2016;38:37-46. doi:10.1016/j.janxdis.2016.01.001
18. Hien DA, Morgan-López AA, Saavedra LM, et al. Project Harmony: A meta-analysis with individual patient data on behavioral and pharmacologic trials for comorbid posttraumatic stress and alcohol or other drug use disorders. *Am J Psychiatry.* 2023;180(2):155-166. doi:10.1176/appi.ajp.22010071
19. Killeen TK, Back SE, Brady KT. Implementation of integrated therapies for comorbid post-traumatic stress disorder and substance use disorders in community substance abuse treatment programs. *Drug and Alcohol Review.* 2015;34(3):234-241. doi:10.1111/dar.12229
20. D'Amico EJ, Tucker JS, Dunbar MS, et al. Unpacking disparities in substance-related outcomes among racial, ethnic, sexual, and gender minoritized groups during adolescence and emerging adulthood. *Psychol Addict Behav.* 2023;37(5):651-656. doi:10.1037/adb0000905
21. McCuistian C, Burlew K, Espinosa A, Ruglass LM, Sorrell T. Advancing health equity through substance use research. *J Psychoactive Drugs.* 2021;53(5):379-383. doi:10.1080/02791072.2021.1994673
22. Scheer JR, Helminen EC, Cascalheira CJ, et al. Probable PTSD, PTSD symptom severity, and comorbid PTSD and hazardous drinking among sexual minority women compared to heterosexual women: A meta-analysis. *Clin Psychol Rev.* 2023;102:102283. doi:10.1016/j.cpr.2023.102283
23. Wenzel K, Anderson K, Thomas J, et al. Treatment retention and MOUD uptake among adults with OUD in a public-sector inpatient treatment program. In: ; 2023.
24. Hooper LM, Stockton P, Krupnick JL, Green BL. Development, use, and psychometric properties of the Trauma History Questionnaire. *Journal of Loss and Trauma.* 2011;16(3):258-283. doi:10.1080/15325024.2011.572035

25. Gray MJ, Litz BT, Hsu JL, Lombardo TW. Psychometric properties of the Life Events Checklist. *Assessment*. 2004;11(4):330-341. doi:10.1177/1073191104269954
26. Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *Am J Prev Med*. 1998;14(4):245-258. doi:10.1016/s0749-3797(98)00017-8
27. Blevins CA, Weathers FW, Davis MT, Witte TK, Domino JL. The Posttraumatic Stress Disorder Checklist for *DSM-5* (PCL-5): Development and initial psychometric evaluation. *Journal of Traumatic Stress*. 2015;28(6):489-498. doi:10.1002/jts.22059
28. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*. 5th ed. American Psychiatric Association; 2013.
29. Weathers FW, Litz BT, Keane TM, Palmieri PA, Marx BP, Schnurr PP. The PTSD Checklist for DSM-5 (PCL-5). Published online 2013. Accessed August 20, 2021. <https://www.ptsd.va.gov/professional/assessment/adult-sr/ptsd-checklist.asp>
30. Bovin MJ, Marx BP, Weathers FW, et al. Psychometric properties of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (PCL-5) in veterans. *Psychol Assess*. 2016;28(11):1379-1391. doi:10.1037/pas0000254
31. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*. 2001;16(9):606-613. doi:10.1046/j.1525-1497.2001.016009606.x
32. Kaufman EA, Xia M, Fosco G, Yaptangco M, Skidmore CR, Crowell SE. The Difficulties in Emotion Regulation Scale Short Form (DERS-SF): Validation and replication in adolescent and adult samples. *Journal of Psychopathology and Behavioral Assessment*. 2016;38(3):443-455. doi:10.1007/s10862-015-9529-3
33. Sheehan DV, Lecrubier Y, Sheehan KH, et al. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatry*. 1998;59 Suppl 20:22-33.
34. Vilsaint CL, Kelly JF, Bergman BG, Groshkova T, Best D, White W. Development and validation of a Brief Assessment of Recovery Capital (BARC-10) for alcohol and drug use disorder. *Drug Alcohol Depend*. 2017;177:71-76. doi:10.1016/j.drugalcdep.2017.03.022
35. Ware JE, Kosinski M, Keller SD. *SF-12: How to Score the SF-12 Physical & Mental Health Summary Scales*. 2nd ed. The Health Institute, New England Medical Center; 1995.
36. Schafer JL, Graham JW. Missing data: Our view of the state of the art. *Psychological Methods*. 2002;7:147-177. doi:10.1037/1082-989X.7.2.147
37. Flentje A, Livingston NA, Roley J, Sorensen JL. Mental and Physical Health Needs of Lesbian, Gay, and Bisexual Clients in Substance Abuse Treatment. *J Subst Abuse Treat*. 2015;58:78-83. doi:10.1016/j.jsat.2015.06.022

38. Green KE, Feinstein BA. Substance use in lesbian, gay, and bisexual populations: an update on empirical research and implications for treatment. *Psychol Addict Behav.* 2012;26(2):265-278. doi:10.1037/a0025424
39. Kerridge BT, Pickering RP, Saha TD, et al. Prevalence, sociodemographic correlates and DSM-5 substance use disorders and other psychiatric disorders among sexual minorities in the United States. *Drug Alcohol Depend.* 2017;170:82-92. doi:10.1016/j.drugalcdep.2016.10.038
40. Marchi M, Travascio A, Uberti D, et al. Post-traumatic stress disorder among LGBTQ people: a systematic review and meta-analysis. *Epidemiol Psychiatr Sci.* 2023;32:e44. doi:10.1017/S2045796023000586
41. Glass JE, Williams EC, Oh H. Racial/ethnic discrimination and alcohol use disorder severity among United States adults. *Drug Alcohol Depend.* 2020;216:108203. doi:10.1016/j.drugalcdep.2020.108203
42. Kirkinis K, Pieterse AL, Martin C, Agiliga A, Brownell A. Racism, racial discrimination, and trauma: a systematic review of the social science literature. *Ethn Health.* 2021;26(3):392-412. doi:10.1080/13557858.2018.1514453
43. Andersson HW, Wenaas M, Nordfjærn T. Relapse after inpatient substance use treatment: A prospective cohort study among users of illicit substances. *Addict Behav.* 2019;90:222-228. doi:10.1016/j.addbeh.2018.11.008
44. Brorson HH, Ajo Arnevik E, Rand-Hendriksen K, Duckert F. Drop-out from addiction treatment: a systematic review of risk factors. *Clin Psychol Rev.* 2013;33(8):1010-1024. doi:10.1016/j.cpr.2013.07.007
45. Syan SK, Minhas M, Oshri A, et al. Predictors of premature treatment termination in a large residential addiction medicine program. *J Subst Abuse Treat.* 2020;117:108077. doi:10.1016/j.jsat.2020.108077
46. Galovski TE, Blain LM, Mott JM, Elwood L, Houle T. Manualized therapy for PTSD: flexing the structure of cognitive processing therapy. *J Consult Clin Psychol.* 2012;80(6):968-981. doi:10.1037/a0030600
47. Harned MS, Schmidt SC, Korslund KE, Gallop RJ. Does adding the Dialectical Behavior Therapy Prolonged Exposure (DBT PE) protocol for PTSD to DBT improve outcomes in public mental health settings? A pilot nonrandomized effectiveness trial with benchmarking. *Behav Ther.* 2021;52(3):639-655. doi:10.1016/j.beth.2020.08.003
48. Foa EB, Steketee G, Rothbaum BO. Behavioral/cognitive conceptualizations of post-traumatic stress disorder. *Behavior Therapy.* 1989;20(2):155-176. doi:10.1016/S0005-7894(89)80067-X

Table 1. Demographic descriptive statistics by probable PTSD status (PCL-5 score > 30).

Variable (possible range)		M (SD) or % (n)		
		PTSD (n = 95)	No PTSD (n = 41)	Total Sample (n = 136)
Age in years*		38.37 (12.05)	43.12 (12.15)	39.82 (12.24)
Gender	Women	41% (39)	24% (10)	36% (49)
	Men	59% (55)	76% (31)	64% (86)
Race	White	48% (44)	50% (20)	49% (64)
	Black	38% (35)	48% (19)	41% (54)
	Multiracial or other	14% (13)	3% (1)	11% (14)
Ethnicity	Not Hispanic/Latine	90% (85)	98% (40)	92% (125)
	Hispanic/Latine	11% (10)	2% (1)	8% (11)
Sexual orientation*	Heterosexual	77% (71)	93% (37)	82% (108)
	Lesbian/gay/bisexual/+	23% (21)	8% (3)	18% (24)
Marital status	Single	73% (69)	71% (29)	72% (98)
	Married/cohabitating	11% (10)	7% (3)	10% (13)
	Previously partnered	17% (16)	22% (9)	18% (25)
Highest educational level	Some high school	28% (26)	46% (19)	34% (45)
	Completed high school	33% (31)	29% (12)	32% (43)
	Post-secondary (trade, college, etc.)	39% (36)	24% (10)	34% (46)
Monthly income		\$750.13 (930.37)	\$734.63 (1465.19)	\$745.58 (1106.77)
Currently unemployed		81% (74)	88% (35)	83% (109)
Ever been arrested		89% (69)	79% (19)	86% (88)

Notes. Analyses were based on available data. Percentages do not reflect missing data. Two-tailed *t*-tests assessed group differences for continuous variables. Chi-squared tests (Fisher's exact) assessed group differences for categorical variables.

* $p < .05$ ** $p < .01$

Table 2. Exposure to Criterion A and non-Criterion A stressors.

Category	Item prevalence	Category prevalence % (n)
Accidents/disasters		70% (94)
Serious accident (A)	62% (83)	
Natural disaster with feared death/injury to self/others (A)	29% (39)	
Human-made disaster with feared death/injury to self/others (A)	20% (27)	
Physical threat or harm to self (non-assault)		55% (74)
Exposure to health-threatening chemicals/radioactivity	14% (19)	
Serious or life-threatening illness (catastrophic/sudden) (A)	11% (15)	
Serious or life-threatening illness (not catastrophic/chronic)	18% (24)	
Seriously injured, other situation (A)	17% (23)	
Feared death or serious injury, other situation (A)	30% (40)	
Property crime		77% (104)
Attempted/completed robbery	67% (90)	
Attempted/completed home break-in	35% (47)	
Attempted/completed robbery with force or threat of force (A)	56% (76)	
Attempted/completed home break-in while at home	16% (22)	
Witnessed physical threat or harm to others (not loved ones)		73% (99)
Saw someone seriously injured or killed (A)	60% (81)	
Saw or handled dead bodies (other than at a funeral) (A)	53% (71)	
Caused serious injury, harm, or death to someone else (A)	26% (35)	
Loss or threat of loss of loved ones		82% (111)
Close friend/family member died violently or accidentally (A)	56% (75)	
Death of partner or child (not violent or accidental)	27% (27)	
News of illness or unexpected death of loved one (not violent/accidental)	60% (81)	
Family violence in childhood		41% (56)
Mother pushed, grabbed, slapped, had something thrown at her	35% (47)	
Mother kicked, bitten, hit with a fist, hit with something hard (A)	28% (38)	
Mother repeatedly hit (A)	27% (36)	
Mother threatened with, or hit by, a knife or gun (A)	18% (24)	
Emotional abuse		70% (94)
Household member swore at, insulted, put you down (in childhood)	52% (70)	

Household member caused fear of injury (A) (in childhood)	42% (57)	
Threatened with serious injury (A)	41% (55)	
Childhood sexual assault		43% (58)
Touched/fondled in sexual way (A)	38% (52)	
Had you touch them in sexual way (A)	28% (38)	
Attempted oral, anal, or vaginal intercourse (A)	32% (43)	
Completed oral, anal, or vaginal intercourse (A)	27% (36)	
Sexual assault, timing unspecified		49% (66)
Touched or made to touch under force or threat (A)	37% (50)	
Other forced unwanted sexual contact (A)	24% (32)	
Attempted/completed oral/anal/vaginal intercourse (A)	38% (51)	
Childhood physical assault		41% (56)
Household member pushed, grabbed, shoved, or slapped you (A)	35% (47)	
Hit by household member, leaving marks or injury (A)	30% (41)	
Physical assault, timing unspecified		63% (84)
Attacked without weapon; seriously injured (A)	38% (51)	
Attacked with weapon (A)	44% (59)	
Family member beat, spanked, pushed; caused injury (A)	40% (53)	
Held in captivity (abducted, held hostage, prisoner of war) (A)	17% (24)	
Childhood exposure to household members' stressors		79% (107)
Household member had drinking problem	60% (82)	
Household member used street drugs	52% (71)	
Household member depressed or mentally ill	51% (69)	
Household member attempted suicide	15% (21)	
Household member went to prison	29% (40)	
Combat (in military service; official or unofficial war zone (A)	2% (3)	--
Other event: Any other extraordinarily stressful situation or event	25% (33)	--

Note. (A) indicates Criterion A event.

Table 3. Health indicator descriptive statistics by probable PTSD status (PCL-5 score > 30).

Variable (possible range)		M (SD) or % (n)		
		PTSD	No PTSD	Total
Criterion A events experienced (0-30)**		11.45 (5.79)	5.64 (4.80)	9.76 (6.11)
Non-Criterion A events experienced (0-10)**		6.77 (3.21)	3.95 (3.02)	5.94 (3.40)
PCL-5 score (0-80)**		54.84 (13.63)	13.12 (10.04)	42.27 (22.99)
PHQ-9 score (0-18)**		15.63 (7.07)	6.40 (4.83)	12.78 (7.73)
DEERS-SF score (18-90)**		54.62 (14.49)	37.56 (13.28)	49.37 (16.15)
SUD diagnosis	AUD	8% (8)	2% (1)	7% (9)
	DUD	38% (36)	50% (20)	41% (56)
	AUD and DUD	38% (36)	32% (13)	36% (49)
BARC-10 score (10-60)		41.35 (8.18)	44.43 (11.60)	42.31 (9.44)
SF-12 score	Physical component	44.13 (9.15)	47.20 (10.29)	45.06 (9.58)
	Mental component**	31.80 (11.92)	46.62 (9.12)	36.32 (13.05)

Notes. Percentages are based on available data and do not reflect missing data. Two-tailed *t*-tests assessed group differences for continuous variables. Chi-squared tests (Fisher's exact) assessed group differences for categorical variables. AUD = alcohol use disorder; DUD = drug use disorder.

* $p < .05$ ** $p < .01$

Table 4. Regression Analyses between Number of Criterion A and Non-Criterion A Events and Mental Health Indicators

	Criterion A stressors				Non-Criterion A stressors			
	B	95% CI for B	β	p	B	95% CI for B	B	p
PTSD symptoms (PCL-5)	1.58	[0.76, 2.41]	.42	<.001	1.20	[-0.29, 2.68]	.18	.113
Depressive symptoms (PHQ-9)	0.57	[0.26, 0.87]	.45	<.001	-0.04	[-0.59, 0.51]	-.02	.885
Emotion regulation difficulties (DERS-SF)	0.66	[0.01, 1.32]	.25	.048	0.79	[-0.39, 1.98]	.17	.186
Recovery capital (BARC-10)	-0.34	[-0.75, 0.07]	-.22	.102	0.17	[-0.57, 0.91]	.06	.648
Quality of life: physical health (SF-12)	-0.78	[-1.20, -0.36]	-.50	<.001	0.75	[-0.01, 1.51]	.27	.052
Quality of life: mental health (SF-12)	-0.52	[-1.07, 0.03]	-.24	.064	-0.84	[-1.83, 0.16]	-.22	.097