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Prevalence of Substance Use and Mental Health Problems among Transgender and Cisgender U.S. Adults: Results from a National Probability Sample

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Abstract

Transgender individuals experience numerous health disparities relative to cisgender individuals. However, most transgender-health studies have focused on convenience samples with limited generalizability. This study utilized data from the 2016–2018 TransPop Study, the first national probability sample of transgender adults (n=274) with a cisgender comparison sample (n=1162). Using multivariable logistic regression, adjusted for demographics, we compared the prevalence of hazardous drinking, problematic drug use, serious psychological distress, suicidality, and non-suicidal self-injury between transgender and cisgender individuals and among transgender men (n=78), transgender women (n=120), and transgender nonbinary individuals (n=76). Among transgender individuals, 28.2% (95%CI 21.2–35.2) and 31.2% (95%CI 23.8–38.7) reported hazardous drinking and problematic drug use, respectively; 44.4% (95% CI 35.8–53.0) reported recent suicidal ideation, 6.9% (95% CI 2.3–11.5) reported a recent suicide attempt, and 21.4% (95% CI 14.5%–28.4%) reported recent non-suicidal self-injury. In their lifetime, 81.3% (95%CI

75.1–87.5) of transgender respondents had suicidal ideation, 42.0% (95%CI 34.2–49.8) had attempted suicide, and 56.0% (95% CI 48.2–63.8) reported non-suicidal self-injury. Most (81.5%; 95%CI 75.5–87.5) had utilized formal mental health care and 25.5% (95%CI 18.5–32.4) had sought informal mental health support. There were no differences in alcohol or drug-use outcomes between transgender and cisgender adults. Compared to cisgender adults, transgender adults had higher odds of serious psychological distress (aOR=3.1; 95%CI 1.7–5.7), suicidal ideation (recent: aOR=5.1, 95%CI 2.7–9.6); lifetime: aOR=6.7, 95%CI 3.8–11.7), lifetime suicide attempts (aOR=4.4, 95%CI 2.4–8.0), and non-suicidal self-injury (recent: aOR=13.0, 95%CI 4.8–35.1); lifetime: aOR=7.6, 95%CI 4.1–14.3). Transgender nonbinary adults had the highest odds for all outcomes, including substance use outcomes. Findings from these national probability samples support those of earlier convenience-sample studies showing mental health disparities among transgender adults relative to cisgender adults, with nonbinary individuals at highest risk. These findings also highlight variations in risk across sub-groups of transgender individuals.

Keywords

gender identity; alcohol; drugs; suicidal ideation; self-injurious behaviors

1. INTRODUCTION

"Transgender" refers to people with gender identities or expressions that differ from the gender socially attributed to the sex they were assigned at birth (i.e., male or female) (Coleman et al., 2022). The term "cisgender" describes people whose gender identity aligns with their sex assigned at birth. "Transgender men" refers to men who were assigned female at birth. "Transgender women" descries women who were assigned male at birth. Collectively, transgender men and transgender women are considered to have "binary gender identities" because they fall within the male-female binary. Other transgender people have gender identities outside of the male-female binary (i.e., nonbinary gender identities). Generally, not all nonbinary individuals identify as transgender; some nonbinary people may consider their gender identity to be in a separate category from transgender and cisgender. Over 1.3 million US adults (0.5%) and 300,000 youth aged 13 to 17 (1.4%) identify as transgender (Herman, Flores, & O'Neill, 2022). While there is less information about nonbinary individuals, approximately 1.2 million (11%) lesbian, gay, bisexual, transgender, and queer (LGBTQ) adults report a nonbinary gender identity (Wilson & Meyer, 2021). Notably, gender identity (e.g., transgender and cisgender) is distinct from sexual identity (the types of people to which one is romantically or sexually attracted; e.g., lesbian, gay, bisexual).

The National Institutes of Health have designated transgender people and other sexual and gender minorities a health disparity population, recognizing the unique health challenges that these individuals face (National Institutes of Health, 2022). Previous research, which primarily relied on convenience samples, has suggested that transgender people may experience high rates of substance use and mental health problems (Connolly & Gilchrist, 2020; Gilbert, Pass, Keuroghlian, Greenfield, & Reisner, 2018; Pinna et al., 2022). For example, in these studies, transgender people reported depressive and anxiety disorders

as well as suicidal ideation at disproportionately higher rates than cisgender heterosexual people (Reisner et al., 2016; Tucker, 2019; Wanta, Niforatos, Durbak, Viguera, & Altinay, 2019). Studies have also found high rates of hazardous drinking (e.g., binge drinking, heavy drinking) and alcohol use disorder among transgender individuals (Gilbert et al., 2018; Martinez et al., 2016; Scheim, Bauer, & Shokoohi, 2016). Other studies have documented high rates of cannabis use (Gonzalez, Gallego, & Bockting, 2017), prescription drug misuse (Kidd, Goetz, Shea, & Bockting, 2021), and problematic substance use more generally (Connolly et al., 2022) among transgender people.

Minority Stress Theory is a public health framework that is widely used to explain gender-identity-related health disparities (Hendricks & Testa, 2012). In this conceptual model, marginalized populations experience additive, chronic stress (i.e., minority stress) due to discrimination, societal prejudice, and internalized stigma (Meyer, 2003; Rich, Salway, Scheim, & Poteat, 2020). A systematic review of 77 studies published between 1997 and 2017 revealed a consistent link between minority stress and poor mental health among transgender people (Valentine & Shipherd, 2018). For example, violence victimization, substance use, and suicide risk are all linked to anti-transgender stigma and discrimination (Testa et al., 2017; Winter et al., 2016). There is also robust evidence that anti-transgender stigma limits opportunities and access to education, employment, and healthcare (Downing & Przedworski, 2018; White Hughto, Reisner, & Pachankis, 2015). This contributes to a higher burden of discrimination, violence, mental distress and disability among transgender people as well as lower educational attainment, income, and insurance coverage than cisgender people (Downing & Przedworski, 2018). Such discrimination and stigmatization also occurs in healthcare settings (Kenagy, 2005; Lyons et al., 2015; Mullens et al., 2017), leading some transgender individuals to avoid seeking necessary care due to fears of discrimination (James et al., 2016).

To date, prevalence studies of substance use and mental health problems and treatment-seeking among transgender individuals have primarily relied on data collected from convenience samples (Connolly & Gilchrist, 2020; Gilbert et al., 2018; Pinna et al., 2022). With limited generalizability, researchers cannot draw conclusions about the magnitude of substance use and mental health problems and treatment need among transgender populations, disparities between transgender and cisgender individuals, or differences among sub-groups of transgender individuals (e.g., transgender men, transgender women, transgender nonbinary individuals). There have been no studies utilizing national probability samples that specifically targeted US transgender adults. Some nationally representative surveys (e.g., the Behavioral Risk Factor Surveillance System, the Youth Risk Behavior Surveillance System) include gender-identity measures but permit US states to opt-out of including them. This allows these surveys to collect data on transgender individuals but with potential bias. Additionally, recruitment for such general-population surveys is not designed to achieve a representative sample of transgender adults.

Studies of community-based, non-probability samples of transgender individuals have tended to find more significant disparities, relative to cisgender individuals, than secondary analyses that examined transgender respondents to surveys of representative samples of the overall U.S. adult population (Henderson, Blosnich, Herman, & Meyer, 2019). In the latter

type of study, the number of transgender respondents is typically too small for nuanced analyses. To address this limitation and a conflicting body of evidence, this secondary analysis utilized data from the TransPop Study (Transgender Population Study) (Krueger, Divsalar, Luhur, Choi, & Meyer, 2020), which included the first nationally representative sample of U.S. transgender adults with a cisgender comparison sample. We used these data to (1) estimate the prevalence of substance use and mental health problems and treatment-seeking among transgender adults; (2) compare prevalence estimates for transgender and cisgender adults; and (3) investigate differences in prevalence among three sub-groups of transgender individuals (transgender men, transgender women, and transgender nonbinary individuals).

2. METHODS

2.1 Recruitment, eligibility screening, and survey administration

Detailed information about methodology for the TransPop Study, the parent study upon which this secondary analysis is based, can be found in the TransPop Study technical manual (Krueger et al., 2020) and in other publications that utilized this dataset (Carone, Rothblum, Bos, Gartrell, & Herman, 2021; Feldman, Luhur, Herman, Poteat, & Meyer, 2021). The TransPop Study included two national probability samples of US adults (age 18): one sample comprised of transgender adults and the other of cisgender adults. The transgender sample is the first nationally representative sample to specifically focus on US transgender adults. Both samples were recruited by Gallup (2023), a survey research company that was contracted to administer the TransPop survey. The transgender sample was recruited during two time periods (April 2016-August 2016 and June 2017-December 2018). Gallup recruited the cisgender sample in February 2018 and in November-December 2018. The recruitment period for the cisgender sample was shorter than the transgender sample because there are more cisgender people in the US population.

Recruitment for both the transgender and cisgender samples utilized the same national probability sampling frame. Following this sampling frame, individuals were randomly selected to be contacted for screening. During the first recruitment period (April-August 2016 for the transgender sample and February 2018 for the cisgender sample), Gallup employed random digit dialing to cell phone and landline numbers. In the second recruitment period (June 2017-December 2018 for the transgender sample and November-December 2018 for the cisgender sample), Gallup shifted to address-based sampling in accordance with updated industry standards. Throughout recruitment, the national probability sampling frame remained the same.

For the transgender sample, the first screening question asked potential participants if they identified as transgender. If they answered affirmatively, they were then asked their sex assigned at birth and current gender identity. Individuals were eligible for inclusion in the transgender sample if they identified as transgender and their gender identity differed from their sex assigned at birth. This definition was adopted by the TransPop Study investigators to be consistent with the definition used by the Centers for Disease Control's Behavior Risk Factor Surveillance System (Centers for Disease Control and Prevention, 2019). Additional inclusion criteria were age 18, education 6th grade, and English fluency. There were

no additional exclusion criteria. For this secondary analysis, individuals in the transgender sample were further categorized into three sub-groups: (1) transgender men (men who were assigned female at birth), transgender women (women who were assigned male at birth), and transgender nonbinary individuals (transgender individuals with a nonbinary gender identity). Transgender men and transgender women are collectively referred to as "transgender individuals with binary gender identities."

For the cisgender sample, prospective individuals were first asked their sex assigned at birth and current gender identity. If these differed, they were screened for the transgender sample. Otherwise, individuals were eligible for inclusion in the cisgender sample if they also reported age 18, education 6th grade, and English fluency. There were no additional exclusion criteria.

All eligible individuals provided informed consent. In both the transgender and cisgender samples, eligible respondents then completed a self-administered survey by mail or online.

2.2. Sampling weighting

Sampling weights for the combined samples (transgender and cisgender samples) and for the transgender sample were based on national demographics as well as a national sample of lesbian, gay, bisexual, transgender, and queer (LGBTQ) people that had previously been recruited by Gallup. Weights were also adjusted to account for non-response (e.g., eligible individuals who did not opt-in to the study, individuals who opted-in but did not complete the survey).

2.3. Measures

2.3.1. Demographics—Age, race, ethnicity, annual household income, and education were assessed using items from the 2010 U.S. Census (U.S. Census Bureau, 2010). For descriptive purposes, age was categorized as 18–25, 26–40, 41–60, and 60+ (oldest age was 100). Continuous age was used in multivariable analyses. Responses to questions about race and ethnicity were combined to create a 5-level "race and ethnicity" variable: White non-Hispanic, Black/African American, Hispanic/Latinx, Asian Pacific Islander, Multiracial/Other. Respondents reported their sexual identity ("Which of the following best describes your current sexual orientation?") using the following response options: straight/ heterosexual, lesbian, gay, bisexual, queer, same-gender loving, or other. Sexual minority individuals were those who indicated a response other than "straight/heterosexual." Annual household income was assessed using a categorical measure with 14 response options (e.g., no income; $1 to $4,999; $5,000 to $9,999; $10,000 to 14,499…$75,000 to 99,999; $100,000 to 149,999; $150,000 or more). This item was recoded to a 4-level variable ($0-$24,999; $25,000-$49,999; $50,000-$74,999; and $75,000+) after examining the distribution of responses and considering that $50,000 is approximately three-times the 2018 federal poverty level for a two-person household (U.S. Department of Health and Human Services, 2018). Education was categorized as high school or less, some college, undergraduate degree (associates or bachelors), and graduate/professional degree.

2.3.2.   Substance use problems—Hazardous drinking was measured using the three-item Alcohol Use Disorders Identification Test (AUDIT-C) (Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998), a widely used screening measure. Respondents rated their frequency of drinking, amount drunk on a typical day, and how often they had   6 drinks at one time. AUDIT-C scores range from 0 to 12, and there are sex-based scoring thresholds for hazardous drinking (female: score   3 and male: score   4) that were validated in cisgender population groups (Bush et al., 1998). There is no consensus for applying these thresholds in transgender populations (Gilbert et al., 2018). Because of this, and after finding no difference in hazardous-drinking prevalence estimates when criteria were applied based on sex assigned at birth or gender identity (for those with binary identities), we applied cut-offs based on sex assigned at birth because this was most consistent across the two samples and inclusive of those transgender individuals with nonbinary gender identities. Internal consistency, as measured by Cronbach's alpha, for the combined samples (transgender and cisgender samples) was 0.59. For the transgender sample, internal consistency was 0.65.

Problematic drug use was assessed using the Drug Use Disorders Identification Test (DUDIT) (Berman, Bergman, Palmstierna, & Schlyter, 2005), an 11-item scale that assesses frequency of drug use, loss of control over use, and functional impairment. Items 1 to 9 are scored on a 5-point Likert scale (ranging 0 to 4); items 10 and 11 are scored on a 3-point scale (0, 2, or 4). Item scores are summed to produce a composite score ranging 0–44. While the DUDIT has sex-based scoring thresholds for problematic drug use, these were normed with cisgender samples and are less well-established than the AUDIT-C thresholds. Therefore, we conservatively applied the higher cut-off (total score   6) in this study. Internal consistency was 0.87 for both the combined samples and for the transgender sample.

2.3.3.   Mental health problems—Serious psychological distress was assessed using the six-item Kessler Psychological Distress Scale (Kessler et al., 2010). Respondents used a Likert scale ranging from 0 "none of the time" to 4 "all of the time" to indicate how often they had felt "so sad nothing could cheer them up;" nervous, restless or fidgety, hopeless "that everything was an effort;" or worthless in the past 30 days. Individual item responses were summed to produce a composite score (ranging 0–24), which was dichotomized at   13 to indicate "serious psychological distress" (Kessler et al., 2003; Kessler et al., 2010). Internal consistency was 0.91 for both the combined samples and for the transgender sample.

Using three separate questions, respondents were asked about lifetime suicidal ideation ["Did you ever think about how you might kill yourself (e.g., taking pills, shooting yourself) or work out a plan of how to kill yourself?"], suicide attempt ["Did you ever make a suicide attempt (i.e., purposefully hurt yourself with at least some intention to die)?"], and non-suicidal self-injury ["Did you ever do something to hurt yourself on purpose, but without wanting to die (e.g., cutting yourself, hitting yourself, or burning yourself)?"]. For each measure, if the respondent answered affirmatively, they were asked how old they were the most recent time this occurred. If the age they reported was within one year of their current age, this was classified as "recent suicidal ideation," "recent suicide attempt," or "recent non-suicidal self-injury."

2.3.4. Mental health treatment or support—Respondents were presented with a list of professionals and asked to "mark all that apply" any whom they had seen in their lifetime for "…problems with your emotions, nerves, or your use of alcohol or drugs" (Kessler & Ustun, 2004). Respondents who marked any of the following were classified as having received "formal mental health care": psychiatrist; general practitioner, family doctor, or another medical doctor; psychologist or social worker; or a counselor or any other mental health professional. Respondents who marked any of the following were classified as having received informal mental health support: "a religious or spiritual advisor like a minister, priest, or rabbi" or "any other healer, like an herbalist, chiropractor, or spiritualist." Respondents could have received both types of care/support.

2.4. Data analysis

We used Rao-Scott chi-square tests to evaluate demographic differences between groups by gender identity, between the transgender and cisgender samples and within the transgender sample (transgender men, transgender women, and transgender nonbinary individuals). We estimated the prevalence of each outcome for each group (transgender and cisgender samples), as well as within each sub-group of the transgender sample, with weighted proportions and accompanying confidence intervals accounting for survey design. We tested associations between gender identity and substance use/mental health outcomes using multivariable logistic regression, controlling for continuous age, race and ethnicity, annual household income, and education. When comparing transgender men and transgender women, transgender women were chosen as the reference group because previous research suggested that this group may experience higher rates of mental health problems (Stanton et al., 2021). For comparisons involving transgender nonbinary individuals, we conducted separate pair-wise comparisons with transgender men and transgender women as reference groups in order to examine differences between transgender individuals with binary and nonbinary identities.

The percentage of missing data was generally low [under 5% except for DUDIT scores (5.4% missing), recent suicidal ideation (5.6% missing), and informal mental health support (8.6% missing)] and was handled using listwise deletion in all models. Sensitivity analyses were conducted using multiple imputation, to ensure that results were not dependent on the missing data approach. The imputation created 20 data sets, with each missing value being predicted by the full set of relevant demographics, substance use, mental health variables, and the sample weight. Imputations were carried out separately for the combined samples (transgender individuals plus cisgender individuals) and for the transgender sample.

Statistical significance was determined at an alpha of less than 0.05, or a confidence interval that did not include 1.0. All analyses were conducted using the SURVEY procedures in SAS software version 9.4 (2016), with appropriate sample weights applied. The TransPop Study protocol was reviewed and approved by the Institutional Review Boards (IRBs) of Gallup, University of California-Los Angeles, and seven partner institutions. This secondary analysis was conducted with publicly available data from the University of Michigan's ICPSR data-sharing consortium (University of Michigan, 2023).

3. RESULTS

The transgender sample contained 274 respondents (51 individuals from the first recruitment period and 223 individuals from the second recruitment period). The cisgender sample contained 1162 respondents (353 individuals from the first recruitment period and 809 individuals from the second recruitment period). Table 1 presents demographic comparisons between the transgender and cisgender samples as well as among the three sub-groups of transgender individuals. Compared to cisgender individuals, transgender individuals were significantly younger [37.7% vs 12.6% were 18–25 years old, p < .01) and more likely to be non-white (43.5% vs 27.7%, p < .01) and sexual minority (82.4% vs 9.9%, p < .01). Transgender individuals were also more likely to have an annual household income below $50,000 (61.2% vs 43.3%, p < .01) and less likely to have a college degree (24.8% vs 36.5%, p < .01). Transgender men, transgender women, and transgender nonbinary individuals were similar in terms of race and ethnicity, annual household income, and education. Transgender men and transgender nonbinary individuals were significantly younger than transgender women (17.0% of transgender women were age 18–25 vs 53.2% of transgender men and 47.5% of transgender nonbinary individuals, p < 0.01). Nearly all transgender nonbinary individuals identified as sexual minorities (99.4%), compared to 71.7% of transgender men and 76.7% of transgender women (p < 0.01).

Table 2 (Column 2) presents unadjusted prevalence estimates for mental health and substance use outcomes among transgender individuals. Nearly one-third of transgender individuals reported hazardous drinking (28.2%; 95% CI 21.2–35.2) and problematic drug use (31.2%; 95% CI 23.8–38.7). Among transgender respondents, 44.4% (95% CI 35.8–53.0) reported recent suicidal ideation, 6.9% (95% CI 2.3–11.5) reported a recent suicide attempt, and 21.4% (95% CI 14.5%−28.4%) reported recent non-suicidal self-injury. In their lifetime, most transgender respondents had experienced suicidal ideation (81.3%; 95% CI 75.1–87.5), 42.0% (95% CI 34.2–49.8) had attempted suicide, and 56.0% (95% CI 48.2–63.8) had engaged in non-suicidal self-injury. The majority (81.5%; 95% CI 75.5–87.5) had utilized formal mental health care and one-quarter (25.5%; 95% CI 18.5–32.4) had sought informal mental health support (e.g., religious/spiritual leaders, complementary/alternative medicine providers).

Figure 1 visually compares adjusted prevalence estimates (with 95% confidence intervals) for substance use and mental health outcomes among transgender and cisgender adults. (Additional details about adjusted prevalence estimates are provided in Supplementary Table 1.) Table 2 presents the results from adjusted multivariable logistic regression analyses that compared the odds of substance use and mental health problems/treatment-seeking between transgender and cisgender individuals. After adjusting for demographics, there was no statistically significant difference between transgender and cisgender adults in the odds of hazardous drinking or problematic drug use. However, transgender individuals had higher odds of serious psychological distress (aOR=3.1, 95% CI 1.7–5.7), suicidal ideation (recent: aOR 5.1, 95% CI 2.7–9.6; lifetime: aOR 6.7, 95% CI 3.8–11.7), lifetime suicide attempts (aOR 4.4, 95% CI 2.4–8.0), and non-suicidal self-injury (recent: aOR=13.0, 95% CI 4.8–35.1; lifetime: aOR=7.6, 95% CI 4.1–14.3). Transgender people also had higher odds of receiving formal mental health care (aOR 5.1, 95% CI 2.9–8.8) than cisgender individuals.

There was no difference between transgender and cisgender individuals in likelihood of informal mental health support.

Table 3 presents adjusted prevalence odds ratios from multivariable logistic regression models that compared substance use and mental health outcomes among transgender men, transgender women, and transgender nonbinary individuals. (Supplemental Table 2 provides additional details about the adjust prevalence estimates of each outcome for the three sub-groups of transgender individuals.) There were no statistically significant differences between transgender men and transgender women for any of the outcomes. Transgender nonbinary individuals had significantly higher odds of hazardous drinking (aOR 4.2, 95% CI 1.5–11.7) than transgender women. Compared to transgender men, transgender nonbinary individuals had higher odds of problematic drug use (aOR=4.4, 95% CI 1.5–12.6), serious psychological distress (aOR=3.1, 95% CI 1.1–8.8), and recent suicidal ideation (aOR=5.5, 95% CI 1.7–17.8), and lifetime non-suicidal self-injury (aOR=3.6, 95%CI 1.3–10.5).

Sensitivity analyses using multiple imputation showed highly convergent results, with only one discrepancy among the tested comparisons. Transgender men showed lower odds of recent suicidal ideation than transgender women. All other associations were consistent across the two approaches (i.e., unimputed and imputed).

4. DISCUSSION

Given the association between negative health outcomes and minority stress (Valentine & Shipherd, 2018), it was surprising that there was no difference between transgender and cisgender adults in hazardous drinking or problematic drug use. Results provide clear evidence of poorer mental health (serious psychological distress, suicidality, non-suicidal self-injury) among transgender adults, compared to cisgender adults. Our study also provides evidence that transgender nonbinary individuals are at even greater risk of experiencing negative substance use and mental health outcomes than transgender individuals with binary gender identities (i.e., transgender men and transgender women).

4.1. Demographic differences between U.S. transgender and cisgender adults

Because recruitment for both the transgender and cisgender samples utilized the same national probability sampling frame, the demographic differences (age, race and ethnicity, annual household income, education) between these two groups represent actual differences between these populations and support findings from general-population surveys like the Behavior Risk Factor Surveillance System (BRFSS) and the Youth Risk Behavior Survey (YRBS). For example, Herman et al (2022) found that transgender respondents in the 2017–2020 BRFSS and the 2017/2019 YRBS were significantly younger and less likely to identify as white than the general population. The 2015 US Transgender Survey, with a convenience sample of over 27,000 transgender adults, found that a higher percentage of respondents reported living in poverty, compared to the general population (James et al., 2016).

4.2. Similar substance-use outcomes for transgender and cisgender adults

When all transgender individuals were combined, rates of hazardous drinking and problematic drug use were similar for transgender and cisgender adults. While the alcohol

finding is surprising given the link between minority stress and numerous other negative health outcomes (Valentine & Shipherd, 2018), this finding is consistent with earlier research on alcohol use among transgender respondents in the 2014–2015 Behavioral Risk Factor Surveillance System (BRFSS) who were more likely to be non-drinkers than their cisgender counterparts (Streed, McCarthy, & Haas, 2017). Our findings, which are derived from separate national probability samples of transgender and cisgender adults, support earlier findings from the BRFSS general-population nationally representative sample that transgender adults may not experience disparities in hazardous drinking relative to cisgender adults (Meyer, Brown, Herman, Reisner, & Bockting, 2017).

While most prior studies of non-alcohol drug use have not directly compared transgender and cisgender individuals, several studies have documented higher rates of stimulant-related problems among transgender individuals (Connolly & Gilchrist, 2020). Others studies have found high rates of cannabis (Gonzalez et al., 2017) and prescription drug misuse (Kidd et al., 2021) among transgender people. The drug-use measure used in the TransPop Study, the DUDIT, screens for overall problematic drug use rather than for individual classes of drugs. Future research is needed to investigate differences between transgender and cisgender adults in the use of specific substances.

4.3. Psychological distress, suicidality, and mental health treatment-seeking among transgender adults

Our findings highlight elevated rates of serious psychological distress among transgender individuals that exceed those of cisgender individuals. Rates of suicidal ideation and non-suicidal self-injury among transgender individuals were particularly alarming. These findings are consistent with previous studies that used non-probability samples to study mental health among transgender individuals (Reisner et al., 2016; Tucker, 2019; Wanta et al., 2019). Suicidal ideation may be in reaction to minority stressors (e.g., transphobic harassment and violence) directed at the individual and internalized reactions to minority stress, including stress related to internalized stigma (Pellicane & Ciesla, 2022). Previous research has shown that non-suicidal self-injury may represent an attempt by transgender individuals to cope with negative emotions, including internalized stigma in the form of felt stigma (i.e., expecting or anticipating rejection based on one's gender identity) (Jackman, Dolezal, Levin, Honig, & Bockting, 2018). Our findings show serious disparities in these mental health outcomes and suggest that interventions are needed to mitigate this risk. These may include increasing access to gender-affirming care, which is related to lower odds of suicidal ideation (Almazan & Keuroghlian, 2021; Tordoff et al., 2022). More generally supporting transgender individuals can also improve health. For example, research suggests that transgender community connectedness and other forms of social support may buffer the impact of minority stress (Pflum, Testa, Balsam, Goldblum, & Bongar, 2015; Valente et al., 2020) and may be associated with lower rates of suicidality (Gosling, Pratt, Montgomery, & Lea, 2022).

Given the observed mental health disparities between transgender and cisgender individuals, it is not surprising that transgender individuals reported higher rates of formal mental health treatment than cisgender individuals. While this may indicate a reassuring level of

help-seeking in a population with demonstrated need, it is unclear from our data whether the treatment transgender individuals received was evidence-based, appropriately tailored to address culturally distinct factors like minority stress, or effective.

4.4. Transgender nonbinary adults experience the highest odds of substance use and mental health problems

While transgender adults overall had similar rates of hazardous drinking and problematic drug use to cisgender adults, differences emerged among sub-groups of transgender adults. Transgender nonbinary individuals reported higher rates of hazardous drinking and problematic drug use than transgender individuals with binary gender identities; rates that were also higher than cisgender adults. Transgender nonbinary individuals also had poorer mental health outcomes relative to transgender individuals with binary gender identities. These findings are consistent with previous research that found higher rates of depressive symptoms and hazardous drinking among transgender nonbinary individuals, compared to transgender individuals with binary gender identities (Reisner & Hughto, 2019). Transgender nonbinary people may experience minority stress differently from transgender individuals with binary gender identities due to the lack of societal recognition and acceptance of gender identities that are outside of the binary of man or woman (Jackman, Edgar, Ling, Honig, & Bockting, 2018; Johnson, LeBlanc, Deardorff, & Bockting, 2020). In research from the TransPop Study and other samples, transgender nonbinary people reported higher rates of non-affirming treatment in their everyday lives (e.g., misgendering, family rejection) than transgender individuals with binary gender identities (Aparicio-Garcia, Diaz-Ramiro, Rubio-Valdehita, Lopez-Nunez, & Garcia-Nieto, 2018; Jackman et al., 2018; Lane, Waljee, & Stroumsa, 2022). In addition to minority stress from the larger society, transgender nonbinary people may feel excluded from or stigmatized in transgender-affirming spaces that primarily cater to the needs and life experiences of transgender people with binary gender identities (Scandurra et al., 2023). This would further diminish social support and increase minority stress for transgender nonbinary individuals and could explain their increased vulnerability to substance use and mental health problems.

4.5. Strengths and limitations

As the first study to examine the prevalence of substance use and mental health problems/treatment-seeking in a national probability sample of US transgender and cisgender adults, this study has notable strengths. Nonetheless, there are some limitations. First, the TransPop Study used self-report measures of substance use and mental health that are subject to recall and social desirability bias. However, these biases would be experienced by all respondents (transgender and cisgender) and are therefore less likely to exert a differential influence by gender identity. Second, because recruitment time-periods differed between the transgender and cisgender sample and because there was a switch from random digit dialing and to address-based sampling, this could introduce bias. However, this switch in recruitment method occurred in both the transgender and cisgender samples, did not alter the national probability sampling frame, and was somewhat accounted for by adjusting for non-response bias at each phase of recruitment. Third, individuals were classified as transgender or cisgender based on self-report, therefore we were not able to include transgender individuals who did not feel comfortable disclosing their gender identity. Fourth,

the transgender sample in this study only included nonbinary individuals if they identified as transgender. Therefore, we are not able to draw conclusions about substance use and mental health outcomes among nonbinary individuals who do not identify as transgender. This study also excluded individuals not fluent in English, limiting generalizability to non-English-speaking populations. Fifth, although the AUDIT-C and DUDIT are widely used screening measures of hazardous drinking and problematic drug use, respectively, they are not diagnostic. Additionally, while these measures have sex-based threshold scores for their respective outcomes that were established in studies of cisgender individuals. The AUDIT-C, in particular, showed low reliability in this study for both the combined samples (transgender plus cisgender individuals) and for the transgender sample. Future research is needed to investigate the validity of these instruments with transgender populations. Additionally, the DUDIT is a general measure of problematic drug use and is not substance-specific. Sixth, due to the lack of previous research with probability samples of transgender adults, group comparisons are intended to be hypothesis generating. Therefore, we did not correct for multiple comparisons and recommend future studies of observed associations. Finally, while nearly all findings were supported in sensitivity analyses, we observed changes in statistical significance for transgender sub-group comparisons of recent suicidal ideation. This indicates that unimputed results for this outcome should be interpreted with caution and underscores the need for further research designed to investigate differences across sub-groups of transgender individuals.

4.6. Conclusions

Transgender adults reported high rates of serious psychological distress, including suicidality and self-injury, with odds that exceeded those of cisgender adults. While the odds of hazardous drinking and problematic drug use outcomes were similar for transgender and cisgender adults, transgender nonbinary individuals had higher odds than other sub-groups of transgender adults. In fact, transgender nonbinary individuals had the highest odds for all substance use and mental health outcomes except suicide attempts. Our findings reinforce the importance of substance use and mental health screening and interventions for transgender adults and the need for screening instruments specifically validated for this population. This study also illustrates how national probability sampling can be used to assess the health needs of transgender adults and to support the development of tailored interventions and targeted resource allocation. Finally, study findings suggest that transgender individuals with binary and nonbinary gender identities have different health needs, highlighting the need for health care providers and policymakers to take into account gender diversity among transgender adults.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights

- Transgender (TG) adults reported more psychological distress than cisgender adults.

- TG adults were more likely to report suicidality and self-injury.

- Alcohol and drug use outcomes were similar for TG and cisgender adults.

- TG nonbinary people had the highest odds of substance and mental health problems.
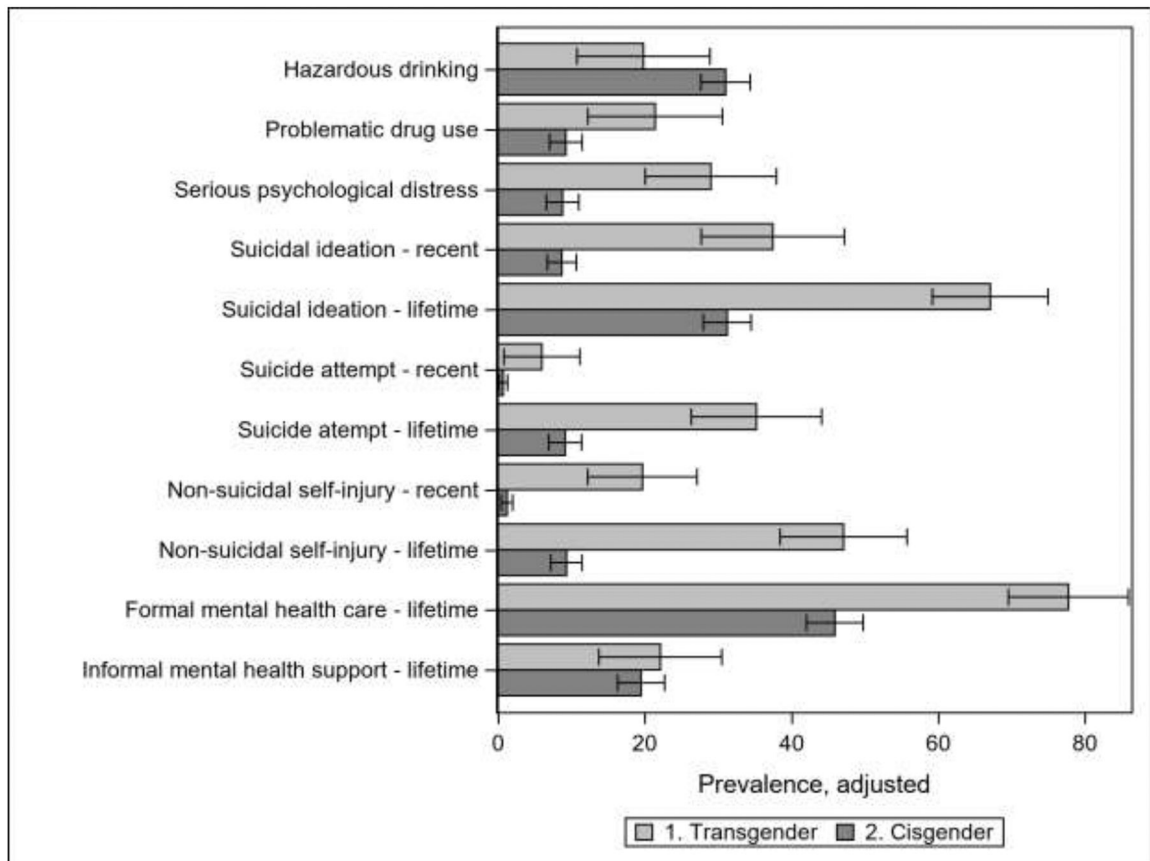
Figure 1.
Adjusted prevalence estimates of substance use and mental health problems and treatment-seeking among U.S. transgender and cisgender adults

*Adjusted for age (continuous), race and ethnicity, income, and education

Table 1.

Demographic comparisons by gender identity (N = 1436)

	Transgender Adults (n = 274) Weighted % (95%CI)	Cisgender Adults (n = 1162) Weighted % (95%CI)	p-value	Transgender Men (n = 78) Weighted % (95%CI)	Transgender Women (n = 120) Weighted % (95%CI)	Transgender Nonbinary People (n = 76) Weighted % (95%CI)	p-value
Age (years)			**<.01**				**<.01**
18–25	37.7% (29.9–45.6)	12.6% (9.2–16.1)		53.2% (38.9–67.5)	17.0% (7.0–27.1)	47.5% (32.9–62.2)	
26–40	32.6% (25.4–39.9)	21.8% (18.2–25.5)		20.2% (9.9–30.5)	42.7% (30.4–54.9)	32.8% (19.4–46.2)	
41–60	22.7% (16.2–29.2)	34.8% (31.0–38.5)		23.2% (10.6–35.8)	28.5% (17.9–39.2)	15.1% (4.6–25.6)	
60+	6.9% (4.2–9.7)	30.8% (27.4–34.1)		3.4% (0.5–6.2)	11.8% (6.2–17.3)	4.6% (0.0–9.6)	
Race and ethnicity			**<.01**				0.42
White, non-Hispanic	56.5% (48.6–64.4)	72.3% (68.3–76.3)		55.4% (40.9–69.9)	59.3% (46.9–71.7)	54.2% (39.5–69.0)	
Black/African American	9.5% (4.8–14.2)	11.1% (7.9–14.2)		12.6% (2.8–22.4)	7.7% (0.7–14.7)	8.5% (0.7–16.3)	
Hispanic/Latinx	15.7% (9.4–22.1)	9.2% (6.5–11.9)		16.6% (4.2–28.9)	10.1% (3.0–17.2)	21.7% (8.5–35.0)	
Asian/Pacific Islander	6.2% (2.2–10.3)	2.5% (1.2–3.9)		9.6% (0.6–18.5)	7.1% (0.0–14.4)	1.8% (0.0–4.8)	
Multiracial/Other	12.1% (6.6–17.5)	4.9% (3.3–6.5)		5.8% (1.2–10.5)	15.8% (5.6–26.0)	13.7% (2.7–24.8)	
Sexual Identity			**<.01**				**<.01**
Straight/heterosexual	17.6% (11.9–23.3)	90.1% (87.3–92.9)		28.3% (15.7–40.8)	23.3% (13.0–33.6)	0.60% (0.0–1.3)	
Sexual minority	82.4% (76.7–88.1)	9.9% (7.1–12.7)		71.7% (59.2–84.3)	76.7% (66.4–87.0)	99.4% (98.7–100.0)	
Annual Household Income			**<.01**				0.15
$0–24,999	36.9% (29.1–44.6)	22.4% (18.7–26.0)		37.6% (23.0–52.3)	40.4% (28.1–52.6)	31.8% (18.3–45.2)	
$25,000–$49,999	24.3% (17.4–31.2)	20.9% (17.4–24.5)		22.5% (10.4–34.6)	29.2% (17.5–40.9)	19.9% (8.2–31.6)	
$50,000–$74,999	17.0% (10.9–23.0)	15.9% (13.1–18.7)		24.1% (11.3–37.0)	6.7% (2.4–11.0)	23.0% (9.9–36.0)	
$75,000 and higher	21.9% (15.6–28.2)	40.8% (36.9–44.8)		15.7% (5.2–26.2)	23.8% (14.1–33.4)	25.4% (12.6–38.2)	
Education			**<.01**				0.52
High school or less	44.1% (35.9–52.2)	31.9% (27.5–36.2)		50.8% (36.4–65.2)	40.7% (28.0–53.4)	41.3% (25.9–56.8)	
Some college	31.2% (24.2–38.1)	31.6% (27.9–35.3)		30.7% (18.3–43.1)	36.3% (24.9–47.8)	25.1% (12.7–37.6)	
Undergraduate degree	14.3% (9.8–18.8)	19.9% (17.1–22.8)		10.3% (3.9–16.7)	13.8% (7.1–20.5)	19.0% (8.7–29.3)	
Graduate degree	10.5% (6.7–14.3)	16.6% (14.2–19.0)		8.1% (1.0–15.3)	9.2% (4.2–14.2)	14.5% (6.3–22.6)	

Bold = statistically significant at the α< 0.05 level.

Table 2.

Comparing the prevalence of alcohol, drug use, and mental health problems and treatment-seeking among US transgender and cisgender adults.

	Transgender Adults (n=274) Weighted % (95%CI)	Cisgender Adults (n=1162) Weighted % (95%CI)	Transgender vs Cisgender Adults (ref) OR (95%CI)	Transgender vs Cisgender Adults (ref) aOR (95%CI)
Hazardous drinking	28.2% (21.2–35.2)	33.6% (29.7–37.5)	0.8 (0.5–1.2)	0.6 (0.4–1.0)
Problematic drug use	31.2% (23.8–38.7)	10.6% (7.7–13.6)	**3.8 (2.4–6.1)**	2.0 (1.0–3.8)
Serious psychological distress	38.9% (31.1–46.7)	10.6% (7.6–13.5)	**5.4 (3.4–8.5)**	**3.1 (1.7–5.7)**
Suicidal ideation				
Recent	44.4% (35.8–53.0)	10.5% (7.8–13.1)	**6.8 (4.4–10.7)**	**5.1 (2.7–9.6)**
Lifetime	81.3% (75.1–87.5)	34.5% (30.5–38.5)	**8.3 (5.3–12.9)**	**6.7 (3.8–11.7)**
Suicide attempt				
Recent	6.9% (2.3–11.5)	1.0% (0.1–1.9)	**7.3 (2.3–22.9)**	3.4 (0.7–17.1)
Lifetime	42.0% (34.2–49.8)	10.6% (7.7–13.5)	**6.1 (3.9–9.5)**	**4.4 (2.4–8.0)**
Non-suicidal self-injury				
Recent	21.4% (14.5–28.4)	1.7% (0.6–2.8)	**15.6 (7.2–34.2)**	**13.0 (4.8–35.1)**
Lifetime	56.0% (48.2–63.8)	11.7% (8.9–14.6)	**9.6 (6.3–14.5)**	**7.6 (4.1–14.3)**
Formal mental health care (lifetime)	81.5% (75.5–87.5)	47.1% (43.0–51.3)	**4.9 (3.2–7.6)**	**5.1 (2.9–8.8)**
Informal mental health support (lifetime)	25.5% (18.5–32.4)	20.4% (16.9–23.8)	1.3 (0.9–2.0)	1.2 (0.7–1.9)

Note: Final models were adjusted for age (continuous), race and ethnicity, income, and education

Bold = statistically significant at the α< 0.05 level.

Table 3.

Comparing the prevalence of alcohol, drug use, and mental health problems and treatment-seeking among US transgender men, transgender women, and transgender nonbinary adults.

	Transgender Men (n=78) Weighted % (95%CI)	Transgender Women (n=120) Weighted % (95%CI)	Transgender Nonbinary Adults (n=76) Weighted % (95%CI)	Transgender Men vs. Transgender Women (ref) aOR (95%CI)	Transgender Nonbinary Adults vs Transgender Women (ref) aOR (95%CI)	Transgender Nonbinary Adults vs Transgender Men (ref) aOR (95%CI)
Hazardous drinking	25.0% (12.5–37.4)	17.2% (8.5–25.9)	44.5% (30.0–59.0)	1.8 (0.6–5.0)	**4.2 (1.5–11.7)**	2.4 (1.0–5.9)
Problematic drug use	17.6% (7.4–27.7)	33.2% (21.2–45.2)	41.8% (27.1–56.4)	0.4 (0.1–1.1)	1.7 (0.6–4.6)	**4.4 (1.5–12.6)**
Serious psychological distress	32.5% (18.5–46.5)	32.5% (21.0–44.0)	52.9% (38.4–67.4)	0.6 (0.2–1.8)	2.0 (0.7–5.4)	**3.1 (1.1–8.8)**
Suicidal ideation						
Recent	26.5% (13.1–39.8)	38.2% (24.5–51.9)	66.7% (53.2–80.2)	0.4 (0.2–1.2)	2.4 (0.9–6.1)	**5.5 (1.7–17.8)**
Lifetime	80.1% (67.7–92.5)	74.7% (63.9–85.5)	90.4% (82.5–98.3)	1.0 (0.3–3.5)	2.0 (0.5–7.6)	2.0 (0.5–8.4)
Suicide attempt						
Recent	6.4% (0.0–14.0)	9.7% (0.7–18.7)	4.1% (0.0–10.9)	0.4 (0.1–2.7)	0.3 (0.0–3.7)	0.8 (0.1–8.8)
Lifetime	45.0% (30.6–59.4)	39.3% (27.2–51.4)	42.4% (27.9–56.9)	1.3 (0.6–2.9)	1.1 (0.4–2.6)	0.8 (0.3–2.1)
Non-suicidal self-injury						
Recent	19.6% (7.9–31.2)	20.8% (9.6–32.0)	24.1% (10.8–37.3)	0.4 (0.1–1.7)	0.7 (0.2–2.2)	1.6 (0.5–5.2)
Lifetime	50.6% (35.9–65.2)	45.9% (33.7–58.2)	74.3% (61.2–85.6)	0.7 (0.3–1.9)	2.6 (1.0–6.5)	**3.6 (1.3–10.5)**
Formal mental health care	77.9% (65.9–89.9)	81.6% (72.9–90.3)	85.0% (74.2–95.7)	0.6 (0.2–1.8)	0.7 (0.3–2.2)	1.3 (0.4–4.6)
Informal mental health support	22.7% (9.7–35.6)	28.9% (17.3–40.5)	24.0% (12.4–35.7)	0.6 (0.2–1.7)	0.7 (0.3–2.0)	1.3 (0.5–3.6)

[*] Final models were adjusted for age (continuous), race and ethnicity, income, and education

Bold = statistically significant at the α< 0.05 level