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Trauma Symptoms, Minority Stress, and Substance Use: Implications for Trauma Treatment in Sexual and Gender Minority Communities

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Patient consent statement: Participants completed informed consent upon enrollment in The PRIDE Study.

Trauma Symptoms, Minority Stress, and Substance Use: Implications for Trauma Treatment in Sexual and Gender Minority Communities

Abstract

Objective: Posttraumatic stress symptoms are very high among sexual and/or gender minority (SGM) people. Development and testing of trauma interventions with SGM people is needed, but first we need to understand who among SGM people are at greatest risk of posttraumatic stress symptoms, how minority stress may contribute, and the frequency of substance use comorbidity with significant posttraumatic stress symptoms among SGM people.

Method: General linear models and logistic regressions were used to examine demographic differences, minority stress, and substance use related to posttraumatic stress symptoms among a national sample of SGM people ($N = 4,589$, $M_{age} = 32.1$, 55% cisgender).

Results: All gender groups had greater posttraumatic stress symptoms than the reference group of cisgender men. All sexual orientation groups, except for straight/heterosexual SGM people, had greater posttraumatic stress symptoms than participants in the reference gay/lesbian group. Younger age and identifying as American Indian or Alaska Native and Hispanic, Latino, or Spanish was associated with more posttraumatic stress symptoms. Non-specific and SGM-specific minority stress were each related to greater odds of significant posttraumatic stress symptoms, even after accounting for Criterion A events. Among participants with significant posttraumatic stress

symptoms, 13.6% were at risk for alcohol use disorder, and 56.4% were at risk for other substance use disorder.

Conclusions: Marginalized SGM subgroups have more posttraumatic stress symptoms. Interventions for SGM people should consider minority stress coping strategies and substance use comorbidities.

Keywords: PTSD phenomenology; Substance abuse; LGBTQ/Sexual minority status/Sexual or gender minority

Introduction

Sexual and/or gender minority people (SM and GM, respectively; collectively SGM) experience a higher risk for posttraumatic stress disorder (PTSD) than their heterosexual and/or cisgender counterparts (Livingston et al., 2022; Roberts et al., 2010; Shipherd et al., 2011, 2021). Estimated PTSD prevalence is 12-27% in SM women, 7-14% in SM men (Roberts et al., 2010), and 44% in community samples of GM people (Barr et al., 2021; Reisner et al., 2016). There appear to be differences in posttraumatic stress symptoms and prevalence between different subgroups of SGM people, including higher PTSD prevalence among SM women than SM men (Roberts et al., 2010) and greater posttraumatic symptoms among transgender women than transgender men (Reisner et al., 2016). These differential rates correspond in part to differences in rates of trauma exposure, with estimated ranges of lifetime trauma exposure at 77-89% for SM women, 76-88% for SM men, and 82-98% for GM people collectively (House et al., 2011; Roberts et al., 2010; Shipherd et al., 2011).

The intersectionality framework proposes that the mental health and lived experiences of multiply oppressed and marginalized individuals are shaped by the power structures which operate based on the intersections of their marginalized identities (e.g., Collins, 1990; Crenshaw, 1989). The application of the intersectionality framework in trauma research among SGM populations has yielded important findings such individuals with multiple marginalized identities reporting higher rates of traumatic events

(Caceres et al., 2019), greater discriminatory experiences, and more posttraumatic stress symptoms (Reisner et al., 2016). For example, transgender women and GM adolescents who were exposed to high levels of racial- and GM-based discrimination were nearly two to three times as likely to report posttraumatic stress symptoms as those with low levels of exposure, though trauma exposure was not accounted for in this study (Wilson et al., 2016). The intersectionality framework suggests that SGM individuals holding multiple marginalized identities are likely to have even greater posttraumatic stress symptoms. A better understanding of posttraumatic stress symptoms among SGM populations is needed, particularly among SGM populations that have been less frequently researched and who are at the intersections of multiple marginalized identities.

These frameworks alone do not provide the nuanced information necessary to understand how minority stress and trauma experiences coalesce to produce posttraumatic stress symptoms among SGM people, nor does it provide what is needed to know the clinical steps to take for SGM people who are experiencing both trauma and minority stress. As outlined by Shipherd et al., 2019 in their seminal work on the integration of trauma recovery with the Minority Stress Model, the minority stress model ideally provides the impetus for prevention efforts (*e.g.*, preventing minority stress as in Heck, 2015). Shipherd et al. (2019) outline the Trauma and Minority Stress Exposure Model for GM people to understand clinically significant

experiences which influence symptoms among GM people, which include trauma exposures, minority stress, discrimination, and microaggressions, and they make assessment and treatment recommendations for GM populations.

Complicating Factors such as Minority Stress and Substance Use

Complicating factors such as ongoing minority stress and substance use may diminish the effectiveness of existing posttraumatic stress treatments to reduce posttraumatic stress symptoms in SGM people. The minority stress model posits that historically oppressed and marginalized groups (such as SGM people) are at greater risk for poor health outcomes (e.g., posttraumatic stress symptoms and substance use) because of heightened experiences of identity-based stressors in the social environment (Hatzenbuehler, 2009; Meyer, 2003; Brooks, 1981). These stressors are over and above general stressors experienced by all, such as financial stressors.

A clinical diagnosis of PTSD requires exposure to one or more events involving actual or threatened death, serious injury, or sexual violence, known as Criterion A events (Wilson et al., 2016). However, direct linkages between minority stressors, which may or may not qualify as Criterion A exposures (Livingston et al., 2019), and the development or worsening of posttraumatic stress symptoms are beginning to be demonstrated. SM women experience greater posttraumatic stress symptoms longitudinally in relation to both internalized stigma and trauma exposures (Dworkin et al., 2018). Similarly, previous trauma exposure may worsen elements of minority

stress, such as internalized stigma related to a marginalized identity, which can exacerbate posttraumatic stress symptoms (Straub et al., 2018). Internalized stigma is also associated with greater posttraumatic stress symptoms over and above the risk conferred by potentially traumatic events among SM women (Veldhuis et al., 2022). These findings suggest that minority stress may contribute to an exacerbation of posttraumatic stress symptoms among SGM people, increasing these symptoms beyond the impacts of a Criterion A events alone.

Extensive research has demonstrated that minority stress among SGM people is associated with greater substance use (e.g., (Livingston et al., 2017; Wolford-Clevenger et al., 2021) and posttraumatic stress disorder is related to higher occurrence of substance use disorder among the general population (McCauley et al., 2012). These relationships have often been attributed to the use of substances as a means to cope with minority stress experiences (e.g., Dyar et al., 2022) and posttraumatic stress symptoms (McCauley et al., 2012). Greater rates of substance use have been consistently observed among SGM populations compared to non-SGM populations (e.g., Reisner et al., 2015). However, the co-occurrence of substance use among SGM people with posttraumatic stress symptoms remains unstudied. Information about the co-occurrence of substance use and posttraumatic stress symptoms within SGM communities is needed to inform the development and testing of treatments for these groups.

Posttraumatic Stress Treatments among SGM People

While the results of large clinical trials of posttraumatic stress treatments for SGM people are not yet available, recent case studies have described successful treatment of posttraumatic stress symptoms for SGM patients using existing trauma treatments (e.g., a pilot study of 14 SGM people demonstrated reduced posttraumatic stress symptoms after receiving trauma-focused psychodynamic psychotherapy, Keefe et al., 2023). Clinical considerations for SGM populations have been outlined in prior work (Livingston et al., 2020). The limited treatment evidence suggests that more research on trauma treatments for SGM people are needed to understand if there are heterogeneity of treatment effects among SGM subpopulations, and to understand the impacts of minority stress and substance use on the effectiveness of these treatments. Unfortunately, systematic review has demonstrated that clinical trials of mental health interventions have failed to report on SGM status (Heck et al., 2017), and clinical trials for posttraumatic stress disorder are also failing to report SGM status (Harper et al., 2022), making secondary analysis or meta-analysis of existing trials infeasible. To prepare for treatment research, more information is needed about posttraumatic stress among SGM people including 1) the severity of posttraumatic stress symptoms among subgroups of SGM people that have not been substantially represented in prior research, 2) how minority stress is related to posttraumatic stress symptoms over and above traumatic (*i.e.*, Criterion A) events, and 3) the frequency of the co-occurrence of substance use and significant posttraumatic stress symptoms among SGM people.

Information about the heterogeneity of posttraumatic stress symptoms across various marginalized identities, the role of minority stress in contributing to posttraumatic stress symptoms and the co-occurrence of substance use may be relevant to tailoring PTSD treatments to optimize outcomes.

Purpose of the Study

The purpose of this study was to investigate areas that may inform future trauma treatment research and clinical practice to ultimately improve trauma treatments for SGM people. We built our analyses and hypotheses on the Minority Stress Model, the Intersectionality Framework, and the Trauma and Minority Stress Exposure Model. We built the analysis plan with input from our Trauma Focused Learning Collaborative, which included representatives from across the United States including: SGM patients who have received posttraumatic stress treatment, SGM researchers and clinical experts, posttraumatic stress focused researchers and clinical experts, clinicians in SGM-specific clinics across the United States, and administrators in SGM-specific clinics across the United States. Our goal was to glean the information necessary to implement a successful comparative effectiveness study of posttraumatic stress treatments among SGM people, taking into account the specific subgroups that may be important for heterogeneity of treatment effects based on differences in symptoms, as well as understanding the cooccurrence of complicating factors (*i.e.*, substance use and minority stress) that may alter treatment effectiveness. To accomplish

these goals, first, we examined the prevalence of posttraumatic stress symptoms within a national cohort of SGM people (including people with identities that have been less well-researched and those with multiple marginalized identities) and examined demographic differences in posttraumatic stress symptoms by gender, sexual orientation, race and ethnicity, and age, and at the intersections of these characteristics. Consistent with an intersectionality framework, we expected people with identities that are associated with greater societal marginalization (*e.g.*, racial minority people, transgender people, nonbinary people) would have greater posttraumatic stress symptoms than people with less marginalized identities. Second, we sought to determine if there was a relationship between minority stress and posttraumatic stress symptoms even after accounting for whether an individual had experienced a Criterion A event. Finally, we examined the co-occurrence of posttraumatic stress symptoms and substance use among SGM people, expecting that there would be a high co-occurrence of risk for alcohol and other substance use disorders among SGM people experiencing posttraumatic stress symptoms.

Method

Participants

This study included participants of The Population Research in Identity and Disparities for Equality (PRIDE) Study, a longitudinal cohort study of SGM people within the United States and its territories. Eligible participants for The PRIDE Study must be age 18 or older, identify as LGBTQ+ or another

sexual and/or gender minority, and be comfortable reading and writing in English. Data were collected using The PRIDE Study's digital research platform and Qualtrics survey software (for details, see Lunn et al., 2019). Participants are recruited through PRIDENet's networks of LGBTQ+-serving organizations, through in person events, and through online engagement and advertising.

Community Input

This paper arose from a community engaged process, working with a Trauma Focused Learning Collaborative (20 individuals) comprised of: clinicians, SGM patients who had experienced trauma treatment, and administrators from 5 LGBTQIA+-serving mental health clinics from across the United States as well as SGM research and clinical experts and trauma research and clinical experts (who are part of the authorship team). The Learning Collaborative met for two years in quarterly 2-hour meetings. The analyses described here were built upon their input, the review of available literature by the research team and with this group, and their experiences being or providing care for SGM patients with posttraumatic stress symptoms. During these meetings these stakeholders provided their input and weighed in about exactly what was needed in posttraumatic stress research among LGBTQIA+ patients and communities in their settings. Topics of interest emerged which included the observations that there are differences in trauma symptoms among different subgroups of LGBTQIA+ people, that these differences are exacerbated by minority stress, and that there is great comorbidity with substance use.

Interest in these topics supported the development of this investigation. Planned analyses were also reviewed by the Participant Advisory Committee of The PRIDE Study.

Procedure

Participants provided informed consent upon enrollment in The PRIDE Study. Participants were entered into drawings for gift cards related to survey completion. Data analyzed within this study were from the 2021 Annual Questionnaire, administered July 2021 and May 2022. The study was approved by the institutional review boards of the University of California, San Francisco, WIRB-Copernicus Group (WCG), and Stanford University.

Measures

Race and ethnicity were measured by the question, “What categories best describe you?” with 8 response options offered as found in Table 1. Participants could select more than one race and/or ethnicity. For analyses, we created dichotomous indicator variables for each race and ethnicity to account for those who reported more than one race and/or ethnicity.

Sexual orientation was measured by the question, “If you had to choose only one of the following terms, which best describes your current sexual orientation?” with response options: “Asexual/Demisexual/Gray-Ace,” “Bisexual/Pansexual,” “Gay/Lesbian,” “Queer,” “Straight/Heterosexual,” or “Another sexual orientation.” These six categories were created based on feedback from experts in SGM health including The PRIDE Study’s Participant Advisory Committee. Gender was measured by asking participants, “If you

had to choose only one of the following terms, which best describes your current gender identity?" with response options: "Cisgender man," "Cisgender woman," "Non-binary," "Transgender man," "Transgender woman," or "Another gender identity." Additional detail on sexual orientation and gender can be found in Supplemental Material 1.

Posttraumatic Stress Symptoms

DSM-IV posttraumatic stress symptoms were measured using the Abbreviated 6-Item PTSD Checklist (PCL-6, Lang & Stein, 2005). The measure assesses how much the individual has been bothered by six problems in the past month, with two items from each of the three symptom clusters (criterion B, C, D) of the DSM-IV diagnostic criteria. These problems include reoccurring dreams, thoughts, or feelings related to the traumatic event, avoidance of thoughts, places, or people associated with the event, and hyperarousal induced by the event. For example, "In the past month, how much have you been bothered by the following problem: Feeling very upset when something reminded you of a stressful experience from the past?" Items were rated on a 5-point Likert scale (1: *Not at all* to 5: *Extremely*). PCL-6 scores were calculated as a sum of the 6 items (range: 6 to 30). The PCL-6 has demonstrated concurrent validity and good internal consistency (Cronbach's $\alpha = .88$ to $.90$) among military veterans (Lang et al., 2003; Lang & Stein, 2005). A similar Cronbach's α was noted in the current sample ($.85$). To assess for *significant* posttraumatic stress symptoms corresponding to screening positive for posttraumatic stress disorder, we used a score of \geq

14, the commonly accepted cutoff score (Lang & Stein, 2005).

Criterion A Events

Criterion A events were measured through a single item from the Primary Care PTSD Screen for DSM-5 (PC-PTSD-5, Prins et al., 2016): “Sometimes things happen to people that are unusually or especially frightening, horrible, or traumatic. For example: a serious accident or fire, a physical or sexual assault or abuse, an earthquake or flood, a war, seeing someone be killed or seriously injured, having a loved one die through homicide or suicide.” We asked participants if they had experienced an event like that within the past 12 months, more than 12 months ago, or not at all.

Minority Stress

To examine minority stress experiences, participants completed either two or three subscales that were adapted from the 5-item SM and 4-item non-specific minority stress subscales of the Cultural Assessment for the Risk of Suicide (CARS) Scale (Chu et al., 2013). These subscales were developed and tested specifically to measure minority stress experiences, and have previously been shown to be related to both clinical and biological outcomes consistent with minority stress exposures (*e.g.*, Chu et al., 2013; Flentje et al., 2018; Ghanooni et al., 2022). Validation studies of the adapted measures are in progress. Participants were administered the non-specific minority stress subscale in addition to a SM stress subscale, a GM stress subscale (adapted from the SM stress subscale), or both SM and GM subscales based on whether participants chose to complete measures designed for SM

people, GM people, or both. Additional details about these scales can be found in Supplementary Material 1. As there is no consensus on how to account for minority stress experiences related to multiple identities, the highest score of the subscales was used to reflect the greatest amount of SGM-specific minority stress experienced by the individual, irrespective of whether it was due to SM or GM identity. The measures demonstrated poor to fair internal consistency in our sample (Cronbach's $\alpha = .70$ for non-specific minority stress, $.59$ for SM stress, and $.54$ for GM stress), which is consistent with them conceptually measuring discrete components of minority stress which may not be uniform within an individual.

Substance Use

Moderate to high risk for substance use disorder was measured using the Alcohol Use Disorders Identification Test (AUDIT, Saunders et al., 1993), and risk for other substance use disorder was assessed using the National Institute on Drug Abuse (NIDA)-Modified Alcohol, Smoking and Substance Involvement Screening Test (NM-ASSIST, Humeniuk et al., 2008). The AUDIT is a 10-item screening measure for hazardous alcohol use that assesses alcohol-related problems, alcohol consumption, and behaviors associated with alcohol use over the past 12 months. Scores range from 0 to 40 with higher scores indicating greater severity. The AUDIT was used to derive two categories: low risk and moderate to high risk for alcohol use disorder using the cut point of 8 or more as indicative of moderate to high risk for alcohol use disorder (Saunders et al., 1993). The AUDIT has demonstrated good

psychometric properties (Daeppen et al., 2000; Saunders et al., 1993). The NM-ASSIST measures the use of the following substances: cannabis, cocaine, prescription stimulants, methamphetamine, inhalants, sedatives/sleeping pills, hallucinogens, street opioids, prescription opioids, and other drugs over the past 3 months. Based on expert and community feedback about SGM substance use, the following substances were also queried in a format identical to the NM-ASSIST format: inhaled nitrates (poppers), MDMA, and GHB. For each substance, scores range from 0 to 39 with higher scores indicating greater severity. Scores of 4 or more indicated moderate or high-risk for other substance use disorder (Humenuik et al., 2008). The NM-ASSIST has demonstrated good internal consistency (Cronbach's $\alpha = .73-92$), and validity (Humenuik et al., 2008; Newcombe et al., 2005; World Health Organization, 2002).

Data Analysis

Frequencies were calculated for all study variables. To examine demographic differences in posttraumatic stress symptoms, we used general linear models (GLMs) to assess relationships between demographics (gender, sexual orientation, race and ethnicity, age) and posttraumatic stress symptoms (PCL-6 score). The reference group for sexual orientation was people who self-classified into the lesbian/gay category and for gender was people who selected the category of cisgender men because these SGM groups are the most well-researched in SGM trauma literature (e.g., Roberts et al., 2010). Additional *post hoc* pairwise comparisons were performed to

examine least squares mean differences in PCL-6 scores by gender and sexual orientation groups using a Tukey-Kramer multiple comparison adjustment (Kramer, 1956).

To examine the intersections of gender, sexual orientation, race and ethnicity, and age in relation to PCL-6 scores, we used conditional inference trees via the *c-tree* function (Hothorn et al., 2006a) in R, Version 4.2.3 (R Core Team, 2023). Conditional inference trees are non-parametric regression models that use a supervised machine learning algorithm to perform unbiased recursive partitioning of independent variables with respect to a dependent variable (Hothorn et al., 2006b). The partitions for the independent variables (e.g., age) were established using a conditional inference framework incorporating binary recursive partitioning and the theory of permutation tests (Hothorn et al., 2006b). The split criterion was determined by statistical significance. A Bonferroni correction was used to adjust for multiple comparisons. Recursive partitioning stopped when there were no further significant Bonferroni-adjusted p-values. Conditional inference trees have been shown to produce accurate estimates in examining intersectionality by retaining intersections that are related to the outcome, particularly when some of these intersections contain small cell sizes (Mahendran et al., 2022). For this analysis, <1% of participants were excluded because of missing data.

GLMs investigated the relationship between Criterion A events and posttraumatic stress symptoms, minority stress and posttraumatic stress

symptoms, and the relationship between minority stress and posttraumatic stress symptoms when Criterion A events are considered. Logistic regressions investigated the relationship between Criterion A events and significant posttraumatic stress symptoms (*i.e.*, PCL-6 score ≥ 14), minority stress and significant posttraumatic stress symptoms, and the relationship between minority stress and significant posttraumatic stress symptoms when adjusting for Criterion A events. The reference group for Criterion A events was participants with no reported Criterion A events. Chi-square tests were conducted to examine whether participants with significant posttraumatic stress symptoms differed by risk for alcohol and other substance use disorders (*i.e.*, dichotomized to moderate or high risk versus low risk for alcohol and other substance use disorders based on categories created using AUDIT and NM-ASSIST scores) and Criterion A events (*i.e.*, within the past 12 months, more than 12 months ago, and no Criterion A event). Data were analyzed using SAS, Version 9.4 (SAS Institute, 2013) and R, Version 4.2.3 (R Core Team, 2023).

Results

Demographics ($N = 4,589$) are described in Table 1. The median age was 32.1 years. Forty-five percent of participants identified with a GM identity (*i.e.*, non-binary, transgender man, transgender woman, and another gender identity). The largest sexual orientation groups were gay/lesbian (42%), bisexual/pansexual (25%), and queer (23%). Most of the sample identified as White only (82%%, an additional 10% reported White and

another race or ethnicity), had a college degree (53%), and an income of \leq \$40K (51%). Among all participants, 57% reported a Criterion A event and 45% had significant posttraumatic stress symptoms.

Demographics related to Posttraumatic Stress Symptoms

Results of the analyses of demographics and posttraumatic stress symptoms are presented in Table 2. All gender groups had higher posttraumatic stress symptoms than cisgender men (B range: 1.05-3.15, $p < .001$ for all). Cisgender women had lower PCL-6 scores than all other gender groups except for cisgender men ($p = .028$ for transgender woman and $p < .001$ for the remaining groups). Non-binary participants had higher PCL-6 scores than transgender women ($p = .045$). All sexual orientation groups, except for straight/heterosexual, had greater PCL-6 scores than the gay/lesbian group (B range: .59-2.65, p range: $< .001$ -.027), no other differences were noted in subsequent sexual orientation pairwise comparisons. Older age was related to lower posttraumatic stress symptoms ($B = -.07$, $p = < .001$). American Indian or Alaska Native ($B = 1.44$, $p < .001$) and Hispanic, Latino, or Spanish ($B = .94$, $p = .004$) groups had greater posttraumatic stress symptoms.

The first recursive partition of the conditional inference trees was induced by age (displayed in Figure 1). Two categories emerged: participants aged ≤ 47.5 years and > 47.5 years. The ≤ 47.5 -year-old partition of the sample was divided based on gender, suggesting differences in PCL-6 scores based on cisgender versus gender minority groups. Among the gender

minority partition, the sample was further divided by age ($p < .001$), suggesting higher PCL-6 scores among participants ≤ 23.1 years of age than those between the ages of 23.1 and 47.5 years. The cisgender partition among participants ≤ 47.5 years was divided by gender ($p < .001$), suggesting higher PCL-6 scores among cisgender women than cisgender men.

Among those > 47.5 years, an additional split occurred for age, dividing participants into two categories: participants aged ≤ 57.5 years and > 57.5 years ($p < .001$). Among participants aged 47.5- 57.5 years, higher PCL-6 scores were observed among gender minority people (vs. cisgender people) ($p = .031$). Among participants > 57.5 years of age, further partitioning occurred based on American Indian or Alaska Native identity ($p = .038$, indicating higher scores among individuals with American Indian or Alaska Native identity). These results suggest that age, gender, and American Indian or Alaska Native identity were the most significant intersections in relation to PCL-6 scores.

Criterion A Events, Minority Stress, and Posttraumatic Stress Symptoms

Results of the analyses of Criterion A events and minority stress predicting posttraumatic stress symptoms and significant posttraumatic stress symptoms (*i.e.*, PCL-6 ≥ 14) are presented in Table 3. Considered alone, Criterion A events (within and beyond the past year) were related to posttraumatic stress symptoms ($B = 5.46$ for past year event, $B = 3.02$ for

event more than one year prior, $p < .001$ for both) and odds of significant posttraumatic stress symptoms (OR: 4.84, 95% CI: [3.91-5.99] for past year event, OR: 2.84, 95% CI: [2.50-3.23] for event more than one year prior, $p < .001$ for both). Non-specific ($B = .29$, $p < .001$) and SM- or GM-specific ($B = .32$, $p < .001$) minority stress were related to both posttraumatic stress symptoms and odds of significant posttraumatic stress symptoms (OR: 1.12, 95%CI: [1.10-1.14], $p < .001$ and OR: 1.12, 95% CI: [1.11-1.14], $p < .001$, respectively). Non-specific ($B = .24$, $p < .001$) and SM- and GM- ($B = .30$, $p < .001$) minority stress remained related to posttraumatic stress symptoms and non-specific (OR: 1.10, 95% CI: [1.08, 1.12], $p < .001$) and SM- and GM-specific (OR: 1.12, 95% CI: [1.10-1.14], $p < .001$) minority stress were related to greater odds of significant posttraumatic stress symptoms, even after accounting for Criterion A traumatic events. Percentages of people with significant posttraumatic stress symptoms by experiences of Criterion A events are in Table 4.

Substance use and Significant Posttraumatic Stress Symptoms

Chi-square analyses indicated that participants with significant posttraumatic stress symptoms were more likely to be at moderate to high risk for alcohol use disorder ($\chi^2 [1] = 17.82$, $p = <.001$) and other substance use disorder ($\chi^2 [1] = 217.32$, $p = <.001$, Table 4). Among participants with significant posttraumatic stress symptoms, 13.6% (278 out of 2,050 with significant posttraumatic stress symptoms) were at moderate or high risk for alcohol use disorder, and 56.4% (1,157 out of 2,051 with significant

posttraumatic stress symptoms) were at moderate or high risk for other substance use disorder.

Discussion

In this study, we found that both SGM-specific and non-specific minority stress and Criterion A events were associated with posttraumatic stress symptoms. The association of minority stress with posttraumatic stress symptom severity persisted after accounting for Criterion A events. Although a growing body of research has demonstrated an association between minority stress and posttraumatic stress symptoms, few studies have specifically examined minority stress as a path to the development of posttraumatic stress symptoms (Straub et al., 2018). Our findings provide empirical support for the claim that posttraumatic stress sequelae occur even when Criterion A events are not present, as previously demonstrated (Alessi et al., 2013). Posttraumatic stress treatment may be beneficial for SGM people ineligible or not considered for trauma treatment services (*e.g.*, those exhibiting posttraumatic stress symptoms in the absence of a Criterion A event), though more research is needed to understand which, if any, existing posttraumatic stress treatments may be indicated or therapeutic. Clinicians who provide care for GM patients did not perceive anticipated GM-related victimization, discrimination, and hate crimes as Criterion A events, even when GM people perceived these as Criterion A events (Salomaa et al., 2022). Posttraumatic stress interventions for SGM people should incorporate the impacts of minority stress on posttraumatic stress symptoms

Interventions have been developed to help SGM people cope with minority stress (e.g., Chaudoir et al., 2017; Flentje et al., 2022) and components of these interventions may be helpful to incorporate into existing posttraumatic stress interventions (see also, Salomaa et al., 2024 for a discussion).

Within this study, 14% of people with significant posttraumatic stress symptoms who may benefit from posttraumatic stress treatment also had moderate to high risk for alcohol use disorder and 56% had moderate to high risk for other substance use disorder. Past work has demonstrated higher rates of alcohol-related deaths and more years of life lost due to alcohol use among SM (vs. non-SM) veterans (Lynch et al., 2022). These findings highlight the importance in developing and testing interventions that incorporate coping strategies to reduce and/or directly address substance use, as these may be more effective in treating posttraumatic stress symptoms with this population. Skills Training in Affective and Interpersonal Regulation (STAIR) Narrative Therapy is a skills-based, trauma-focused intervention that has been shown to reduce posttraumatic stress symptoms and coping-driven substance use by improving emotional management and interpersonal skills (Levitt et al., 2007). Interventions that include coping skills for ongoing stress (*i.e.*, not focusing solely on past events) may be more appropriate in the context of minority stress.

This study is one of few that have examined posttraumatic stress symptoms among SGM groups that are rarely examined in trauma research, such as non-binary people. In the study, we found that several demographic

characteristics were associated with greater symptom severity. All gender groups, including cisgender women, non-binary people, transgender men, transgender women, and people reporting another gender had more severe posttraumatic stress symptoms than cisgender men. Further, cisgender women had lower symptom severity than all other gender groups except for cisgender men. Non-binary participants had greater symptom severity than transgender women. To our knowledge, this is the first study to suggest that non-binary people may have more severe posttraumatic stress symptoms than transgender women. We expect this is because prior work has not included enough non-binary people to detect this relationship, though it may also be that our relatively small sample of transgender women are not reflective of the population. Clinicians should be aware of the potential for higher occurrence of posttraumatic stress symptoms among SGM people with more marginalized genders. Further, studies testing posttraumatic stress disorder treatments should account for the potential of heterogeneity of treatment effects by gender in their designs.

When examining differences by sexual orientation, all groups (except for straight/heterosexual SGM participants) had greater posttraumatic stress symptom severity than the gay/lesbian group. When we considered sexual orientation among other intersecting identities, it was not identified as one of the key intersections related to posttraumatic stress symptoms, though this may have been different if our sample included cisgender heterosexual people. Gender, age, and race and ethnicity may be more important

predictors of posttraumatic stress symptoms among SGM people.

Our study demonstrated that older age is associated with less severe posttraumatic stress symptoms, substantiating prior findings in the general population (Reynolds et al., 2016). An exception to this was participants aged older than 57.5 years who identified as Native American or Alaska Native. Despite older SGM adults in this study generally having less severe symptoms, trauma treatment among this population is still needed.

When examining the associations between race and ethnicity and posttraumatic stress symptoms, we found that SGM people who reported an identity of American Indian or Alaska Native or Hispanic, Latino, or Spanish experienced greater symptom severity than those not reporting the respective identity. Similar patterns have been found in general population studies when comparing people who identified as American Indian/Native American and Hispanic/Latino with their White counterparts (e.g., Bassett et al., 2014). These differences may be attributed to an increased experience of peri-traumatic reactions such as dissociation (Alcántara et al., 2013) or due to experiences of both individual and collective trauma (Mohatt et al., 2014). A recent study found that people who identified as American Indian/Native American *and* as an SM person had higher rates of trauma exposure than those who did not identify as an SM person (Giano et al., 2021). Culturally informed interventions for these groups may be needed to address their experiences of intersectional minority stress and trauma.

Limitations

In this study, we used cross-sectional data. Longitudinal research may provide greater insight into trauma, its sequelae, and the naturalistic changing of posttraumatic stress symptoms over time. The measures aimed at capturing non-specific and SGM-specific minority stress had poor to fair internal consistency in this study; this may reflect variability in experiences of the different components of minority stress assessed within these composite measures. We employed brief self-report screening measures to obtain information about participants' Criterion A events and posttraumatic stress symptoms. This sacrificed the specificity of clinician assessment but enabled us to reach larger samples of SGM people to test study hypotheses among underrepresented SGM subgroups. A clinician administered interview would be needed to determine if an individual is in need of treatment. To provide continuity of measurement within the longitudinal design of The PRIDE Study, the measures assessing posttraumatic stress symptoms were based on the now outdated DSM-IV criteria for PTSD, as those were the measures available in a brief format at the start of longitudinal data collection. Future studies should consider using more comprehensive measurement tools. Further, less than 5% of the sample identifying as: American Indian or Alaska Native; Black, African American, or African; Middle Eastern or North African; and Native Hawaiian or other Pacific Islander, though we used methods that are robust with smaller samples of identity intersections (Mahendran et al., 2022). Due to the significantly lower number of racial minority participants than White only participants, our findings

should be interpreted with caution. Future research is needed to replicate these findings in samples with greater racial and ethnic diversity.

Conclusion

The study examined rates of posttraumatic stress symptoms among a national cohort of SGM people and found demographic differences in posttraumatic stress symptom severity. Non-binary people reported greater posttraumatic stress symptoms than transgender women and all sexual orientation groups (except for straight/heterosexual SGM people) reported greater posttraumatic stress symptoms than the gay/lesbian individuals. Older people generally had less posttraumatic stress symptom severity. People who identified as American Indian or Alaska Native or Hispanic, Latino, or Spanish had greater posttraumatic stress symptom severity. Both SGM and non-specific minority stress were associated with posttraumatic stress symptoms, even after accounting for Criterion A events. Our findings also suggest that SGM people who seek posttraumatic stress treatment may have co-occurring substance use. Future trauma-focused interventions for SGM populations should consider incorporating strategies to cope with both minority stress and substance use.

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