Prevalence of social and economic stressors among transgender veterans with alcohol and other drug use disorders

Olivia V. Fletcher a, 1, Jessica A. Chen a, b, Jenna van Draanen c, d, Madeline C. Frost a, c, Anna D. Rubinsky a, c, John R. Blosnich f, g, Emily C. Williams a, c

a Health Services Research & Development (HSR&D) Center of Innovation for Veteran-Centered and Value-Driven Care, Veterans Affairs (VA) Puget Sound Health Care System, 1660 S Columbia Way, Seattle, WA, 98108, USA
b Department of Psychiatry and Behavioral Science, University of Washington, 1595 NE Pacific St, Box 356560, Seattle, WA, 98195, USA
c Department of Health Systems and Population Health, University of Washington School of Public Health, 3980 15th Ave NE, Box 351621, Seattle, WA, 98195, USA
d Department of Family Medicine, University of Washington, 311 Fisher Hall, 1959 NE Pacific St, Box 356560, Seattle, WA, 98195, USA
e Suzanne Dworak-Peck School of Social Work, University of Southern California, 669 W 34th St, Los Angeles, CA, 90089, USA
f Health Services Research & Development (HSR&D) Center for Health Equity Research and Promotion, Veterans Affairs (VA) Pittsburgh Healthcare System, University Drive C, Pittsburgh, PA, 15240, USA

corresponding author. Health Systems Research Development, VA Puget Sound Health Care System, 1660 S. Columbian Way, Seattle, WA, 98108, USA.

E-mail addresses: Olivia.Fletcher@va.gov (O.V. Fletcher), jessica.chen663@va.gov (J.A. Chen), jvandraa@uw.edu (J. van Draanen), madeline.frost@va.gov (M.C. Frost), anna.rubinsky@usc.edu (A.D. Rubinsky), bllosnich@usc.edu (J.R. Blosnich), emily.williams3@va.gov (E.C. Williams).

https://doi.org/10.1016/j.ssmph.2022.101153
Received 24 March 2022; Received in revised form 17 June 2022; Accepted 17 June 2022
Available online 28 June 2022
2352-8273/Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

Transgender persons—individuals who identify with a gender that differs from their sex assigned at birth—are more likely than cisgender persons to experience a variety of social and economic stressors, including housing instability and economic hardship (Balsam, Rothblum, & Beauchaine, 2005; Blosnich et al., 2013; Blosnich, Marsiglio, et al., 2017; Brown & Jones, 2016; Grant et al., 2010; Hughes, Johnson, & Wilsnack, 2001; Lehavot et al., 2016; Shipherd, Darling, Klap, Rose, & Yano, 2018; Stotzer, 2009), likely resulting from substantial exposure to social and economic risk factors.
transphobic discrimination and violence (Bradford, Reisner, Honnold, & Xavier, 2013; James et al., 2016; Lombardi, Wilchins, Priesing, & Malouf, 2002; White Hughto, Reisner, & Pachankis, 2015; Wolfe et al., 2021). The Minority Stress Model posits that discrimination, violence, rejection, and internalized stigma (e.g., internalized transphobia) (Meyer, 2003) negatively affect a person’s resilience and ability to cope with stress (Hendricks & Testa, 2012), thereby increasing risk for adverse health outcomes, including substance use disorders (SUDs) (Hatzenbuehler, 2009; Labouvie & Bates, 2002; Meyer, 1995, 2003; Tartaglia & Bergagna, 2020).

Social and economic stressors may be both a cause and consequence of substance use and related disorders (Assana, Ayvaci, Pollio, Hong, & North, 2018; Braveman & Gottlieb, 2014; DiGuiseppi, Davis, Leighty, & Rice, 2020; Grant et al., 2015; Johnson & Chamberlain, 2008). More specifically, individual experiences of social and economic stress may increase risk of alcohol and drug use disorders (AUD and DUD, respectively) and related adverse outcomes (Giuse et al., 2017; Institute of Medicine, 2011; Mulia et al., 2008; Scheer & Pachankis, 2019; van Draanen et al., 2020), which may in turn increase likelihood of subsequent social and economic stressors and experiences of marginalization (Shehham, 2009; World Health Organization, 2014). This overlapping phenomenon can be characterized as a syndemic, whereby two or more health-related issues interact synergistically and compound one another, further contributing to the burden of disease (Mendenhall, Kohrt, Norris, Ndetei, & Prabhakaran, 2017; Singer, Bulle, Ostrach, & Mendenhall, 2017).

Persons with chronic homelessness (Davidson et al., 2014) and just system involvement (Blodgett et al., 2015) have higher rates of substance use relative to those without these social stressors. Similarly, trauma exposure and victimization—both in early life and adulthood—are predictive of substance use (Begle et al., 2010; Ullman, Relyea, Peter-Hagene, & Vasquez, 2013). The association between substance use and other stressors, such as economic hardship and lack of access to healthcare have also been hypothesized (Galea, Nandi, & Vlahov, 2004; Karriker-Jaffe et al., 2012, 2018; van Draanen et al., 2020), but to our knowledge, have not been studied in persons with SUDs across transgender status.

Research on transgender persons has found that they experience high rates of heavy episodic drinking, AUDs, and other DUDs (Frost et al., 2020; James et al., 2016; Reisner, Greytak, Parsons, & Ybarra, 2015; Williams et al., 2021). Prevalence estimates of alcohol and other drug use among transgender persons range from 26.5% (nonmedical use of prescription drugs) to 72% (alcohol use) (Benotsch et al., 2013; Garofalo et al., 2006; Peacock, Andrinopoulos, & Ybarra, 2015; van Draanen et al., 2020), but to our knowledge, have not been studied in persons with SUDs across transgender status.

We used ICD-9-CM and ICD-10-CM diagnosis codes for abuse or dependence, excluding in remission (Supplemental Table 1) to define prevalence of AUD and DUD in the year prior to AUDIT-C screen. DUD included opioid use disorder, amphetamine/other stimulant use disorder, cocaine use disorder, cannabis use disorder, sedative use disorder, and/or hallucinogen use disorder.

2.4. Social and economic stressors

Guided by the Minority Stress Model, we examined the following social and economic stressors: homelessness, housing instability (a broader term that encompasses chronic homelessness as well as spending one or more nights without shelter), economic hardship, legal problems, social and family problems, barriers to accessing healthcare, military sexual trauma (MST), and other victimization. We defined each stressor using methods that have been previously employed with VA EHR data (Blosnich, Marsiglio, et al., 2017; Blosnich, Montgomery, et al., 2020), based on a combination of outpatient clinic stop codes, inpatient specialty codes, templated social work referral assessments, ICD-9 and ICD-10 codes, and clinical screening questions (Supplemental Table 1). We identified the presence of each stressor in the two years of social and economic stressors among transgender Veterans with and without AUD, DUD, and both, overall and compared to cisgender Veterans.

2. Material and methods

2.1. Data sources and population

We conducted a secondary analysis using data from a study designed to examine patterns of alcohol use and receipt of alcohol-related care among transgender Veterans (Williams et al., 2021). All data were extracted from the VA Corporate Data Warehouse (CDW), a national repository of clinical and administrative data (Souden, 2017). The study population included all VA outpatients at each facility who had at least one documented Alcohol Use Disorders Identification Test Consumption (AUDIT-C) screen between October 1, 2009 and July 31, 2017. The AUDIT-C is administered annually at VA primary care visits for >90% of VA outpatients (Bradley et al., 2006), thus this population is largely representative of the national VA outpatient population. Although patients could have multiple AUDIT-C screens during the study period, the most recent screen at each facility served as the index date, as this would best reflect the current social environment experienced by transgender Veterans. All study procedures were approved by Institutional Review Boards at the VA Puget Sound and the University of Washington.

2.2. Transgender status

Consistent with prior research, we identified transgender Veterans using a method based on International Classification of Disease, 9th and 10th Revision, Clinical Modification (ICD-9-CM and ICD-10-CM) codes related to transgender status (Supplemental Table 1). The use of ICD codes to ascertain transgender status was developed and validated by VA researchers (Blosnich et al., 2013; Blosnich, Brown, Wojcio, Jones, & Bossarte, 2014; Blosnich et al., 2016; Blosnich, Marsiglio, et al., 2017; Brown & Jones, 2016), and has been applied in studies using Centers for Medicare & Medicaid Services Data (Proctor, Hafer, Ewald, Hodge, & James, 2016). Patients with one or more of these codes from the beginning of CDW (1/1/99) to the end of the study (7/31/17) were considered transgender. Although this method does not capture self-reported gender identity, it has high concordance with structured chart reviews assessing the presence of transgender-related clinician notes to determine patients’ gender identity (Blosnich et al., 2018).

2.3. Alcohol and drug use disorder

We used ICD-9-CM and ICD-10-CM diagnosis codes for abuse or dependence, excluding in remission (Supplemental Table 1) to define presence of AUD and DUD in the year prior to AUDIT-C screen. DUD included opioid use disorder, amphetamine/other stimulant use disorder, cocaine use disorder, cannabis use disorder, sedative use disorder, and/or hallucinogen use disorder.

2.4. Social and economic stressors

Guided by the Minority Stress Model, we examined the following social and economic stressors: homelessness, housing instability (a broader term that encompasses chronic homelessness as well as spending one or more nights without shelter), economic hardship, legal problems, social and family problems, barriers to accessing healthcare, military sexual trauma (MST), and other victimization. We defined each stressor using methods that have been previously employed with VA EHR data (Blosnich, Marsiglio, et al., 2017; Blosnich, Montgomery, et al., 2020), based on a combination of outpatient clinic stop codes, inpatient specialty codes, templated social work referral assessments, ICD-9 and ICD-10 codes, and clinical screening questions (Supplemental Table 1). We identified the presence of each stressor in the two years...
prior to AUDIT-C screen, except for MST, which we ascertained at any time prior to AUDIT-C screen as it captures a static variable (history of trauma exposure).

2.5. Additional descriptive variables

Age, race, ethnicity, marital status, and VA copay status were extracted from the CDW at the time of AUDIT-C screen. VA copay status was included as a proxy for socioeconomic status whereby those having no copay required were considered the most disadvantaged. Clinical characteristics, including presence of tobacco use disorder, mood disorders (depression, anxiety, bipolar disorder, other mood disorder), PTSD, suicide risk (ICD codes for suicide ideation and attempt/self-harm; does not include death by suicide), and Charlson comorbidity index (Deyo, Cherkin, & Ciol, 1992) were measured using ICD-9 and ICD-10 codes in the year prior to AUDIT-C screen. HIV and hepatitis C were measured using ICD-9 and ICD-10 codes in 2 years prior to AUDIT-C screen.

2.6. Statistical analyses

We described demographic and clinical characteristics overall and stratified by transgender status. We also described the prevalence of each stressor stratified by transgender status, in the overall population, and separately among Veterans with AUD and/or DUD. Subsequently, to describe the intersecting relationship between social and economic stressors, AUD, and DUD among transgender patients, we estimated the prevalence of each stressor among transgender and cisgender Veterans with AUD only, with DUD only, with both AUD and DUD, and with neither AUD nor DUD. We used Chi-square tests to compare prevalence of stressors between transgender and cisgender Veterans and used a p-value of <0.001 as a cutoff for statistical significance due to the large number of comparisons.

3. Results

3.1. Study population characteristics

Between October 1, 2009 and July 31, 2017, 8,872,793 patients met inclusion criteria, of whom 8619 (0.1%) were transgender (Table 1). Demographic and other population characteristics are presented in Table 1. Transgender patients had a mean age of 52 and were predominantly of non-Hispanic White race/ethnicity (76.9%) and unmarried (72.3%). In this sample of transgender patients, 38.1% had no copay required due to means, 25.1% had PTSD, 4.4% had diagnostic codes related to suicidal ideation or attempt, and 1.9% had HIV. Cisgender patients were generally older (mean age 61), less likely to be of non-Hispanic White race/ethnicity (71.5%), more likely to be married (72.3%). In this sample of transgender patients, 38.1% had no copay required were considered the most disadvantaged. Clinical characteristics, including presence of tobacco use disorder, mood disorders (depression, anxiety, bipolar disorder, other mood disorder), PTSD, suicide risk (ICD codes for suicide ideation and attempt/self-harm; does not include death by suicide), and Charlson comorbidity index (Deyo, Cherkin, & Ciol, 1992) were measured using ICD-9 and ICD-10 codes in the year prior to AUDIT-C screen. HIV and hepatitis C were measured using ICD-9 and ICD-10 codes in 2 years prior to AUDIT-C screen.

Table 1 Demographic and clinical characteristics of a national sample of transgender and cisgender Veterans 2013–2017

| Age (years) | Transgender (N = 8619) | Cisgender (N = 8,864,174) | Total (N = 8,872,793) |
|-------------|------------------------|---------------------------|------------------------|
| Under 30    | 1159 (13.5)            | 552,068 (6.2)             | 553,227 (6.2)          |
| 30–39       | 1323 (15.4)            | 828,099 (9.3)             | 829,422 (9.4)          |
| 40–49       | 1057 (12.3)            | 838,943 (9.5)             | 840,000 (9.5)          |
| 50–59       | 1706 (19.6)            | 1,201,361 (14.7)          | 1,203,567 (14.7)       |
| 60+         | 3374 (39.2)            | 5,343,203 (60.3)          | 5,346,577 (60.3)       |
| Age (years, mean, SD) | 51.7 (16.5)       | 61.2 (17.7)               | 61.2 (17.7)            |

Table 1 Demographic and clinical characteristics of a national sample of transgender and cisgender Veterans 2013–2017

| Race/Ethnicity | Transgender (N = 8619) | Cisgender (N = 8,864,174) | Total (N = 8,872,793) |
|----------------|------------------------|---------------------------|------------------------|
| Black non-Hispanic | 919 (10.7)          | 1,491,965 (16.8)          | 1,493,884 (16.8)       |
| Hispanic        | 429 (5.0)              | 510,902 (5.8)             | 511,331 (5.8)          |
| White non-Hispanic | 6630 (76.9)         | 6,338,799 (71.5)          | 6,345,429 (71.5)       |
| Other           | 331 (3.8)              | 250,783 (2.8)             | 251,114 (2.8)          |
| Unknown         | 310 (3.6)              | 271,725 (3.1)             | 272,035 (3.1)          |

Table 1 Demographic and clinical characteristics of a national sample of transgender and cisgender Veterans 2013–2017

| Marital Status | Transgender (N = 8619) | Cisgender (N = 8,864,174) | Total (N = 8,872,793) |
|----------------|------------------------|---------------------------|------------------------|
| Unknown/Missing | 58 (0.7)              | 48,455 (0.6)             | 48,513 (0.6)           |
| Copay Status   |                        |                           |                        |
| Copay required due to means | 924 (10.7)      | 2,077,865 (23.4)          | 2,079,898 (23.4)       |
| No copay required due to disability | 2165 (25.1)  | 1,655,621 (18.7)          | 1,657,766 (18.7)       |
| No copay required due to means/other | 3280 (38.1) | 3,007,928 (33.9)          | 3,011,208 (33.9)       |
| Other           | 2250 (26.1)            | 2,122,760 (23.9)          | 2,125,010 (24.0)       |
| Alcohol Use Disorder (AUD) | 737 (8.6)  | 537,664 (6.1)             | 538,401 (6.1)          |
| Any Drug Use Disorder (DUD) | 622 (7.2)    | 342,789 (3.9)             | 343,411 (3.9)          |
| AUD and DUD     | 265 (3.1)              | 150,783 (1.7)             | 151,048 (1.7)          |

Table 1 Demographic and clinical characteristics of a national sample of transgender and cisgender Veterans 2013–2017

| Health Conditions | Transgender (N = 8619) | Cisgender (N = 8,864,174) | Total (N = 8,872,793) |
|-------------------|------------------------|---------------------------|------------------------|
| Tobacco Use Disorder | 1261 (14.6)    | 983,683 (11.1)            | 984,444 (11.1)         |
| Major Depression  | 2557 (29.7)           | 912,846 (10.3)            | 915,403 (10.3)         |
| Other Depression  | 1433 (16.6)           | 741,993 (8.4)             | 743,462 (8.4)          |
| Anxiety           | 1559 (18.1)           | 605,341 (6.8)             | 606,900 (6.8)          |
| Bipolar           | 729 (8.5)              | 208,945 (2.4)             | 209,674 (2.4)          |
| Other Mood Disorder | 855 (9.9)       | 314,553 (3.6)             | 315,408 (3.6)          |
| PTSD              | 2162 (25.1)           | 1,176,799 (13.3)          | 1,178,961 (13.3)       |
| Suicide Risk      | 377 (4.4)             | 89,324 (1.0)              | 89,701 (1.0)           |
| HIV               | 164 (1.9)              | 37,298 (0.4)              | 37,462 (0.4)           |
| Charlson Comorbidity Index | 305 (3.5) | 263,253 (3.0)             | 263,558 (3.0)          |

Table 1 Demographic and clinical characteristics of a national sample of transgender and cisgender Veterans 2013–2017

3.2. Prevalence of AUD, DUD, and social and economic stressors across groups

In the overall sample, 6.1% had AUD only, 3.9% had DUD only, and 1.7% had both. Among transgender patients, 8.6% had AUD only, 7.2% had DUD only, and 3.1% had both. Among cisgender patients, 6.1% had AUD only, 3.9% had DUD only, and 1.7% had both.

Among all patients, 0.7% had barriers to access to care, 3.8% had economic hardship, 6.1% had housing instability, 5.1% had homelessness, 6.9% had social and family problems, 1.4% had legal problems, 3.9% had military sexual trauma, and 0.7% had other victimization. Transgender patients experienced all eight stressors at a significantly higher rate than cisgender patients (all p < 0.001; Table 2).
Table 2

Prevalence of Social determinants of health among transgender and cisgender VA outpatients: overall and stratified by presence of alcohol and drug use disorder (N = 8,872,793).

| Barriers to Access to Care | Transgender (N = 8,864,174) | Cisgender (N = 8,864,174) | Chi-Square p-value | Total (N = 8,872,793) |
|---------------------------|-----------------------------|--------------------------|-------------------|----------------------|
| N (%)                     | N (%)                       | p-value                  | N (%)             |
| **Economic Hardship**     |                             |                          |                   |
| All patients              | 1416 (17.0)                 | 537,250 (6.1)            | <0.001            | 538,719 (6.1)        |
| Patients with AUD         | 301 (40.8)                  | 129,702 (24.1)           | <0.001            | 130,003 (24.2)       |
| Patients with DUD         | 265 (45.8)                  | 125,405 (36.6)           | <0.001            | 125,690 (36.6)       |
| Patients with AUD & DUD   | 152 (57.4)                  | 70,861 (47.0)            | 0.001             | 71,013 (47.0)        |
| Patients with neither AUD nor DUD | 1035 (13.8) | 353,004 (4.4)            | <0.001            | 354,039 (4.4)        |
| **Homelessness**          |                             |                          |                   |
| All patients              | 1249 (14.5)                 | 451,806 (5.1)            | <0.001            | 453,055 (5.1)        |
| Patients with AUD         | 281 (38.1)                  | 119,798 (22.3)           | <0.001            | 120,079 (22.3)       |
| Patients with DUD         | 267 (42.9)                  | 117,421 (34.3)           | <0.001            | 117,688 (34.3)       |
| Patients with AUD & DUD   | 144 (54.3)                  | 67,196 (44.6)            | 0.001             | 67,340 (44.6)        |
| Patients with neither AUD nor DUD | 845 (11.2) | 281,783 (3.5)            | <0.001            | 282,628 (3.5)        |
| **Social & Family Problems** |                          |                          |                   |
| All patients              | 1490 (17.3)                 | 608,202 (6.9)            | <0.001            | 609,692 (6.9)        |
| Patients with AUD         | 233 (31.6)                  | 85,595 (15.9)            | <0.001            | 85,828 (15.9)        |
| Patients with DUD         | 190 (30.6)                  | 72,196 (21.1)            | <0.001            | 72,388 (21.1)        |
| Patients with AUD & DUD   | 98 (37.0)                   | 38,848 (25.8)            | <0.001            | 38,946 (25.8)        |
| Patients with neither AUD nor DUD | 1165 (15.5) | 489,257 (6.0)            | <0.001            | 490,422 (6.0)        |
| **Legal Problems**        |                             |                          |                   |
| All patients              | 261 (3.0)                   | 125,122 (1.4)            | <0.001            | 125,383 (1.4)        |
| Patients with AUD         | 83 (11.3)                   | 42,050 (7.8)             | 0.001             | 42,133 (7.8)         |
| Patients with DUD         | 91 (14.6)                   | 37,864 (11.1)            | 0.004             | 37,955 (11.1)        |
| Patients with AUD & DUD   | 54 (20.4)                   | 23,259 (15.4)            | 0.026             | 23,313 (15.4)        |
| Patients with neither AUD nor DUD | 141 (1.9) | 68,467 (0.8)             | <0.001            | 68,608 (0.8)         |

Table 2 (continued)

Patients with neither AUD nor DUD

| Total (N = 8,872,793) | Transgender (N = 8,864,174) | Cisgender (N = 8,864,174) | Chi-Square p-value |
|-----------------------|-----------------------------|--------------------------|-------------------|
| N (%)                 | N (%)                       | p-value                  | N (%)             |
| Military Sexual Trauma|                             |                          |                   |
| All patients          | 1437 (16.7)                 | 345,055 (3.9)            | <0.001            | 346,492 (3.9)        |
| Patients with AUD     | 157 (21.3)                  | 30,237 (5.6)             | <0.001            | 30,394 (5.7)         |
| Patients with DUD     | 151 (24.3)                  | 27,262 (8.0)             | <0.001            | 27,413 (8.0)         |
| Patients with AUD & DUD| 73 (27.6)                   | 12,711 (8.4)             | <0.001            | 12,784 (8.5)         |
| Patients with neither AUD nor DUD | 1202 (16.0) | 300,267 (3.7)            | <0.001            | 301,469 (3.7)        |
| Other Victimization    |                             |                          |                   |
| All patients          | 275 (3.2)                   | 61,937 (0.7)             | <0.001            | 62,212 (0.7)         |
| Patients with AUD     | 54 (7.3)                    | 11,172 (2.1)             | <0.001            | 11,226 (2.1)         |
| Patients with DUD     | 54 (8.7)                    | 9886 (2.9)               | <0.001            | 9940 (2.9)           |
| Patients with AUD & DUD| 30 (11.3)                   | 5829 (3.9)               | <0.001            | 5859 (3.9)           |
| Patients with neither AUD nor DUD | 197 (2.6) | 46,708 (0.6)             | <0.001            | 46,905 (0.6)         |

3.3. Prevalence of social and economic stressors in veterans with alcohol use disorder, drug use disorder, or both

The prevalence of social and economic stressors increased nearly linearly for patients with AUD, DUD, or both relative to those without either (the only exception being that the prevalence of social and family problems was not significantly higher among those with DUD than AUD; Table 2, Fig. 1). In every group of patients based on SUD diagnoses, the prevalence of social and economic stressors was significantly higher among transgender than cisgender patients (Fig. 1). For instance, among patients with AUD, the prevalence was nearly 2 times higher for transgenders compared to cisgender patients for several stressors (barriers to access care 2.8% vs. 1.7%, economic hardship 28.6% vs. 15.9%, housing instability 40.8% vs. 24.1%, homelessness 38.1% vs. 22.3%, social and family problems 31.6% vs. 15.9%, and legal problems 11.3% vs. 7.8%), and over 3 times higher for MST (21.3% vs. 5.6%) and other victimization (7.3% vs. 2.1%) (p-values ≤0.001 for all except barriers to accessing care (p = 0.015)). Similarly, though differences were smaller than with AUD, among patients with DUD, the prevalence of all stressors was greater among transgender than cisgender patients (barriers to access care 3.9% vs. 2.3%, economic hardship 32.6% vs. 24.3%, housing instability 45.8% vs. 36.6%, homelessness 42.9% vs. 34.3%, social and family problems 30.6% vs. 21.1%, and legal problems 14.6% vs. 11.1%). Notably, among those with DUD, prevalence of other victimization was nearly 3 times higher in transgender than in cisgender persons (8.7% vs. 2.1%).
2.9%), and MST was more than 4 times higher (24.3% vs. 8.0%) (p-values ≤0.001 for all except barriers to accessing care (p = 0.011). The same was true among patients with both AUD and DUD: transgender patients had higher prevalence of all eight stressors compared to cisgender patients (barriers to access to care 3.8% vs. 2.8%, economic hardship 44.9% vs. 32.7%, housing instability 57.4% vs. 47.0%, homelessness 54.3% vs. 44.6%, social and family problems 37.0% vs. 25.8%, and legal problems 20.4% vs. 15.4%). Again, military sexual trauma and other victimization were each around 3 times more prevalent in transgender persons than in cisgender persons (27.6% vs. 8.4% and 11.3% vs. 3.9%, respectively) (Table 2).

4. Discussion

In this large sample of transgender and cisgender VA patients, we found that those with AUD and/or DUD experience individual-level social and economic stressors at alarmingly high rates relative to those without, and that rates of these stressors are particularly high among transgender patients regardless of SUDs. These findings highlight that patients with AUD and/or DUD—particularly transgender patients with these conditions—are at high risk for negative health outcomes and health disparities associated with adverse social determinants of health (Adler, Glymour, & Fielding, 2016).

To our knowledge, this is the first study to describe the prevalence of individual-level social and economic stressors and experiences of marginalization among transgender Veterans with and without AUD and/or DUD and to compare them to those of cisgender Veterans with and without AUD and/or DUD. We were able to measure eight facets of social and economic hardship using multiple dimensions of administrative data in a large, non-recruited, national sample, while previous studies of substance use and social and economic stressors among transgender persons have largely been limited to survey data (Grant et al., 2010; Keuroghlian et al., 2015). Our overall prevalence estimates of social and economic stressors for transgender Veterans regardless of substance use are generally consistent with previous estimates (Blosnich, Marsiglio, et al., 2017; Brown and Jones, 2016; Grant et al., 2010; Shipherd, Mizock, Maguen, & Green, 2012), with slight differences, likely reflecting different study windows, as we limited ascertainment of most stressors (except MST) to a two-year time period. Additionally, aligning with Kilbourne et al.’s stages of disparities research (Kilbourne, Switzer, Hyman, Crowley-Matoka, & Fine, 2006), this study represents an important formative step in detecting the extent to which the sociodemographic status and/or the social experience of these groups (those with AUD/DUD and transgender persons) may increase likelihood of SUDs. However, we cannot know the directional nature of these phenomena, and AUD and/or DUD may conversely contribute to exposure to or experience of social and economic stressors.

Findings indicate substantial syndemic risks of social and economic stressors among patients with AUD and/or DUD, particularly among transgender persons. Even in the absence of SUD, transgender individuals shoulder a disproportionate burden of social and economic stressors (Blosnich, Marsiglio, et al., 2017), reflecting downstream sequelae of social norms and systems that privilege gender-“normative” identities and underlie transphobic stigma and discrimination (Meyer, 1995, 2003). However, while the prevalence of each stressor explored in this study was higher in transgender than cisgender patients, in many cases, prevalence increased more steeply across SUD diagnoses (from AUD only to DUD only to both AUD and DUD) among cisgender than transgender patients. For instance, in the subgroup with AUD and DUD, we saw both the highest prevalence of stressors and the smallest disparity between transgender and cisgender patients. Conversely, the largest relative disparity in social and economic stressors is between...
that the syndemic harms of social and economic stressors with AUD and DUD may be worse for cisgender persons than for transgender persons, while overall, transgender persons experience the greatest risks of both stressors and SUD. These findings align with the Minority Stress Theory such that the daily lived experience of transphobic discrimination, which impacts both stressors and substance use, may make the direct impacts of SUD on social and economic stressors less obvious among transgender people compared to cisgender people (Otten & Heinrichs, 2014; Meyer, 2003). In other words, though transgender persons have higher risk of both, cisgender persons appear to experience a greater interaction or syndemic effect between the two. Findings may also support the idea that transphobic stigma and discrimination is a “fundamental cause” influencing adverse health through multiple mechanisms and risk factors (Link & Phelan, 1995). Further research is needed to explore the directionality of the relationship between social and economic stressors and SUDs, for both transgender and cisgender persons, as well as to test Fundamental Cause Theory in transgender populations highly impacted by chronic structural and interpersonal discrimination.

Further, though the impact of these social and economic stressors on adverse physical and mental health outcomes has been well-established in the literature (Adler & Stewart, 2010; Braveman, Egerter, & Williams, 2011; Marmot & Bell, 2012), most healthcare systems do not screen for these stressors and patients’ broader lived experience is rarely addressed in addictions and/or other behavioral interventions in clinical settings. Interventions that address the lived experiences of persons with addictions are in their nascent and should be further developed and tested (Tsui et al., 2021), particularly for transgender individuals (Austin & Goodman, 2017; Blosnich et al., 2013; Blosnich, Lehavot, et al., 2017; Brown & Jones, 2016; Glick et al., 2018; Hatzenbuehler et al., 2013; Hatzenbuehler & Pachankis, 2016; Lehavot & Simoni, 2011).

The present study highlighted concerningly high rates of housing instability and homelessness among patients (particularly transgender patients, with rates >50%) who have co-occurring AUD and DUD. The VA has social programs for housing, employment, and justice system involvement (Finlay et al., 2016; Gabriellan et al., 2015; Twamley et al., 2013). While evidence suggests that supportive housing programs are reaching transgender VA patients (Blosnich, Rodriguez, et al., 2020; Montgomery, Shipherd, Kauth, Harris, & Blosnich, 2020), it is unclear whether other VA social programs are also reaching these patients, and whether these programs are addressing SUDs synergistically. Evaluations of these efforts are needed, including implementation and evaluation of provider and staff training programs to create welcoming environments for minority patient populations (van Heesewijk, Kent, van de Grift, Harleman, & Muntinga, 2022). Finally, the present study’s findings highlight the adverse sequelae of transphobic social structures and norms. Structural (e.g., policy) and cultural (e.g., social marketing) interventions should be developed and tested to address these potential fundamental causes to eliminate inequalities in stressors and substance use (Eder et al., 2021; National Academies of Science, 2019).

4.1. Limitations

Our study has several limitations. First, transphobic stigma and discrimination are fundamental causes of health inequities (Garofalo et al., 2006; Glynn & van den Berg, 2017; Lehavot & Simoni, 2011; Lombardi, 2007) but were not measured directly in this study. However, the high rates of social and family problems and MST suggest that many transgender Veterans with AUD/DUD are exposed to hostile and stressful social environments associated with minority stress. Next, transgender patients were identified using ICD-9 and ICD-10 codes associated with transgender status. Although these processes have been validated in administrative data (Blosnich et al., 2013, 2014, 2016; Brown & Jones, 2016), it may have resulted in misclassification, as it is not based on self-identification. Similarly, the use of administrative data to define social and economic stressors may have resulted in an under-estimation of their prevalence. Providers may differentially ask clinical screening questions or differentially apply ICD-9 and 10 codes, and patients may not always feel comfortable discussing their experiences with these stressors with their provider (Vest et al., 2017). Additionally, this study was cross-sectional; our results do not indicate causal associations nor explore mechanisms underlying patterns observed. Our findings among transgender persons receiving VA healthcare may also not be generalizable to other transgender populations, especially given that VA has structural interventions in place to support transgender health (Department of Veterans Affairs, 2020). Transgender Veterans eligible for VA benefits likely have better access to a wider range of healthcare compared to other transgender persons. Because this VA administrative data did not ascertain gender identity, this study unfortunately could not assess differences across self-identified gender groups. Transgender men, transgender women, and gender non-binary individuals may have important differences in experiences of social and economic stressors, which should be further studied and considered when designing policy. Additionally, there may be important differences in experiences of social stressors within intersectional groups of transgender persons defined by race and ethnicity which this study did not ascertain. Consistent with intersectionality theory, belonging to multiple marginalized and minoritized groups compounds risk for unequal and disparate outcomes (Bowleg, 2012) and may heighten the burden of these stressors experienced by transgender persons with intersecting marginalized identities and lead to differences in downstream health outcomes. Lastly, it must be noted that these data were collected between 2009 and 2017, and in recent years, the sociopolitical climate for transgender people has inarguably shifted toward increased anti-transgender policy and rhetoric (Barbee, Deal, & Gonzales, 2022; Cahill, Miller, & Keuroghlian, 2022; Horne, McGinley, Yel, & Maroney, 2022). As such, our findings may underestimate the current prevalence of and relationships between stressors, SUDs, and disparities (Burgess, Kauth, Klemt, Shanawani, & Shipherd, 2019).

5. Conclusions

Social and economic stressors are highly prevalent among VA patients with SUDs, particularly those who are transgender, likely resulting from transphobic structures and social norms that engender substantial discrimination and stigma consistent with Minority Stress Theory. Findings illuminate the need for interventions aimed at supporting social needs among patients with AUD and/or DUD, including interventions focused on screening for and addressing social and economic stressors, to better support vulnerable populations (e.g., transgender persons) whose heightened exposure to these stressors may be linked to their substance use and subsequent health outcomes. It is imperative that leaders and policy makers address the transphobic structures that lead to high rates of social and economic stressors among transgender persons. To better serve transgender Veterans and transgender persons at large, particularly those with SUD, further research should be done on the interventions, structures, and policies that reduce the experience of social stressors and marginalization in this population.

Ethical statement

All study procedures were approved by Institutional Review Boards at the VA Puget Sound and the University of Washington.

Author statement

Olivia V. Fletcher: Conceptualization, Methodology, Formal analysis, Investigation, Writing – Original Draft, Writing – Review & Editing, Project administration.

Jessica A. Chen: Writing – Original Draft, Writing – Review & Editing.
Jenna vanDraanen: Writing – Original Draft, Writing – Review & Editing.
Madeline C. Frost: Writing – Original Draft, Writing – Review & Editing.
Anna D. Rubinsky: Validation, Writing – Original Draft, Writing – Review & Editing.
John R. Blosnich: Conceptualization, Writing – Original Draft, Writing – Review & Editing, Funding acquisition.
Emily C. Williams: Conceptualization, Methodology, Validation, Investigation, Writing – Original Draft, Writing – Review & Editing, Supervision, Funding acquisition.

Declaration of competing interest
None.

Funding Acknowledgments
This study was a secondary analysis from a project funded by the National Institute on Alcohol Abuse and Alcoholism (R21 AA025973; Williams/Blosnich, PIs) to the University of Washington. This work was supported in part with resources and the use of facilities at the VA Puget Sound Health Care System in Seattle, WA. However, the contents of this manuscript do not represent the views of the U.S. Department of Veterans Affairs or the United States Government. The funders had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; or decision to submit the manuscript for publication.

Appendix A. Supplementary data
Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmph.2022.101153.

References
Adler, N. E., Gloum, M. M., & Fielding, J. (2016). Addressing social determinants of health and health inequalities. JAMA: The Journal of the American Medical Association, 316(16), 1641-1642. https://doi.org/10.1001/jama.2016.4055
Adler, N. E., & Stewart, J. (2010). Preface to the biology of disadvantage: Socioeconomic status and health. Annals of the New York Academy of Sciences, 1186(1), 1-4. https://doi.org/10.1111/j.1749-6632.2009.05385.x
2018/10/02 Asana, O. O., Ayvaci, E. R., Pollio, D. E., Hong, B. A., & North, C. S. (2018). Experiences of transgender-related discrimination and implications for health. Journal of General Internal Medicine, 35(6), 1759-1767. https://doi.org/10.1007/s11606-019-05447-z
Balsam, K. F., Rothblum, E. D., & Beauchaine, T. P. (2005). Victimization over the life span: A comparison of lesbian, gay, bisexual, and heterosexual siblings. Journal of Consulting and Clinical Psychology, 73(3), 477-487. https://doi.org/10.1037/0022-006X.73.3.477
Barber, H., Deul, C., & Gonzalez, G. (2022). Anti-transgender legislation – a public health concern for transgender youth. JAMA Pediatr, 176(2), 125-126. https://doi.org/10.1001/jamapediatrics.2021.4483
Begle, A. M., Henningsen, M. R., Ruggiero, K. J., Amstadter, A. B., et al. (2020). Longitudinal pathways of victimization, substance use, and delinquency: Findings from the National Survey of Adolescents. Addictive Behaviors, 36(7), 682-689. https://doi.org/10.1016/j.addbeh.2010.12.026
Benotsch, E. G., Zimmerman, R., Cathers, L., McNulty, S., Pierce, J., Heck, T., et al. (2013). Non-medical use of prescription drugs, polysubstance use, and mental health in transgender adults. Drug and Alcohol Dependence, 132(1), 391-394. https://doi.org/10.1016/j.drugalcdep.2013.02.027
Aug Benotsch, E. G., Zimmerman, R. S., Cathers, L., Pierce, J., McNulty, S., Heck, T., et al. (2016). Non-medical use of prescription drugs and HIV risk behavior in transgender women in the Mid-Atlantic region of the United States. International Journal of STD and AIDS, 27(9), 776-782. https://doi.org/10.1177/0956462415595319.
Blodgett, J. C., Avondiani, T., Finlay, A. K., Rosenthal, J., Asch, S. M., Mainel, N. C., et al. (2015). Prevalence of mental health disorders among justice-involved veterans. Epidemiologic Reviews, 37(1), 163-176. https://doi.org/10.1590/epirev/mxe003
Blosnich, J. R., Brown, G. R., Shiperd PhD, J. C., Kauth, M., Piegarl, R. I., & Bossarte, R. M. (2013, Oct). Prevalence of gender identity disorder and suicide risk among transgender veterans utilizing veterans health administration care. American Journal of Public Health, 103(10), e27–32. https://doi.org/10.2105/ AJPH.2013.301907
Blosnich, J. R., Brown, G. R., Wojcik, S., Jones, K. T., & Bossarte, R. M. (2014, Dec). Mortality among veterans with transgender-related diagnoses in the veterans health administration, FY2000-2009. LGBT Health, 1(4), 269-276. https://doi.org/10.1089/lgbt.2014.0050
Blosnich, J. R., Cashy, J., Gordon, A. J., Shiperd, J. C., Kauth, M. R., Brown, G. R., et al. (2018, Apr 4). Using clinician text notes in electronic medical record data to validate transgender-related diagnosis codes. Journal of the American Medical Informatics Association, 25(7), 905-908. https://doi.org/10.1093/jamia/ocy029
Blosnich, J. R., Levato, K., Glass, J. E., & Williams, E. C. (2017, Nov). Differences in alcohol use and alcohol-related health care among transgender and nontransgender adults: Findings from the 2014 behavioral risk factor surveillance system. Journal of Studied Alcohol and Drugs, 78(6), 861-866. https://doi.org/10.15286/jsad.2017.86.01
Bradford, J. P., Reiner, S. L. M. A., Homnold, J. A. P., & Kivlahan, D. R. (2006, Oct). Implementation of evidence-based managed care screening in the veterans health administration. The American Journal of Public Health, 121(10), 1097-1066.
Braveman, P., Egerter, S., & Williams, D. R. (2011). The social determinants of health: Coming of age [review]. Annual Review of Public Health, 32, 381-398. https://doi.org/10.1146/annurev-publhealth-031210-121182
Burgess, C., Kauth, M. R., Klement, C., Shanawani, H., & Shiperd, J. C. (2019, Jun). Evolving sex and gender in electronic health records. Federal Practitioner, 36(6), 29-37.
Cahill, S., Miller, A. S., & Krumholz, A. S. (2022). Sexual and gender minority health equity in the biden administration. JAMA Health Forum, 3(2), 1-7. https://doi.org/10.1001/jamahealthforum.2021.4868.e214868-e214868
Deyo, R. A., Cherkin, D. C., & Ciol, M. A. (1992, Jun). Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases. Journal of Clinical Epidemiology, 45(6), 613-619. http://www.ncbi.nlm.nih.gov/pubmed/24385661.
Deyo, R. A., Cherkin, D. C., & Ciol, M. A. (1992, Jun). Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases. Journal of Clinical Epidemiology, 45(6), 613-619. http://www.ncbi.nlm.nih.gov/pubmed/24385661.
Deyo, R. A., Cherkin, D. C., & Ciol, M. A. (1992, Jun). Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases. Journal of Clinical Epidemiology, 45(6), 613-619. http://www.ncbi.nlm.nih.gov/pubmed/24385661.
Deyo, R. A., Cherkin, D. C., & Ciol, M. A. (1992, Jun). Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases. Journal of Clinical Epidemiology, 45(6), 613-619. http://www.ncbi.nlm.nih.gov/pubmed/24385661.
Sheiham, A. (2009). Closing the gap in a generation: Health equity through action on the social determinants of health. A report of the WHO Commission on Social Determinants of Health (CSDH) 2008. Community Dental Health, 26(1), 2–3. https://doi.org/10.1922/CDH_2500Sheiham02

Shipberd, J. C., Darling, J. E., Klap, R. S., Rose, D., & Yano, E. M. (2018). Experiences in the veterans health administration and impact on healthcare utilization: Comparisons between LGBT and non-LGBT women veterans. LGBT Health, 5(5), 33–311. https://doi.org/10.1089/lgbt.2017.0179

Shipberd, J. C., Mizock, L., Maguen, S., & Green, K. E. (2012). Male-to-female transgender veterans and VA health care utilization. International Journal of Sexual Health (Vol. 24(1), 78–87.

2017 03 04 Singer, M., Bulled, N., Ostrach, B., & Mendenhall, E. (2017). Syndemics and the biosocial conception of health. The Lancet, 389(10072), 941–950. https://doi.org/10.1016/S0140-6736(17)30003-X.

Souden, M. (2017). Overview of VA data, information systems, national databases and research uses. from https://www.hrd.research.va.gov/for_researchers/cyber_seminars/archives/2376-notes.pdf. (Accessed 26 July 2019).

Stotzer, R. (2009). Violence against transgender people: A review of United States data. Aggression and Violent Behavior, 14(3), 170–179. https://doi.org/10.1016/j.avb.2009.01.006

2020 07 03 Tartaglia, S., & Bergagna, E. (2020). Alcohol consumption as a maladaptive coping strategy to face low life satisfaction. Drugs: Education, Prevention and Policy, 27(4), 306–311. https://doi.org/10.1080/09687637.2019.1685938.

Tsui, J. I., Barry, M. P., Austin, E. J., Sweek, E. W., Tung, E., Hansen, R. N., et al. (2021, Aug 12). Treat my whole person, not just my condition: Qualitative explorations of hepatitis C care delivery preferences among people who inject drugs. Addiction Science & Clinical Practice, 16(1), 52. https://doi.org/10.1186/s13722-021-00260-8

Twamley, E. W., Baker, L. G., Norman, S. B., Pittman, J. O. E., Lohr, J. B., & Resnick, S. G. (2013). Veterans health administration vocational services for operation Iraqi freedom/operation enduring freedom veterans with mental health conditions. Journal of Rehabilitation Research and Development, 50(5), 663–670. https://doi.org/10.1682/JRRD.2012.08.0137

Ullman, S. E., Relyea, M., Peter-Hagene, L., & Vasquez, A. L. (2013). Trauma histories, substance use coping, PTSD, and problem substance use among sexual assault victims. Addictive Behaviors, 38(6), 2219–2223. https://doi.org/10.1016/j.addbeh.2013.01.027

Vest, J. R., Grannis, S. J., Haut, D. P., Halverson, P. K., & Menachemi, N. (2017, Nov). Using structured and unstructured data to identify patients’ need for services that address the social determinants of health. Int J Med Inform, 107, 101–106. https://doi.org/10.1016/j.ijmedinf.2017.09.008

2015 12 01 White Hughto, J. M., Reisner, S. L., & Pachankis, J. E. (2015). Transgender stigma and health: A critical review of stigma determinants, mechanisms, and interventions. Social Science and Medicine, 147, 222–231. https://doi.org/10.1016/j.socscimed.2015.11.010.

Williams, E. C., Frost, M. C., Rubinsky, A. D., Glass, J. E., Wheat, C. L., Edmonds, A. T., et al. (2021, Jan). Patterns of alcohol use among transgender patients receiving care at the veterans health administration: Overall and relative to nontransgender patients. Journal of Studies on Alcohol and Drugs, 82(1), 132–141. https://doi.org/10.15288/jsad.2021.82.132

2021 06 01 Wolfe, H. L., Biello, K. B., Reisner, S. L., Mimiaga, M. J., Cahill, S. R., & Hughto, J. M. W. (2021). Transgender-related discrimination and substance use, substance use disorder diagnosis and treatment history among transgender adults. Drug and Alcohol Dependence, 223, Article 108711. https://doi.org/10.1016/j.drugalcdep.2021.108711.

World Health Organization. (2014). Social determinants of mental health (mental health and substance use, issue. https://www.who.int/publications/i/item/9789241506809.