Receipt of evidence-based alcohol-related care in a national sample of transgender patients with unhealthy alcohol use: Overall and relative to non-transgender patients

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Abstract

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Background/Objective: Evidence-based alcohol-related care–brief intervention for all patients with unhealthy alcohol use and specialty addictions treatment and/or pharmacotherapy for patients with alcohol use disorder (AUD)–should be routinely offered. Transgender persons may be particularly in need of alcohol-related care, given common experiences of social and economic hardship that may compound the adverse effects of unhealthy alcohol use. We examined receipt of alcohol-related care among transgender patients compared to non-transgender patients in a large national sample of Veterans Health Administration (VA) outpatients with unhealthy alcohol use.

Methods: We extracted electronic health record data for patients from all VA facilities who had an outpatient visit 10/1/09-7/31/17 and a documented positive screen for unhealthy alcohol use (AUDIT-C 5). We identified transgender patients with a validated approach using transgender-related diagnostic codes. We fit modified Poisson models, adjusted for demographics and comorbidities, to estimate the average predicted prevalence of brief intervention (documented 0–14 days following most recent positive screening), specialty addictions treatment for AUD (documented 0–365 days following screening), and filled prescriptions for medications to treat AUD (documented 0–365 days following screening) for transgender patients, and compared to that of non-transgender patients.

Results: Among transgender Veterans with unhealthy alcohol use (N=1,392), the adjusted prevalence of receiving brief intervention was 75.4% (95% CI 72.2 – 78.5), specialty addictions treatment for AUD was 15.7% (95% CI 13.7 – 17.7), and any AUD pharmacotherapy was 19.0% (95% CI 17.1 – 20.8). Receipt of brief intervention did not differ for transgender relative to non-transgender patients (Prevalence Ratio [PR] 1.01, 95% CI 0.98 – 1.04, p=0.574). However, transgender patients were more likely to receive specialty addictions treatment (PR 1.24, 95% CI 1.12 – 1.37, p<0.001) and pharmacotherapy (PR 1.16, 95% CI 1.06 – 1.28, p=0.002).

Conclusions: Findings suggest the majority of transgender VHA patients with unhealthy alcohol use receive brief intervention, though a quarter still do not. Nonetheless, rates of specialty addictions treatment and pharmacotherapy are low overall, although transgender patients may be receiving this care at greater rates than non-transgender patients. Further research is needed to investigate these findings and to increase receipt of evidence-based care overall.

1. Introduction

Unhealthy alcohol use—ranging from drinking above recommended limits to meeting diagnostic criteria for alcohol use disorder (AUD) (Saitz, 2005)—contributes substantially to morbidity and mortality (Room et al., 2005) and is increasingly common and deadly (National Institute on Alcohol Abuse and Alcoholism, 2020; White et al., 2020). Multiple evidence-based interventions or treatments are available for unhealthy alcohol use (Edelman & Tetrault, 2018; National Institute on Alcohol Abuse and Alcoholism, 2007, 2016). Brief counseling interventions, including advice to reduce or abstain from drinking and feedback linking drinking to health (Whitlock et al., 2004), are recommended for all primary care patients who screen positive for unhealthy alcohol use based on data from

randomized controlled trials indicating resultant reductions in drinking (Jonas et al., 2012). For patients with more severe unhealthy alcohol use—those with AUD—additional care is recommended, including behavioral and pharmacologic interventions (Jonas et al., 2014; National Institute on Alcohol Abuse and Alcoholism, 2007, 2016).

Transgender persons—a diverse community whose gender identities (core sense of self as man, woman, both, or neither) differ from sex assigned at birth and/or its related gendered attributes (Blosnich et al., 2014)—disproportionately experience stigma, discrimination, and multiple related health risk factors and barriers to care (Grant et al., 2010). Prior research conducted among transgender persons suggests prevalent unhealthy alcohol use and heavy episodic drinking on par with rates in the broader U.S. population, and the possibility that AUD is more common among transgender than non-transgender persons (Benotsch et al., 2016; Blosnich, Lehavot, et al., 2017; Blosnich, Marsiglio, et al., 2017; Blosnich et al., 2016; Brown & Jones, 2016; Coulter et al., 2015; Garofalo et al., 2006; Horvath et al., 2014; Keuroghlian et al., 2015; Melendez et al., 2006; Reisner et al., 2014; Santos et al., 2014; Testa et al., 2012; Williams et al., 2021). Though limited research has explored the adverse influences of alcohol use on health specifically within transgender communities, transgender persons are at increased risk of multiple social stressors and health outcomes that may be compounded by unhealthy alcohol use relative to non-transgender persons (Grant et al., 2010; Institute of Medicine, 2011), such as greater exposure to violence (Stotzer, 2009) and housing instability (Grant et al., 2010) and higher rates of depression, suicide, HIV, and Hepatitis C (Blosnich et al., 2013; Blosnich et al., 2014; Blosnich et al., 2016; Grant et al., 2010). Given potential increased vulnerability to alcohol-related harm, and potential higher occurrence of AUD among transgender relative to non-transgender persons, receipt of evidence-based alcohol-related care may be particularly important for transgender persons with unhealthy alcohol use.

However, the extent to which transgender individuals with unhealthy alcohol use receive alcohol-related care is unclear. Transgender individuals generally face considerable barriers to receiving high-quality healthcare. For instance, in the 2015 U.S. Transgender Survey, 23% delayed seeking medical care because of fear of mistreatment, and 33% of those who saw a provider in the past year reported having at least one negative health care experience related to being transgender, such as being refused care because of their gender identity or having to teach their providers about transgender health care (James et al., 2016). Further, because transgender persons may have multiple medical needs (Blosnich et al., 2013; Blosnich et al., 2014; Brown & Jones, 2016) with diverse experiences of adverse/negative social determinants of health (Blosnich et al., 2019), transgender patients with unhealthy alcohol use may be less likely than non-transgender patients to receive evidence-based care for unhealthy alcohol use. On the other hand, because transgender persons have greater risk of adverse outcomes associated with alcohol use (e.g., depression, suicide, HIV) than non-transgender persons (Blosnich et al., 2013; Grant et al., 2010), intervention may be more routine. On the other hand, transgender patients who are initiating gender-affirming care (e.g., hormone therapy) may be more engaged in healthcare (Unger, 2016), which may create more opportunities for unhealthy alcohol use to be identified and addressed (e.g., informed presence bias) (Goldstein et al., 2016).

Only two studies to our knowledge have investigated receipt of evidence-based alcohol-related care among transgender persons with unhealthy alcohol use. Data from a sample of 314 transgender women found that, despite 30% of all respondents reporting heavy episodic drinking (5 or more drinks in a single session) in the past year, less than 20% of all respondents reported receiving alcohol or other substance use treatment (Santos et al., 2014). A study of 2014 Behavioral Risk Factor Surveillance System (BRFSS) survey data from 8 states that included 283 (0.6%) self-identified transgender individuals found no differences in receipt of evidence-based alcohol-related care between transgender and non-transgender respondents after adjustment for sociodemographic factors (Blosnich, Lehavot, et al., 2017). However, these studies are likely limited by having a relatively small number of transgender respondents, and/or potentially limited sampling in national surveys regarding representation of transgender persons.

The Veterans Health Administration (VA) is the largest integrated care system in the U.S. and offers a unique opportunity to study receipt of evidence-based alcohol-related care among a non-recruited population of transgender persons with unhealthy alcohol use. The VA serves a high and increasing number of transgender individuals (Department of Veterans Affairs, 2014; Gates & Herman, 2014). In the last 10 years, new diagnoses indicative of transgender identity increased more than 3-fold from ~250 to ~900/year, likely in part due to VA Directive 2013–03 (Department of Veterans Affairs, 2013), which increased access to care for transgender persons. As such, the VA serves enough transgender patients to validly examine differences in care using secondary data. Moreover, VA's nationwide implementation of evidence-based alcohol screening and brief intervention (Bradley & Williams, 2009; Bradley et al., 2006; Williams et al., 2011) offers a novel opportunity to study alcohol-related care among transgender persons. Since 2004, VA has required that outpatients receive annual screening for unhealthy alcohol use with the validated Alcohol Use Disorders Identification Test Consumption (AUDIT-C) questionnaire (Bradley et al., 2006). And, since 2011, brief intervention has been offered to over 75% of screen-positive patients and is documented in the electronic health record (Lapham et al., 2010; Williams, Lapham, Shortreed, et al., 2017). Administrative clinic visit codes and integrated pharmacy data allow measurement of specialty addictions treatment and medications (Harris et al., 2012; Harris et al., 2010). Therefore, in a national sample of transgender Veteran outpatients who received care at the VA and screened positive for unhealthy alcohol use, we evaluated receipt of evidence-based alcohol-related care, both overall and relative to non-transgender patients.

2. Methods

2.1 Data Source and Study Sample

We extracted data for this study from VA's Corporate Data Warehouse (CDW)—a relational data warehouse that links VA's national electronic health record (EHR) to additional administrative and clinical data (Souden, 2017)—for patients within each VA facility who received outpatient care between 10/1/09 and 07/31/17, were 18 years and older, and had one or more *positive* alcohol screens (AUDIT-C score ≥ 5) documented. During the study period, 95% of patients with an outpatient visit had a documented AUDIT-C screen, and

prior research has demonstrated minimal differences between VA patients with and without documented AUDIT-C screens (Williams et al., 2020; Williams et al., 2019). Patients' most recent documented positive alcohol screen at each facility was used for analyses to reflect the most current practices regarding alcohol-related care. We received approval from Institutional Review Boards at the University of Washington, VA Puget Sound, and the University of Pittsburgh for all aspects of the study, including waivers of consent and Health Insurance Portability and Accountability Act (HIPAA) authorization.

2.2   Measures

2.2.1   Transgender Status

We identified patients as *transgender* using International Classification of Disease, 9th and 10th Revision, Clinical Modification (ICD-9-CM and ICD-10-CM, respectively) codes related to gender identity disorder (GID), defined in the Diagnostic and Statistical Manual-IV (DSM-IV) as deeply rooted feelings of persistent discomfort with one's biological sex, to the extent that "the disturbance causes clinically significant distress or impairment in…important areas of function" (American Psychiatric Association, 2000). Though the DSM-5 replaced GID with the term Gender Dysphoria (Zucker et al., 2013), VA EHR are based on ICD coding, which has not been updated to reflect the DSM-5 change in language. The complete list of transgender-related ICD codes used in this definition is published elsewhere (Williams et al., 2021). Patients with one or more transgender-related ICD code documented from the beginning of the CDW (1/1/99) to the end of the study (7/31/17) were considered transgender. These methods for identification of transgender patients were developed and validated using VA data (Blosnich et al., 2013; Blosnich et al., 2014; Blosnich, Marsiglio, et al., 2017; Blosnich et al., 2016; Brown & Jones, 2016), have been applied to Centers for Medicare & Medicaid Services data (Proctor et al., 2016), and have been found to have high concordance with patient transgender status assessed through structured chart review methods (Blosnich et al., 2018).

2.2.2   Outcomes—receipt of evidence-based alcohol-related care.

We assessed four primary outcomes. We measured *receipt of brief intervention* consistent with prior work (Bradley et al., 2013; Williams, Lapham, Shortreed, et al., 2017; Williams et al., 2014) as documented advice to reduce or abstain from drinking in the 0–14 days following a positive screen. Brief intervention is typically conducted in primary care following a positive screen (regardless of severity of alcohol use). Advice is a key component of evidence-based brief intervention (Whitlock et al., 2004) incentivized in VA's performance measure for brief intervention (Williams, Lapham, Rubinsky, et al., 2017) and routinely documented in VA using electronic clinical decision support. We measured *receipt of AUD specialty addictions treatment* dichotomously as having one or more inpatient or outpatient visits to a substance use disorder clinic with a linked AUD diagnostic code in the year following a positive screen (Williams et al., 2014). A complete list of VA visit codes indicating specialty addictions treatment is published A complete list of VA visit codes indicating specialty addictions treatment is published elsewhere (Williams, Lapham, Shortreed, et al., 2017). Various behavioral and psychosocial AUD treatments may be provided in these substance-specific settings, such as cognitive behavioral therapy (National Institute on Drug Abuse, 2018). We measured r*eceipt of AUD medications* as any filled prescription for medications that were either approved by the U.S. Food and Drug Administration (FDA) to

treat AUD or that have strong evidence for use in AUD treatment in the year following a positive screen (Harris et al., 2012; Harris et al., 2010; Williams, Gupta, et al., 2017). These included acamprosate, disulfiram, or oral or injectable naltrexone (all FDA-approved) and topiramate, gabapentin, and baclofen (all with evidence supporting use) (Addolorato et al., 2007; Furieri & Nakamura-Palacios, 2007; Jonas et al., 2014; Leggio et al., 2012; Mason et al., 2014; Myrick et al., 2009). Finally, we evaluated a dichotomous composite measure of *any alcohol-related care* measured based on documentation of any brief intervention, AUD specialty addictions treatment, or AUD medications in the year after a positive screen (Williams, Lapham, Shortreed, et al., 2017).

We also measured several secondary outcomes to further investigate receipt of alcohol-related care: only *FDA-approved medications for AUD* in the year following a positive screen, and dichotomous variables indicating *receipt of each individual AUD medication* (acamprosate, disulfiram, topiramate, oral naltrexone, injectable naltrexone, gabapentin, and baclofen) within a year of positive screening.

2.2.3   Covariates—Covariates included measures of time, and sociodemographic and clinical characteristics. We extracted *fiscal year of positive AUDIT-C screening* to capture potential variation in care delivery and social context over time. We measured sociodemographic characteristics at the time of positive alcohol screening and included a*ge group* categorized as <50, 50–65, and >65 years, and *race/ethnicity* categorized as Black, Hispanic, White, Other, and Unknown. Patients with multiple race/ethnicity data were assigned to a single category by considering both group size in the VA patient population and exposure to structural and interpersonal discrimination (Black>Hispanic>other>white) (Krieger, 2014). We also measured *marital status*, defined as divorced/separated, married, never married/single, widowed, or unknown/missing, and *financial and other hardship* using a 4-category variable based on VA copay requirements (VA copay required, no copay required due to disability, no copay required due to means/other, and unassigned), with those having no copay required being the most disadvantaged. Finally, we included a measure of *EHR-documented gender* that is termed "gender" in the VA's EHR. Of note, this same measure is defined as "sex of the patient" elsewhere in VA administrative data systems, and it can have only one of two possible values: male or female. This data field is generally documented by administrators but can be updated by patients (Department of Veterans Affairs, 2013) and thus does not clearly discern between sex assigned at birth and/or gender identity. Clinical characteristics included indicators of physical and mental health comorbidity and other substance use. Specifically, we used ICD-9-CM and ICD-10-CM codes documented on the day of or in the year prior to the positive alcohol screen to generate the validated *Charlson co-morbidity index* (without inclusion of HIV due to higher prevalence in transgender patients) (Charlson et al., 1994; Charlson et al., 1987; D'Hoore et al., 1996), as well as to measure *Hepatitis C* and *HIV/AIDS* (Fultz et al., 2006), *any mental health condition* (including major depressive disorder, other depression, post-traumatic stress disorder, other anxiety disorders, other mood disorders, bipolar disorder, psychosis, and/or schizophrenia), and *any non-alcohol substance use disorder* (tobacco, amphetamine, cocaine, opioid, cannabis, hallucinogen, and/or sedative abuse or dependence, excluding in remission). We measured s*moking status* based on EHR documentation at the time of

the positive screen, and defined as current smoking, former smoking, never smoking, or unknown.

2.3 Analyses

We described patient characteristics, including alcohol-related outcomes, overall and by transgender status among VA patients with unhealthy alcohol use (AUDIT-C ≥ 5). We tested differences between transgender and non-transgender groups using chi-squared tests for categorical variables and t-tests for continuous variables.

We estimated the relative risk of each outcome for transgender versus non-transgender patients using mixed-effects modified Poisson regression models with logarithm link and a random effect for VA facility (Cameron & Miller, 2015). We calculated robust standard errors using the sandwich estimator to address possible model misspecification. We estimated the average predicted prevalence of each dichotomous outcome for transgender and non-transgender patients using recycled predictions (Basu & Rathouz, 2005; Kleinman & Norton, 2009), which hold the covariate distribution constant at the actual values found in the sample. For each outcome, we fit three models to investigate the influence of covariates: Model 1 adjusted for year of AUDIT-C only; Model 2 adjusted for year of AUDIT-C and demographics; and Model 3 adjusted for year of AUDIT-C, socio-demographics, and comorbidities. In secondary analyses, we repeated all analyses among only patients that also had a documented AUD diagnosis (day of or year prior to the AUDIT-C screen; likely both incident and existing diagnoses), for whom care might be expected to be greater and/or more targeted.

To facilitate convergence of the mixed-effects models, we selected maximization processes for each model to optimize starting values. Except in one case where issues estimating predicted values could not be overcome, we used a Gaussian quadrature integration method (mean and variance adaptive Gauss–Hermite; the default in Stata) . For one model (Model 1) of one outcome (specialty addictions treatment), we used Laplace approximation to facilitate estimates of predicted prevalence. Results using this method of integration approximate those using adaptive Gaussian quadrature in settings using generalized linear mixed models with binary outcomes (Capanu et al., 2013), and in this case produced nearly identical estimates of prevalence ratios and standard errors but allowed estimation of predicted prevalence.

3. Results

We identified 1,405,734 patients who had a positive AUDIT-C screen for unhealthy alcohol use during the study period, and of these, 1,392 (0.1%) were transgender and present the characteristics of the study sample across transgender and non-transgender groups in Table 1. The sample was largely middle-aged (mean 53.1 years) with mostly documented male gender in the EHR (96%) and non-Hispanic white race/ethnicity (70%). The majority (80%) had some indication of financial hardship or disability, and a minority (42%) were married. Physical and mental health co-morbidities were common; approximately one-third of the sample had a Charlson co-morbidity index ≥ 1 and nearly 40% had at least one mental health

diagnosis. These overall characteristics are consistent with previous national studies of VA patients with unhealthy alcohol use (Williams, Lapham, Shortreed, et al., 2017).

Relative to non-transgender patients, transgender patients were younger (mean age 47.1 years), more likely to be of non-Hispanic white race/ethnicity, and to have documented female gender in the EHR. Transgender patients also had higher prevalence of co-morbidities, including Hepatitis C, HIV, mental health conditions, and non-alcohol substance use disorders, and were slightly more likely to have AUDIT-C scores ≥ 9 indicating unhealthy alcohol use in the severe range (Table 1).

Among transgender patients with unhealthy alcohol use (N=1,392), the unadjusted prevalence of brief intervention within 0–14 days was 73.9%, receipt of specialty addictions treatment for AUD was 20.3%, and receipt of AUD medications was 26.1% (Table 2). No difference in the prevalence of brief intervention was observed between transgender and non-transgender patients (73.9% vs. 74.0%, p=0.98), but transgender patients had a higher prevalence of receiving specialty addictions treatment for AUD and AUD medications than non-transgender patients (specialty addictions treatment: 20.3% vs. 11.3%, p<0.001; AUD medications: 26.1% vs. 16.4%, p<0.001).

After adjustment for all covariates, among transgender patients with unhealthy alcohol use, the average predicted prevalence of receiving brief intervention was 75.4% (95% CI 72.2 – 78.5), specialty addictions treatment for AUD was 15.7% (95% CI 13.7 – 17.7), and AUD medications was 19.0% (95% CI 17.1 – 20.8) (Table 3). Receipt of brief intervention did not differ for transgender relative to non-transgender patients with unhealthy alcohol use (Prevalence Ratio [PR] 1.01, 95% CI 0.98 – 1.04, p=0.574). However, transgender patients were more likely to receive specialty addictions treatment (PR 1.24, 95% CI 1.12 – 1.37, p<0.001) and AUD medications (PR 1.16, 95% CI 1.06 – 1.28, p=0.002) after full adjustment.

In secondary analyses among the subset of patients with both unhealthy alcohol use and documented AUD (Table 3), transgender patients were more likely to receive specialty addictions treatment for AUD (PR 1.20, 95% CI 1.09 – 1.32, p<0.001), but did not differ from non-transgender patients in receipt of AUD medications (PR 1.11, 95% CI 1.00 – 1.24, p=0.058).

In additional secondary analyses assessing individual AUD medications both among all patients with unhealthy alcohol use and in the subsample who additionally had an AUD diagnosis, unadjusted analyses suggested that transgender patients were receiving each type of AUD medication at a higher rate than non-transgender patients (Table 2). However, in adjusted analyses (Supplemental Table 1), the only significant differences were in receipt of oral naltrexone (PR 1.35, 95% CI 1.06 – 1.73, p=0.016) and gabapentin (PR 1.14, 95% CI 1.01 – 1.29, p=0.041). With infrequently used medications, such as acamprosate and injectable naltrexone, between-group analyses were limited due to small cell counts.

4. DISCUSSION

In this large national population of non-recruited VA patients with unhealthy alcohol use, transgender patients received evidence-based alcohol care at a similar or higher rate than non-transgender patients. Results were largely consistent after adjustment for sociodemographic characteristics and comorbidities and were similar across primary and secondary outcomes and within the subpopulation of patients with documented AUD. While most transgender patients with unhealthy alcohol use received brief intervention, a quarter still did not, and although rates of specialty addictions treatment for AUD and pharmacotherapy for AUD were higher among transgender patients compared to non-transgender patients, rates were low overall. Among transgender patients with AUD for whom these treatments are indicated, the unadjusted rate of receiving specialty treatment was 36.5% and for pharmacotherapy was 26.1%.

Consistent with previous studies (Williams, Gupta, et al., 2017; Williams, Lapham, Rubinsky, et al., 2017; Williams, Lapham, Shortreed, et al., 2017), findings of the present study suggest room for improvement in the provision of evidence-based alcohol-related care in the VA. Efforts toward improvement may be particularly important among transgender patients due to increased risk of alcohol-related harm such as violence, suicide, depression, hepatitis C, and HIV. Two-thirds to three-quarters of transgender patients with AUD are not receiving recommended care, and rates estimated in the present study for transgender patients are likely higher than rates in the general population (Blosnich, Lehavot, et al., 2017) because VA coverage removes some common barriers to health care access, such as insurance coverage, and because VA has invested substantial resources in the integration of evidence-based care for unhealthy alcohol use into general medical settings (Bradley & Williams, 2009).

The small number of prior studies that have assessed alcohol-related care among transgender persons with unhealthy alcohol use (Blosnich, Lehavot, et al., 2017; Meyer et al., 2017; Santos et al., 2014) were limited in generalizability by sample sizes and sampling strategies; assessment of differences in receipt of alcohol-related care between transgender and non-transgender patients has only been conducted using BRFSS data (Blosnich, Lehavot, et al., 2017; Meyer et al., 2017). Though in the present study we generally identified higher rates of receiving alcohol-related care relative to non-transgender patients, our findings were consistent with those from BRFSS data in that we did not find evidence of differences that disadvantage transgender patients. Brief intervention receipt appeared similar, and transgender patients were more likely to receive specialty addictions treatment for AUD and pharmacotherapy for AUD than non-transgender patients.

Given substantial differences between transgender and non-transgender patients with regard to experiences of adverse social determinants of health, comorbidities, and discrimination (Blosnich et al., 2019; Grant et al., 2010; Institute of Medicine, 2011), it is unclear why transgender patients had higher rates of care for unhealthy alcohol use. There are several possible reasons for these findings. First, it is possible that among patients with unhealthy alcohol use, transgender patients may be more likely to receive specialty addictions treatment or AUD pharmacotherapy based on higher AUDIT-C scores or higher rates of

AUD diagnoses (Williams et al., 2021). However, it may also be the case that agreement to attend treatment results in a documented diagnosis as part of the referral process. Additionally, increased receipt of alcohol-related care may be driven by greater engagement in healthcare among transgender VA patients, which could be related to initiation of gender-affirming medical care (e.g., hormone therapy) (Unger, 2016; Wilson et al., 2015). For example, Myers and Safer (2017) found high rates of smoking cessation among transgender patients after they started gender-affirming hormones. Relatedly, common barriers to healthcare faced by transgender people, including discrimination in healthcare settings (Grant et al., 2010; Institute of Medicine, 2011) and structural inequities in social determinants of health (Blosnich et al., 2019), may be reduced among VA patients. VA's Transgender Healthcare Directive established a policy requiring respectful delivery of healthcare for transgender patients, which may be protective (Department of Veterans Affairs, 2013). Further, many VA benefits, such as healthcare benefits, service-connected disability payments, and housing support, address social determinants of health. Access to these VA benefits may reduce fundamental causes of healthcare disparities (Goldberg et al., 2020). It is also possible that higher service use overall among transgender patients is related to higher medical and mental health comorbidity among transgender relative to non-transgender patients. Indeed, attenuated findings when adjusting for covariates that indicate healthcare need (e.g., comorbidities) suggest this may play a role. Another consideration is stigmatization. Prior studies assessing care for substance use disorders have found that in the VA, rates of specialty addictions treatment are higher among stigmatized groups relative to dominant groups (Bensley et al., 2019; Glass et al., 2010; Williams et al., 2012). While higher rates of treatment are usually considered positive, the picture may be more mixed if one of the reasons for increased treatment receipt is greater criminalization of alcohol use among stigmatized groups (Cook & Alegría, 2011). Finally, these results may also be related to our study methods—it is possible that the population of patients we identified as transgender in this study using diagnostic codes captures a unique subset of transgender patients who may have overcome barriers to care. Longitudinal mixed methods research is needed to elucidate the pathways to care for unhealthy alcohol use and AUD treatment among transgender relative to non-transgender patients.

Though this study was conducted in a very large population of unrecruited transgender and non-transgender outpatients with unhealthy alcohol use, it is limited by several factors. Specifically, though reliance on EHR data enabled a very large study including the entire source population, this design also limited our ability to adequately measure both gender identity and sex, and to fully address the potential for residual confounding. Health systems should routinely assess and document self-identified gender identity, including options for non-binary identities (i.e., identities that do not align with a binary understanding of gender), and sex at birth, including documentation of intersex or differences of sexual development (i.e., people born with sex characteristics that do not align with a binary understanding of male/female bodies) (Scandurra et al., 2019; United Nations Office of the High Commissioner for Human Rights, 2015), which would simultaneously allow for improved care (e.g., targeting of preventive mental health interventions) and improved research on transgender populations. Further, we focused on binary outcomes of receipt of care but did not assess longer-term engagement with or retention in care (Bensley et

al., 2017; Saloner & Lê Cook, 2013). Transgender patients could be initiating specialty addictions treatment or pharmacotherapy at higher rates while not necessarily engaging in a sufficient course of treatment. Additionally, our analyses did not include data about receipt of gender affirming care as the VA currently does not cover surgical affirmation procedures (Kauth et al., 2017), and while the VA does provide hormone therapy transgender VA patients may get hormones through non-VA sources because of barriers to access (Dietert et al., 2017; Rosentel et al., 2016). Consequently, capturing receipt of gender affirming care in VA administrative data may not include the breadth of gender affirming treatments a patient may receive. Future research should operationalize receipt of gender affirming care for VA patients, potentially linking data across health coverage systems (e.g., Medicare) or utilizing unstructured data (e.g., clinical notes) for information about gender affirming care. Finally, due to VA's unique policies on transgender healthcare and benefits related to military service, as well as characteristics specific to transgender Veterans (e.g., military sexual trauma), results from this study may not generalize outside of VA or to non-veteran transgender populations. Future studies comparing alcohol-related care outcomes among transgender Veterans and civilians are needed to better understand whether there are differences between these populations.

Despite these limitations, this is the largest study to date to investigate receipt of evidence-based alcohol-related care in a population of transgender persons with unhealthy alcohol use, and to compare receipt among transgender patients to that among non-transgender patients. Findings suggest the majority of transgender patients with unhealthy alcohol use are receiving brief intervention, though a quarter still are not. Furthermore, overall rates of specialty addictions treatment and pharmacotherapy are low, but transgender patients may be receiving this care at greater rates than non-transgender patients. Further research is needed to investigate these findings and to increase receipt of evidence-based care overall. Given disproportionate exposure to social determinants of health that increase risk for both alcohol use and adverse alcohol-related outcomes (Blosnich et al., 2019; Grant et al., 2010; Institute of Medicine, 2011), as well as disproportionate experience of physical and mental health conditions that may contribute to alcohol-related harms (Blosnich et al., 2013; Blosnich et al., 2014; Brown & Jones, 2016), future work should focus on increasing access to evidence-based alcohol-related care for transgender persons with unhealthy alcohol use.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Funding Sources

Role of Funding Sources

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Highlights

1. Transgender persons with unhealthy alcohol use are particularly vulnerable to adverse effects

2. Whether transgender persons receive evidence-based alcohol-related care is under-studied

3. 25% of transgender patients with documented unhealthy alcohol use are not receiving care

4. Rate of addictions care and pharmacotherapy is low overall but higher among transgender patients

Table 1.

Characteristics of VA outpatients with unhealthy alcohol use (AUDIT-C ≥ 5): Overall and for transgender and non-transgender patients[a]

	Transgender (N=1,392)		Non-Transgender (N=1,404,342)		p-value	Total (N=1,405,734)	
	N	(%)	N	(%)		N	(%)
Documented as Female in EHR	375	(26.9)	55,078	(3.9)	<0.001	55,453	(3.9)
Age categories					<0.001		
<50	709	(50.9)	523,616	(37.3)		524,325	(37.3)
50–65	539	(38.7)	535,731	(38.2)		536,270	(38.2)
>65	144	(10.3)	344,995	(24.6)		345,139	(24.6)
Race/ethnicity					<0.001		
Black/African American	175	(12.6)	246,490	(17.6)		246,665	(17.6)
Hispanic/Latino	78	(5.6)	98,071	(7.0)		98,149	(7.0)
White	1,045	(75.1)	980,311	(69.8)		981,356	(69.8)
Other	47	(3.4)	38,353	(3.1)		38,400	(2.7)
Unknown	47	(3.4)	41,117	(2.9)		41,164	(2.9)
Financial hardship/VA copay status					<0.001		
Copay required	131	(9.4)	281,345	(20.0)		281,476	(20.0)
No copay required (disability)	417	(30.0)	324,778	(23.1)		325,195	(23.1)
No copay required (means/other)	571	(41.0)	497,238	(35.4)		497,809	(35.4)
Unassigned	273	(19.6)	300,981	(21.4)		301,254	(21.4)
Marital status					<0.001		
Divorced/Separated	581	(41.7)	480,730	(34.2)		481,284	(34.2)
Married	310	(22.3)	587,176	(41.8)		587,486	(41.8)
Never married/Single	453	(32.5)	273,503	(19.5)		273,956	(19.5)
Widowed	35	(2.5)	55,613	(4.0)		55,648	(4.0)
Unknown/Missing	13	(0.9)	7,347	(0.5)		7,360	(0.5)
Hepatitis C	83	(6.0)	58,580	(4.2)	0.001	58,663	(4.2)
HIV	35	(2.5)	5,305	(0.4)	<0.001	5,340	(0.4)
Charlson Score (w/o HIV)					0.003		
0	1,013	(72.8)	982,895	(68.6)		963,908	(68.6)
1	220	(15.8)	250,552	(17.8)		250,772	(17.8)
2	159	(11.4)	190,895	(13.6)		191,054	(13.6)
Any mental health condition[b]	938	(67.4)	540,023	(38.5)	<0.001	540,961	(38.5)
Any non-alcohol SUD[c]	517	(37.1)	414,955	(29.6)	<0.001	415,472	(29.6)
Smoking status					0.009		
Current smoking	742	(53.3)	687,705	(49.0)		688,447	(49.0)
Former smoking	289	(20.8)	316,913	(22.6)		317,202	(22.6)
Never smoking	275	(19.8)	294,678	(21.0)		294,953	(21.0)
Unknown smoking status	86	(6.2)	105,046	(7.5)		105,132	(7.5)
AUDIT-C Score					0.030		

	Transgender (N=1,392)		Non-Transgender (N=1,404,342)		p-value	Total (N=1,405,734)	
	N	(%)	N	(%)		N	(%)
5	422	(30.3)	478,022	(34.0)		478,444	(34.0)
6	277	(19.9)	257,423	(18.3)		257,700	(18.3)
7	173	(12.4)	175,938	(12.5)		176,111	(12.5)
8	148	(10.6)	157,791	(11.2)		157,939	(11.2)
9	111	(8.0)	94,976	(6.8)		95,087	(6.8)
10	114	(8.2)	107,348	(7.6)		107,462	(7.6)
11	67	(4.8)	53,118	(3.8)		53,185	(3.8)
12	80	(5.8)	79,726	(5.7)		79,806	(5.7)

AUDIT-C, Alcohol Use Disorders Identification Consumption; EHR, electronic health record; sd, standard deviation; SUD, substance use disorder; VA, Veterans Health Administration

[a] Transgender patients were identified based on documented ICD diagnoses in the electronic health record.

[b] Includes major depressive disorder, other depression, post-traumatic stress disorder, anxiety disorders, other mood disorders, bipolar disorder, psychoses, and schizophrenia.

[c] Includes amphetamine use disorder, cocaine use disorder, opioid use disorder, cannabis use disorder, hallucinogen use disorder, sedative use disorder, and tobacco use disorder.

Table 2.

Unadjusted prevalence of primary and secondary outcomes among VA outpatients with unhealthy alcohol use (AUDIT-C ≥ 5): Overall and compared between transgender and non-transgender patients

	Transgender		Non-Transgender		p-value	Total	
	N	(%)	N	(%)		N	(%)
PRIMARY OUTCOMES							
All patients with unhealthy alcohol use (AUDIT-C ≥ 5)	(N=1,392)		(N=1,404,342)			(N=1,405,734)	
Brief intervention within 0–14 days	1,029	(73.9)	1,038,448	(74.0)	0.984	1,039,477	(74.0)
AUD specialty addictions treatment	283	(20.3)	158,580	(11.3)	<0.001	158,863	(11.3)
Any AUD medications[a]	363	(26.1)	230,367	(16.4)	<0.001	230,730	(16.4)
Any alcohol-related care[b]	1,170	(84.1)	1,134,399	(80.8)	0.002	1,135,569	(80.8)
All patients with unhealthy alcohol use and prior-year AUD diagnosis	(N=642)		(N=520,477)			(N=521,119)	
Brief intervention within 0–14 days	468	(72.9)	387,345	(74.4)	0.376	387,813	(74.4)
AUD specialty addictions treatment	234	(36.5)	131,984	(25.4)	<0.001	132,218	(25.4)
Any AUD medications[a]	214	(33.3)	123,840	(23.8)	<0.001	124,054	(23.8)
Any alcohol-related care[b]	565	(88.0)	448,341	(86.1)	0.171	448,906	(86.1)
SECONDARY OUTCOMES							
All patients with unhealthy alcohol use (AUDIT-C ≥ 5)	(N=1,392)		(N=1,404,342)			(N=1,405,734)	
Brief intervention within 1 year	1,200	(86.2)	1,182,211	(84.2)	0.039	1,183,411	(84.2)
FDA-approved AUD medications[c]	107	(7.7)	46,506	(3.3)	<0.001	46,613	(3.3)
Individual AUD medications							
Acamprosate	15	(1.1)	7,199	(0.5)	0.003	7,214	(0.5)
Disulfiram	14	(1.0)	6,750	(0.5)	0.005	6,764	(0.5)
Oral naltrexone	78	(5.7)	32,761	(2.3)	<0.001	32,839	(2.3)
Injectable naltrexone	11	(0.8)	3,505	(0.3)	<0.001	3,516	(0.3)
Topiramate	42	(3.0)	20,999	(1.5)	<0.001	21,041	(1.50)
Gabapentin	245	(17.6)	168,978	(12.0)	<0.001	169,223	(12.0)
Baclofen	39	(2.8)	28,403	(2.0)	0.039	28,442	(2.0)
All patients with unhealthy alcohol use and prior-year AUD diagnosis	(N=642)		(N=520,477)			(N=521,119)	
Brief intervention within 1 year	558	(86.9)	444,157	(85.3)	0.258	444,715	(85.3)
FDA-approved AUD medications[c]	90	(14.0)	39,084	(7.5)	<0.001	39,174	(7.5)
Individual AUD medications							
Acamprosate	14	(2.2)	6,265	(1.2)	0.023	6,279	(1.2)
Disulfiram	13	(2.0)	5,892	(1.1)	0.033	5,905	(1.1)
Oral naltrexone	63	(9.8)	27,176	(5.2)	<0.001	27,239	(5.2)
Injectable naltrexone	10	(1.6)	3,066	(0.6)	0.001	3,076	(0.6)
Topiramate	17	(2.7)	10,620	(2.0)	0.277	10,637	(2.0)

Gabapentin	134	(20.9)	85,474	(16.4)	0.002	85,608	(16.4)
Baclofen	21	(3.3)	12,773	(2.5)	0.181	12,794	(2.5)

AUD, alcohol use disorder; AUDIT-C, Alcohol Use Disorders Identification Consumption; FDA, U.S. Food and Drug Administration; VA, Veterans Health Administration

[a] Includes acamprosate, disulfiram, oral and injectable naltrexone, topiramate, gabapentin, and baclofen

[b] Includes brief intervention within 14 days, specialty addictions treatment, and any AUD medications

[c] Includes only FDA-approved medications: acamprosate, disulfiram, topiramate, oral and injectable naltrexone

Table 3.

Predicted prevalence and prevalence ratio[a] of primary outcomes for transgender relative to non-transgender patients: Among all VA outpatients with unhealthy alcohol use use (AUDIT-C ≥ 5) and among VA outpatients with unhealthy alcohol use and a prior-year alcohol use disorder diagnosis

	Transgender		Non-Transgender		Prevalence Ratio (PR) for Transgender Relative to Non-Transgender		
	%	**(95% CI)**	**%**	**(95% CI)**	**PR**	**(95% CI)**	**p-value**
AMONG ALL VA OUTPATIENTS WITH UNHEALTHY ALCOHOL USE (N=1,405,734)							
Brief intervention within 14 days							
Model 1[b]	74.2	(70.9 – 77.4)	74.8	(73.0 – 76.5)	0.99	(0.96 – 1.03)	0.655
Model 2[c]	75.0	(71.8 – 78.2)	74.7	(72.9 – 76.5)	1.00	(0.97 – 1.04)	0.823
Model 3[d]	75.4	(72.2 – 78.5)	74.6	(72.9 – 76.4)	1.01	(0.98 – 1.04)	0.574
AUD specialty addictions treatment							
Model 1[b]	22.9	(19.9 – 25.8)	12.7	(11.4 – 13.9)	1.80	(1.62 – 2.01)	<0.001
Model 2[c]	18.8	(16.4 – 21.2)	12.7	(11.4 – 14.1)	1.48	(1.33 – 1.64)	<0.001
Model 3[d]	15.7	(13.7 – 17.7)	12.6	(11.4 – 13.8)	1.24	(1.12 – 1.37)	<0.001
Any AUD medication							
Model 1[b]	26.0	(23.6 – 28.5)	16.4	(15.8 – 17.1)	1.58	(1.44 – 1.74)	<0.001
Model 2[c]	21.9	(19.9 – 23.9)	16.4	(15.9 – 16.9)	1.33	(1.22 – 1.46)	<0.001
Model 3[d]	19.0	(17.1 – 20.8)	16.3	(15.8 – 16.8)	1.16	(1.06 – 1.28)	0.002
Any alcohol-related care							
Model 1[b]	84.2	(81.5 – 87.0)	81.3	(79.9 – 82.7)	1.04	(1.01 – 1.07)	0.013
Model 2[c]	83.8	(81.0 – 86.6)	81.3	(79.9 – 82.7)	1.03	(1.00 – 1.06)	0.040
Model 3[d]	82.8	(80.0 – 85.5)	81.2	(79.8 – 82.6)	1.02	(0.99 – 1.05)	0.183
AMONG VA OUTPATIENTS WITH UNHEALTHY ALCOHOL USE AND A DOCUMENTED ALCOHOL USE DISORDER IN THE YEAR PRIOR TO POSITIVE ALCOHOL SCREENING (N=521,119)							
Brief intervention within 14 days							
Model 1[b]	72.9	(68.7 –77.1)	75.1	(73.2 – 77.0)	0.97	(0.92 – 1.02)	0.233
Model 2[c]	73.7	(69.5 – 77.8)	75.0	(73.1 – 76.8)	0.98	(0.94 – 1.03)	0.466
Model 3[d]	74.8	(70.7 – 78.9)	75.0	(73.1 – 76.8)	1.00	(0.95 – 1.05)	0.937
AUD specialty addictions treatment							
Model 1[b]	51.1	(36.2 – 66.0)	35.9	(25.8 – 46.0)	1.42	(1.28 – 1.58)	<0.001
Model 2[c]	40.0	(31.5 – 48.4)	31.4	(25.2 – 37.5)	1.28	(1.16 – 1.40)	<0.001
Model 3[d]	36.8	(29.5 – 44.1)	30.7	(25.2 – 36.2)	1.20	(1.09 – 1.32)	<0.001
Any AUD medication							
Model 1[b]	32.4	(28.8 – 36.0)	23.5	(22.7 – 24.3)	1.37	(1.23 – 1.54)	<0.001

Model 2[c]	28.8	(25.6 – 31.9)	23.5	(22.8 – 24.3)	1.22	(1.09 – 1.36)	<0.001
Model 3[d]	26.1	(23.3 – 29.0)	23.5	(22.8 – 24.2)	1.11	(1.00 – 1.24)	0.058
Any alcohol-related care							
Model 1[b]	88.0	(85.1 – 90.9)	86.4	(85.3 – 87.4)	1.02	(0.99 – 1.05)	0.225
Model 2[c]	87.5	(84.6 – 90.3)	86.4	(85.3 – 87.4)	1.01	(0.98 – 1.04)	0.422
Model 3[d]	87.4	(84.5 – 90.2)	86.4	(85.3 – 87.4)	1.01	(0.98 – 1.04)	0.456

AUD, alcohol use disorder; AUDIT-C, Alcohol Use Disorders Identification Consumption; PR, prevalence ratio; VA, Veterans Health Administration

[a]From mixed-effects modified Poisson regression models with logarithm link and a random effect for VA facility, with robust standard errors

[b]Adjusted for fiscal year in which AUDIT-C screen occurred

[c]Adjusted for fiscal year in which AUDIT-C screen occurred, sex, age, race/ethnicity, VA copay status, and marital status

[d]Adjusted for fiscal year in which AUDIT-C screen occurred, sex, age, race/ethnicity, VA copay status, marital status, smoking status, Hepatitis C, HIV, Charlson score without HIV (categories 0, 1, ≥2); any mental health conditions, any non-alcohol SUD