

UCSF

UC San Francisco Previously Published Works

Title

Levels and outcomes of 12-step participation among sexual and gender minority subgroups

Permalink

<https://escholarship.org/uc/item/7bp6h70j>

Authors

McGeough, Briana L

Zemore, Sarah E

Dastur, Zubin

et al.

Publication Date

2024-12-01

DOI

10.1016/j.josat.2024.209519

Peer reviewed



Published in final edited form as:

J Subst Use Addict Treat. 2024 December ; 167: 209519. doi:10.1016/j.josat.2024.209519.

Levels and Outcomes of 12-Step Participation among Sexual and Gender Minority Subgroups

Briana L. McGeough, PhD¹, Sarah E. Zemore, PhD⁶, Zubin Dastur, MS, MPH^{3,4}, Torsten B. Neilands, PhD¹⁰, Nadra E Lisha, PhD⁹, Mitchell R. Lunn, MD, MAS^{2,3,8}, Juno Obedin-Maliver, MD, MPH, MAS^{4,3,8}, Micah E. Lubensky, PhD^{3,5}, Annesa Flentje, PhD^{3,5,7}

¹School of Social Welfare, University of Kansas

²Division of Nephrology, Department of Medicine, Stanford University School of Medicine

³The PRIDE Study/PRIDENet, Stanford University School of Medicine

⁴Department of Obstetrics and Gynecology, Stanford University School of Medicine

⁵Department of Community Health Systems, School of Nursing, University of California, San Francisco

⁶Alcohol Research Group, Emeryville, CA

⁷Alliance Health Project, Department of Psychiatry, School of Medicine, University of California, San Francisco

⁸Department of Epidemiology and Population Health, Stanford University School of Medicine

⁹Division of General Internal Medicine, Department of Medicine, University of California, San Francisco

¹⁰Division of Prevention Science, Department of Medicine, University of California, San Francisco

Sexual (*e.g.*, bisexual, gay, lesbian, queer) and gender (*e.g.*, transgender, non-binary, gender expansive) minority individuals (SGMI) experience higher rates of alcohol and other substance use disorders than their heterosexual and cisgender (*i.e.*, non-transgender) counterparts (Batchelder et al., 2021; Schuler et al., 2018). According to a study utilizing a nationally representative sample in the United States ($N=36,309$), lesbian/gay and bisexual individuals are approximately twice as likely as heterosexual individuals to meet criteria for alcohol use disorder (AUD). This study found that 21.5% of sexual minority individuals and 12.8% of heterosexual individuals met criteria for AUD in the past year (Boyd et

Corresponding Author: Briana L. McGeough, School of Social Welfare, University of Kansas, Twente Hall, University of Kansas, Lawrence, KS 66045, briana.mcgeough@ku.edu.

Conflicts / Disclosures:

Dr. Juno Obedin-Maliver has the following disclosures, none of which are seen to provide a direct conflict of interest with the work presented here: Sage Therapeutics (5/2017, 1-day advisory board, honorarium), Ibis Reproductive Health (03/2017 – 05/2018, 9/2020 – present, worked as a consultant), Hims Inc. (2019 – present, worked as a consultant), Folx Inc. (2019 – present, worked as a consultant), and Upstream Inc (2024, worked as a consultant).

Dr. Lunn has the following disclosures, none of which are seen to provide a direct conflict of interest with the work presented here: Hims Inc. (2019 – present, worked as a consultant), Folx Inc. (2019 – 2021, worked as a consultant), Otsuka Pharmaceutical Development and Commercialization, Inc. (2023, worked as a consultant), and the American Dental Association (2024, worked as a consultant).

al., 2019). Furthermore, a national study of adults in the United States found that sexual minority individuals were approximately twice as likely as heterosexual individuals to meet criteria for any substance use disorder (SUD; Evans-Polce, Veliz, Boyd, Hughes, & McCabe, 2020). A large-scale study of transgender ($n = 15,637$) and cisgender ($n = 46,911$) adults found that transgender individuals were significantly more likely than cisgender individuals to receive a diagnosis for AUD (Hughes et al., 2021). Another large-scale study utilizing approximately nine million electronic health records from the U.S. Department of Veterans Affairs found that transgender patients were more likely than their cisgender counterparts to experience any SUD (Frost et al., 2021). Minority stress, the excess stress that individuals from stigmatized social groups are exposed to as a result of their minoritized social positions, such as prejudice and discrimination, is a leading explanation for these disparities (Meyer, 2013).

Mutual-help Groups and Sexual and Gender Minority Individuals

Mutual-help groups (*e.g.*, 12-Step programs, SMART (Self-Management and Recovery Training) Recovery, LifeRing), also known as self-help groups, are currently the most commonly used source of support for alcohol and other substance use-related problems in the United States (Kelly et al., 2017). These groups consist of people who share an experience or problem and come together to support one another in managing that problem (Humphreys, 2004). These programs have attracted substantial participation partially due to their high accessibility regardless of one's financial and insurance status and wide availability, even in rural areas (Hai et al., 2022; Kelly & Yeterian, 2011).

The most prevalent mutual help group is Alcoholics Anonymous (AA) with over 118,000 groups and 2 million members in 180 countries worldwide (Kelly, Abry, Ferri, & Humphreys, 2020). 12-Step programs are effective for addressing alcohol and other substance-related problems among the general population. A Cochrane Review by Kelly, Humphreys, and Ferri (2020) containing 27 studies involving more than 10,000 participants found AA and 12-Step facilitation interventions to perform as well or better than active comparison interventions, such as formal cognitive-behavioral therapy, for alcohol use outcomes. However, this Cochrane review did not consider whether these interventions are effective specifically for SGMI.

Past research has described a complex picture of SGMI's experiences of 12-Step programs. To foster inclusivity and comfort for SGMI who would prefer to seek support specifically from other SGMI in a space designated for SGMI, the program offers LGBTQ-specific meetings (Alcoholics Anonymous World Services, Inc., 2018). Past research has found that many SGMI have gained a robust array of social and community supports from participating in 12-Step programs, including a sense of community with others who share similar experiences and the attainment of new skills to support their sobriety (McGeough et al., 2023). Unfortunately, past research has also found that some SGMI who participate in 12-Step programs experience barriers to participation. For instance, some participants have described tensions between the religious messaging in 12-Step programs and their identities as SGMI (Hall, 1996; McGeough et al., 2023). Furthermore, some SGM participants have described experiencing discrimination targeting their sexual and gender identities from peers

in 12-step groups (McGeough et al., 2023). These experiences contribute to concerns for some SGMI that they are not welcome in 12-Step meetings and cannot be open about how experiences related to their sexualities or genders intersect with addictive behaviors (McGeough et al., 2023). Furthermore, these programs often involve rigid reinforcement of the gender binary (*i.e.*, that the only two genders are men and women) in how 12-Step sponsors are assigned (such as common practices that men sponsor men and women sponsor women), which can lead to the exclusion of non-binary and other gender expansive participants (Hall, 1996; Matsuzaka, 2018; Sanders, 2020; McGeough et al., 2023).

Despite the concerns of SGMI identified in these qualitative studies, rates of any (*vs.* no) attendance at 12-Step groups appear to be equal to or greater among sexual minority individuals with SUDs compared to their heterosexual counterparts (Allen & Mowbray, 2016; McCabe et al., 2013; McGeough, Zemore & Karriker-Jaffe, 2021). Three population-based studies have examined rates of utilization of 12-Step groups across sexual orientations. One study employing Waves 1 and 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; 2001–2002 and 2004–2005) and examining individuals meeting DSM-IV criteria for alcohol abuse or dependence ($N=11,182$) found bisexual individuals were more likely to have attended 12-Step meetings for their alcohol or drug use ($OR = 1.97, p = .012$) than their heterosexual counterparts, but it did not find different rates of attendance between gay/lesbian and heterosexual, or gay/lesbian and bisexual, respondents (Allen & Mowbray, 2016). A second study employing the NESARC Wave 2 data (2004–2005) and examining individuals meeting DSM-IV criteria for abuse or dependence for any of ten different substances ($N=11,848$) found lesbian or gay (17.6%; $SE = 3.4$) and bisexual (22.5%; $SE = 4.1$) individuals have higher rates of lifetime 12-Step attendance than their heterosexual counterparts (at 10.9%; $SE = 0.4$; McCabe et al., 2013), but it did not appear to find differences in attendance between lesbian/gay and bisexual respondents. A third study by McGeough and colleagues (2021) using five waves of the National Alcohol Survey and analyzing respondents with at least one lifetime AUD symptom ($N = 7,862$) found that, overall, gay or lesbian and bisexual individuals were more likely than heterosexual individuals to report any lifetime AA attendance even while controlling for lifetime AUD severity, gender, race/ethnicity, age, religiosity, and current income. This study did not find differences between gay/lesbian and bisexual respondents. Furthermore, when disaggregated by gender, lesbian and bisexual women had greater odds than heterosexual women of attending AA; this study did not find differences in rates of 12-Step attendance between gay and bisexual men and their heterosexual counterparts. All three studies highlight the importance of considering differences in 12-Step attendance across the range of sexual and gender identities, as the observed differences were not uniform across sexual minority identities (*e.g.* gay/lesbian *vs.* bisexual) and gender (*e.g.*, man *vs.* woman).

Though these studies highlight the substantial rates of participation of sexual minority individuals in 12-Step programs, they have limitations. First, they did not explicitly analyze 12-Step participation of gender minority, particularly non-binary and other gender expansive, individuals. Second, these studies considered 12-Step participation as a dichotomous measure (*i.e.*, participants who had ever attended a 12-Step meeting), and they did not test if SGM status is associated with the level of 12-Step participation more globally, meaning frequency of meeting attendance and intensity of engagement in particular program

activities, such as speaking at meetings or working with a sponsor. It may be that some of the barriers identified in the qualitative studies described above (Hall, 1996; McGeough et al., 2023) do not impact rates of initiating 12-Step participation but do contribute to lower levels of 12-Step participation. For instance, a SGMI may attend a 12-Step meeting, but following an experience of discrimination, they may choose to discontinue participation. Level of participation is an important area of consideration as greater levels of 12-Step participation have been found to predict better substance use outcomes (Kelly et al., 2020). Lastly, no known research has examined the effectiveness of 12-Step participation for SGMI or across sexual and gender identities. In sum, it is plausible that barriers encountered by SGMI in 12-step groups may contribute to both lower levels of participation and diminished benefits of participation for SGMI or sub-groups of SGMI; no known research has investigated these possibilities.

Purpose of this study

Examining individuals reporting a lifetime AUD or other SUD sampled in a large-scale, national survey of sexual and/or gender minority adults, this study aims to: 1) describe the **lifetime** rates (*i.e.*, portion of individuals endorsing any participation in 12-Step activities) and **lifetime** levels of participation in 12-Step programs (*e.g.*, number of program activities – such as working with a sponsor, reading program literature, and attending meetings) among SGMI overall and compare rates and levels of participation across sexual and gender minority identities, 2) determine how **lifetime** level of participation in 12-Step participation relates to alcohol and other substance use outcomes among SGMI and if the relationship between level of **lifetime** 12-Step participation and alcohol/other substance use outcomes differs by sexual orientation and gender identity.

The first aim is exploratory and no hypotheses have been generated due to the paucity of literature examining 12-Step participation for members of many sexual minority groups as well as literature considering levels of 12-Step participation for SGMI. For the second aim, the authors hypothesize that SGMI with higher lifetime levels of 12-Step participation will have lower levels of current alcohol and other substance use and related problems than those with lower lifetime levels of 12-Step participation after controlling for relevant covariates. This hypothesis is aligned with past research of general samples in which greater level of participation in 12-Step programs was associated with lower levels of substance use and substance use-related problems (Kelly et al., 2020). Better understanding the SGMI subgroups who have the highest and lowest levels of participation and the effectiveness of 12-Step participation for SGMI can help SGMI and their treatment providers make more informed decisions about whether to participate in or refer clients to 12-Step programs, respectively. Furthermore, identifying subgroups of SGMI who participate in 12-Step programs at the lowest levels may help us to identify and rectify challenges that these subgroups experience in participating in 12-Step programs and/or facilitate the identification of alternative resources for these subgroups.

Methods

Sampling

This study utilized data collected through The Population Research in Identity and Disparities for Equality (PRIDE) Study, a national, large-scale, longitudinal health study of adults who are at least 18 years old; identify as lesbian, gay, bisexual, transgender, queer, genderqueer, intersex, asexual (LGBTQIA+) or as another sexual and/or gender minority; can read and understand English; and reside in the United States or its territories (Lunn et al., 2019). Data were collected *via* a supplemental survey asking about participants' current and past alcohol and other substance use severity and participation in 12-Step programs (administered January through August 2021), and demographic data were collected through The PRIDE Study's 2021 Annual Questionnaire that participants accessed through The PRIDE Study's online research platform between July 2021 and May 2022. Any demographic data missing from the 2021 Annual Questionnaire were integrated from the 2020 Annual Questionnaire or the 2019 Annual Questionnaire (if it was also missing from the 2020 Annual Questionnaire). Participants were recruited by The PRIDE Study through community partnerships (*e.g.*, centers and service providers oriented toward the LGBTQIA+ community who distribute recruitment materials to their constituents), events (*e.g.*, LGBTQIA+ Pride events, conferences focused on LGBTQIA+ health and equity issues), and online channels (*e.g.*, Facebook ads). This study was approved by the following Institutional Review Boards: University of California, San Francisco, Stanford University, and WCG IRB; it was deemed exempt from review as secondary data analysis by the University of Kansas. For this study, participants needed to meet all criteria for participating in The PRIDE Study, as well as meet criteria for alcohol or another substance disorder.

Procedures

Participants in The PRIDE Study were sent email notifications about the opportunity to complete a survey about their alcohol or other substance use and experiences with substance use treatment and other resources. Interested participants were asked AUD and SUD screening questions to determine if they had ever experienced a problem with alcohol or another substance; participants who endorsed either or both were taken to the full survey.

Measures

This study employed a survey of validated measures of lifetime and past-year substance use (World Health Organization World Mental Health Composite International Diagnostic Interview-Substance Abuse Module [WHO WMH-CIDI-SAM]; Cottler, Robins & Helzer, 1989; scale 0–16) and lifetime participation in 12-Step programs, which assessed whether or not participants had engaged in each of seven 12-Step program activities or experiences, such as serving as a sponsor or reading program literature (Alcoholics Anonymous Affiliation Scale; Humphreys et al., 1998; adapted to focus on lifetime participation in 12-Step programs, rather than exclusively AA participation in the past year; scale 0–7). Participants were also asked to estimate how many 12-Step meetings they had attended in their lifetimes (continuous variable). To reduce survey burden on participants who would likely not meet criteria for alcohol or another substance use disorder, only participants who endorsed having ever had a problem with alcohol in the single-item screener were

administered a WHO WMH-CIDI-SAM focused on alcohol use and those who endorsed having ever had a problem with another substance were administered a WHO WMH-CIDI-SAM focused on other substance use; participants endorsing experiences with problems with both alcohol and another substance were administered both versions of the measure. Responses to the WHO WMH-CIDI-SAM surveys were recoded into 11-item scales that corresponded to the eleven symptoms in the DSM-5-TR for alcohol and other substance use disorders (American Psychiatric Association, 2022). To improve precision and alignment with diagnostic criteria of the alcohol and other substance use measures, participants were asked if they had experienced all endorsed alcohol or other substance use symptoms in the same 12-month period of time. The survey also included a single-item, multiple response option question to assess for any lifetime participation in 12-Step programs or other substance use resources (“Please indicate all the services you have EVER used for a problem related in any way to YOUR drinking or drug use” including the option: “Alcoholics Anonymous (AA) or another 12-Step group, like Narcotics Anonymous or Crystal Meth Anonymous - either in person or online”).

The survey included multiple response option questions (*i.e.*, check all that apply) about sexual orientation, gender identity, and race/ethnicity to provide descriptive statistics of the sample and serve as predictor variables in the subsequent analyses. Each sexual orientation and racial/ethnic identity was coded as a dichotomous indicator variable (individuals who did not endorse the identity or individuals who endorsed the identity); participants’ responses to multiple identities were retained for all selected categories. For feasibility (adequate sample size and considerable overlap in respondents) and simplicity in interpreting the subsequent models, gender identity responses were recategorized into five identity options: cisgender man, cisgender woman, gender expansive, transgender man, and transgender woman; all individuals endorsing multiple gender identities (who were not classified as a cisgender or transgender man or woman) and individuals who endorsed non-binary gender identities were classified as gender expansive. Age and current annual household income (\$10,000 increments for \$1–150,000, \$25,000 increments for \$150,001–200,000, and upper and lower bound categories of \$0 and \$200,001+) were assessed as continuous variables. Religiosity (*i.e.*, if the participant considered religion: not at all important, a little important, somewhat important, very important or extremely important) and spirituality (*i.e.*, if the participant considered spirituality: not at all important, a little important, somewhat important, very important or extremely important) were analyzed as categorical variables. To assess other resource utilization, participants were also asked dichotomous questions (yes/no), as to whether they had ever utilized a variety of substance use-related resources (health care service, specialty treatment, social service, or another mutual help group). Completion of the survey took approximately 30 minutes. Participants who screened into the full survey were compensated with an \$8 [Amazon.com](https://www.amazon.com) gift card for completing the survey.

Analysis

The researchers conducted all analyses in Stata version 15 (Stata, 2020). To align with DSM-5-TR (2022) diagnostic criteria for alcohol and other substance use disorders, participants were only included in the analysis who endorsed at least two symptoms of AUD

or another SUD. To address the first aim, estimating lifetime rates and levels of 12-Step participation, the researchers created crosstabs to calculate the percentage of members of each sexual orientation or gender identity category who had endorsed ever utilizing a 12-Step program and calculated from the adapted version of the Alcoholics Anonymous Affiliation Scale (Humphreys et al., 1998) the median number of 12-Step activities participated in for each sexual orientation and gender identity category among participants who had ever engaged in a 12-Step activity. Due to a significant portion of participants endorsing no lifetime 12-step participation (76%), the *countfit* command in Stata (UCLA OARC, 2021) was used to identify the most appropriate model to employ given the distribution of the data, comparing negative binomial regression, zero-inflated negative binomial regression, and zero-inflated Poisson regression. Given the preponderance of zeros in the outcome variable's distribution, the zero-inflated negative binomial regression (ZINB) was identified as best fitting the data distribution (using Pearson chi-square, AIC, and BIC as fit statistics) and was employed for the analysis. A benefit of ZINB is that it provides both estimates and comparisons of no/any participation (*i.e.*, never participated in any program activities vs. participated in one or more program activities), as well as level of participation (*i.e.*, greater (*vs.* smaller) number of program activities). Unadjusted ZINB models were run with sexual and gender identities (cisgender men served as the reference category for gender identity because cisgender men had the highest rate of any 12-Step involvement) as predictors of lifetime level of 12-Step participation (measured using the adapted version of the Alcoholics Anonymous Affiliation Scale; Humphreys et al., 1998) to identify sexual orientations and gender identities that may be associated with different lifetime rates and levels of 12-Step participation. ZINB models were then run with additional control variables that could potentially explain associations between sexual and gender identities and lifetime 12-Step participation (lifetime AUD and SUD severity, age, level of spirituality, and previous use of specialty substance use treatment). These control variables were selected based on commonly explored variables in the extant literature (e.g., Zemore et al., 2018). Since the model could not converge with all theorized control variables, only covariates that were significantly associated ($p < .05$) with the outcome variable in the unadjusted models were retained, and thus religiosity and racial/ethnic identities were not included in the final models. The authors conducted separate analyses for individuals potentially meeting criteria for AUD or another SUD (individuals endorsing both were included in both sets of models); this disaggregation was done because past research has found patterns of participation in 12-Step programs and the impact of particular 12-Step activities on substance use outcomes to differ between participants experiencing AUD and SUD (Witbrodt & Kaskutas, 2005). To maximize statistical power and avoid excluding participants who had experienced notable distress and impairment related to their substance use, the authors did not require participants to state that they had experienced all symptoms in the same 12-month timeframe to be included in the analyses; exploratory analyses suggested that participants who endorsed all of their symptoms as occurring in the same 12-month timeframe did not differ in 12-Step utilization from those who did not, nor did this restriction generally impact the directionality or significance of associations in the model. To explore multiple dimensions of 12-Step participation, one set of models was run utilizing the adapted AA Participation Scale, which includes a broader range of 12-Step activities, as the outcome measure, and another set of models was run with the

total number of lifetime 12-Step meetings attended as the outcome measure. To handle outliers in number of meetings attended, the top 1% of responses (1,000 meetings or more) were recoded to 1,000 meetings in alignment with the “regression on ranks” procedures articulated in Kennedy and colleagues (1992). Model estimates were exponentiated using the *estout* package to enable reporting of odds ratios, incident rate ratios, and corresponding confidence intervals (Jann, 2007).

To address the second aim, estimating outcomes of 12-Step participation, the researchers conducted a series of ZINB regressions to model the relationship between lifetime level of 12-Step participation and current severity of AUD and SUD symptoms. For these models, the authors regressed current AUD or SUD severity on lifetime level of 12-Step participation, controlling for sexual orientation, gender identity, race/ethnicity, age, income, spirituality, other substance use resource utilization (such as substance use-focused psychotherapy), and lifetime AUD or SUD severity. The authors conducted separate analyses for individuals endorsing a problem with alcohol use and individuals endorsing a problem with use of another substance. To determine if observed associations differed across sexual and gender identities, models were run with interaction terms for lifetime level of participation and sexual and gender identity categories. To estimate effect sizes, the authors calculated the partial Omega squared (ω_p^2) of the linear models (Kroes & Finley, 2023).

The analyses for both Aims 1 and 2 employed *lifetime* AUD and SUD severity as control variables in the models; the analyses for Aim 2 also employed *past year* AUD or SUD severity as dependent variables in the models. The analyses for both aims include only *lifetime* rates and/or levels of 12-Step participation.

Results

Of the 4,387 participants who completed the screening questions, 30.8% ($n = 1,353$) potentially met criteria for an alcohol or another substance use disorder (by endorsing two or more lifetime symptoms for an alcohol and/or another substance use disorder) with 25.5% ($n = 1,074$) potentially meeting criteria for AUD (by endorsing two or more AUD symptoms), and 15.0% ($n = 659$) meeting criteria for another SUD (by endorsing two or more other SUD symptoms). Approximately three-quarters of these individuals endorsed having experienced all of these symptoms in the same 12-month timeframe (74.8% [$n = 789$] for AUD and 74.2% [$n = 480$] for SUD). Of those individuals potentially meeting criteria for AUD symptoms (not requiring all symptoms to be endorsed in the same 12-month timeframe), 24.4% ($n = 262$) had ever participated in a 12-Step program and 27.3% ($n = 180$) participants meeting criteria for another SUD symptoms had ever participated in a 12-Step program. See Table 1 for demographic results.

Aim 1: Lifetime rates and levels of 12-Step participation

Table 2 shows the lifetime rates and levels of 12-Step participation and demographic characteristics by sexual orientations and gender identities across the sample endorsing at least two lifetime symptoms of AUD or another SUD; these models do not contain any additional control variables. Table 3 shows the results of the adjusted models for

sexual orientations or gender identities as predictors of lifetime 12-Step participation for individuals meeting criteria for AUD or another SUD. In addition to sexual orientation and gender identity predictors of lifetime 12-Step participation, these models were adjusted for the number of lifetime alcohol and other drug use symptoms, age, level of spirituality, and previous use of specialty substance use treatment. Within adjusted models of respondents meeting criteria for lifetime AUD, gay (AOR: 0.48; CI: 0.27–0.89) and queer (AOR: 0.52; CI: 0.32–0.86) participants showed lower odds of having never participated 12-Step programs, indicating that gay and queer respondents had higher odds of having *ever participated*, but no additional differences in rates or levels of participation were found across sexual or gender identities. As for lifetime meeting attendance, only gay (AOR: 0.52; CI: 0.29–0.96), but not lesbian, participants had lower odds of having never attended a 12-Step meeting, indicating that gay respondents had higher odds of having *ever attended* a 12-Step meeting; no other differences emerged across sexual orientations or gender identities in terms of number of meetings attended among participants who had ever attended any meetings. Within adjusted models of respondents meeting criteria for another SUD, lesbian participants (AOR: 2.49; CI: 1.05–5.90) showed greater odds of having never participated in 12-Step Programs, indicating that lesbian respondents had lower odds of having *ever participated*, but no additional differences in rates or levels of participation were found across sexual or gender identities. As for lifetime meeting attendance in the adjusted models, no differences emerged in odds of any lifetime meeting attendance or lifetime number of meetings attended across sexual orientations or gender identities.

Aim 2: Outcomes of 12-Step participation

Greater lifetime levels of 12-Step participation were associated with fewer past year symptoms of AUD (IRR = 0.88; CI: 0.83, 0.94, $p < 0.001$) among participants meeting criteria for AUD in their lifetimes, even after controlling for number of lifetime AUD and other SUD symptoms and demographic characteristics. The effect size of this relationship was small-to-medium ($\omega_p^2 = 0.05$; MRC Cognition and Brain Sciences Unit, 2009). Greater lifetime levels of 12-Step participation were associated with fewer past year symptoms of SUD (IRR = 0.96; CI: 0.92, 0.99, $p < 0.05$) among participants meeting criteria for SUD in their lifetimes, even after controlling for number of lifetime AUD and other SUD symptoms and demographic characteristics. The effect size of this relationship was very small ($\omega_p^2 < 0.01$; MRC Cognition and Brain Sciences Unit, 2009). Greater number of lifetime meeting attendance was also associated with past year symptoms of AUD (IRR = 0.99; CI: 0.997, 0.999, $p < 0.001$) among participants meeting criteria for AUD in their lifetimes, even after controlling for number of lifetime AUD and other SUD symptoms and demographic characteristics. The effect size of this relationship was small ($\omega_p^2 = 0.03$; MRC Cognition and Brain Sciences Unit, 2009). The relationship between lifetime 12-Step meeting attendance and number of past year SUD symptoms was not statistically significant after controlling for lifetime AUD and other SUD symptoms and demographic characteristics. Models examining interactions between lifetime levels of 12-Step participation and demographic characteristics as predictors of past-year AUD and SUD symptoms could not converge, so differences in outcomes across sexual orientations and gender identities could not be evaluated.

Discussion

Discussion of Findings

Utilizing data from a large-scale, national survey of SGMI, the current study employs a larger sample than most research focused on SGM populations with more nuanced measures of sexual orientation, gender identity, and level of 12-Step utilization than any known studies of SGMI participating in 12-Step programs. This study serves as the only known study to examine levels of participation in and outcomes of 12-Step programs among SGMI employing a large, national sample.

This study found that greater lifetime levels of 12-Step participation (number of distinct 12-Step activities) predicted lower levels of past year AUD and SUD symptoms among SGMI; this is a compelling piece of support that 12-Step programs may be an effective support for SGMI experiencing AUD or SUD. However, given the methodology of this study, the relationship between lifetime level of participation and alcohol and other substance use outcomes could be confounded by a third factor, such as motivation to change. Since this study did not compare 12-Step outcomes to the outcomes of other mutual help groups, it remains unclear how the level of effectiveness of 12-Step programs compares to the effectiveness of other available options. To address these gaps in the literature, it will be important to expand upon this finding using more rigorous, comparative methodologies, such as randomized-controlled trials employing active control conditions.

Greater lifetime meeting attendance was not found to be associated with fewer past year SUD symptoms but was associated with fewer past year AUD symptoms. Different program components may be associated with change in AUD vs. other SUD, which has been found in general population samples (Witbrodt & Kaskutas, 2005). Future research should explore which aspects of 12-Step programs are most associated with reductions in symptoms of particular substance use disorders. Furthermore, a study by Humphreys and colleagues (2020) found that efforts to facilitate significant and lasting involvement in 12-Step groups were less effective for participants with drug use disorder than for participants with alcohol use disorder, so it may be that our results are explained by lower levels of sustained involvement in 12-Step programs that weren't captured in our measures. Future research should capture the level at which 12-Step participation is sustained over time, examining differences across participants experiencing alcohol use disorder, other substance use disorder, or both. The limitations in methodology discussed in greater detail below (e.g., cross-sectional survey, pandemic context) may have contributed to this null finding; before more definitive conclusions are reached as to the lack of association between meeting attendance and SUD symptoms, future research employing longitudinal and controlled study designs should attempt to substantiate this finding.

This study found that – even while controlling for lifetime AUD and SUD severity, resource utilization, and demographic factors – gay and queer respondents with AUD symptoms were more likely and lesbian respondents with SUD symptoms were less likely than other participants to have ever participated in 12-Step programs. The findings that disappeared in the adjusted analysis were that among participants meeting criteria for AUD and SUD, 1) bisexual individuals had higher odds than non-bisexual individuals and gender expansive

individuals of having ever participated in 12-Step program, and 2) cisgender women had lower odds than cisgender men to have ever participated in 12-Step programs). There are several possible explanations for why the findings in the unadjusted models disappeared in the adjusted analysis. One possibility is that these differences may be due to sexual orientation and gender identity differences in one or more model covariates, such as age and their intersections. The data supported this possibility: age was significantly associated with bisexual and gender expansive identities, and after adding age to the model, bisexual and gender expansive identities no longer predicted lifetime 12-Step participation for participants meeting criteria for AUD or SUD. Similarly, there were several associations between sexual orientations and gender identities (*e.g.*, lesbians were much more likely to identify as cisgender and transgender women), and cisgender women no longer had lower odds of having ever participated in 12-Step programs after sexual orientations were added to the model. This preliminary finding suggests that age and the intersections of sexual orientation and gender identity may be critical factors in explaining differences in participation, and this possibility warrants further study. Previous work with general samples (Labbe et al., 2013; Zemore et al., 2024) and sexual minority samples (McGeough et al., 2021) have found age to be an important factor to consider when supporting effective 12-Step participation. Research by Labbe and colleagues (2013) suggests the importance of connecting younger participants with other similarly-aged participants early in treatment, and future research should examine whether that finding holds for younger SGMI and whether there are additional unique considerations for younger SGMI.

The differences this study found between SGM identity predictors of lifetime 12-Step participation for respondents endorsing lifetime AUD vs. SUD suggest that SGM identities may differentially predict 12-Step participation for individuals experiencing challenges with different substances. This study aggregated individuals experiencing SUD symptoms across many different substances, and it may be important to disaggregate results more fully for individuals with specific substance use challenges. Future research should further disaggregate across participants using particular substances, examining predictors of participation for individuals experiencing challenges with cannabis, crystal methamphetamine, cocaine, *etc.* Similarly, future research should investigate whether SGM identities differentially predict participation in different 12-Step groups (*e.g.*, Alcoholics Anonymous vs. Narcotics Anonymous vs. Crystal Meth Anonymous). Minimal research has explored these questions in the general population and no known research has considered them among SGMI.

While differences emerged in odds of participation across SGM identities, no differences emerged in levels of participation among participants who had attended AA in their lifetimes. The current study may have been underpowered to detect differences given the significant number of identity categories and small portion of participants that have ever participated in 12-Step programs. It may also be that barriers to initiating participation are more varied across SGM identities than barriers to sustaining participation (*e.g.*, anticipated tension with religious messaging in the program vs. actual experienced tension once involved), or there may also be a selection bias that members of some identity groups (*i.e.*, lesbian respondents with SUD) who may be disproportionately likely to participate at low levels instead disproportionately do not become involved at all.

In a clinical trial of participants in a 12-Step facilitation intervention, meeting attendance and having a sponsor were the 12-Step activities that were the strongest and most consistent predictors of abstinence (Zemore et al., 2013). While this study examined SGM identity predictors of attendance, it did not specifically examine SGM identity predictors of having a sponsor. Given the importance of sponsorship to substance use outcomes, future research should explore the SGM identity predictors of having a sponsor and evaluate whether having a sponsor is equally impactful for substance use outcomes across members of different SGM identity groups.

Limitations

Though this study makes valuable contributions to the literature, particularly in its use of a large, national sample, inclusion of a broad range of sexual and gender identities, and measures that capture a more nuanced picture of 12-Step participation, it is not without limitations. Firstly, this study did not have a cisgender, heterosexual comparison group. This makes comparisons between this study and other studies examining rates of participation challenging (Allen & Mowbray, 2016; McCabe et al., 2013; McGeough et al., 2021) and may have minimized the ability to detect differences across sexual orientation groups as differences may have been greater between sexual minority and heterosexual identities. Some prior studies found differences between heterosexual and sexual minority participants, but not between subgroups of sexual minority participants (e.g., gay/lesbian vs. bisexual respondents). Several other aspects of how sexual orientation and gender identities were captured and analyzed may have also undermined the ability to detect differences across subgroups of SGMI, particularly the large number of identity categories and their overlapping nature (i.e., that many participants endorsed multiple identity categories). Unfortunately, some of the identity categories (e.g., Two-Spirit as a sexual orientation) had too few respondents to analyze, and thus the full range of diversity was not captured in the analysis. Similarly, due to convergence issues (i.e., that model estimates couldn't be established) racial and ethnic identities were not included in the final version of the models. Though racial and ethnic identities did not emerge as significant predictors of participation in 12-Step programs in the unadjusted models, there may be important intersections between SGM identities and racial/ethnic identities that the authors were unable to explore in this analysis. Previous qualitative work has identified unique aspects of the experiences of SGM participants of color (e.g., Jerome & Halkitis, 2014), and it is crucial to extend this important body of research to include greater nuance in understanding the experiences of SGM participants holding a broader range of racial and ethnic identities. The sample in this study may not generalize to the general population of SGM people in the United States and may be more racially homogeneous than the general population of SGM people. Whereas 80.3% of the sample *exclusively* endorsed a white identity (did not endorse any additional racial or ethnic identities), only 58.9% of the United States population exclusively identifies as white (U.S. Census Bureau, 2023). This relative homogeneity may have impacted the study's ability to detect differences in 12-Step participation or outcomes across racial and ethnic identities. Finally, it was not possible to get the outcomes models including interaction terms with sexual or gender identities and lifetime level of 12-Step participation to converge, which limited the ability to explore identity-based differences in outcomes. This is an important area of future research.

Because the outcome variables for Aim 2 focus on AUD and SUD in the past year, this approach cannot effectively capture the alcohol or other substance use outcomes of 12-Step participation for someone who experienced onset of an AUD or SUD during the past year. This concern may be partially mitigated by the unfortunate reality that only 2% of people meeting criteria for drug abuse and 1% meeting for alcohol abuse (DSM-IV-TR criteria) seek treatment in the first year following the onset of the disorder (Blanco et al., 2015).

The cross-sectional design is a limitation to this study. It may be difficult for participants to recall lifetime level of 12-Step participation and AUD and SUD severity. Furthermore, 12-Step participation may influence retrospective reporting of past AUD/SUD severity by supporting participants in reflecting on past alcohol-related distress and impairment, leading participants to report greater problem severity (Gmel et al., 2000); if participants over-reported their lifetime AUD and SUD severity, this could lead to an overestimation of the effectiveness of the program. To mitigate this concern about recall bias, future research should employ longitudinal methods to potentially measure AUD and SUD severity prior to 12-Step participation with greater accuracy. Another limitation related to the cross-sectional design is that participants' lifetime involvement in 12-Step programs was associated with their past-year substance use outcomes. For participants who engaged in 12-Step programs in the distant past, this approach may not adequately capture shorter-term outcomes of the program, and these findings may be particularly vulnerable to additional factors (e.g., maturation effects, changes in social networks) that could impact past-year substance use patterns.

Lastly, recent changes in sociopolitical context, such as the COVID-19 pandemic and the recent onslaught of legislation restricting the rights of transgender individuals, may impact substance use and resource utilization patterns among SGMI (Barbosa et al., 2021; Zollweg et al., 2023). Data collection occurred during the COVID-19 pandemic, which is a limitation to our study. This limitation is partially mitigated by measuring some of the key constructs, such as 12-Step participation as lifetime constructs, making this construct less vulnerable to short-term biases related to the pandemic. This is, however, still a limitation; since substance use increased during the pandemic (Barbosa et al., 2021), our past-year substance use outcome measures for Aim 2 may have led to an underestimate of the effectiveness of 12-Step programs in other moments in time. Similarly, participants who, in other historical moments, may have initiated 12-Step participation in the year prior to data collection may not have done so due to unique barriers to accessing 12-Step programs in a COVID lockdown context. This may limit the applicability of these findings to other moments in time. Future research should replicate these findings to evaluate their relevance to other time periods.

Conclusions

This study makes valuable contributions to the literature serving as the only known large-scale, national study that examines lifetime rates of 12-Step participation by gender identity, lifetime levels of 12-Step participation across sexual and gender identity categories, and substance use outcomes of 12-Step participation. That participants who engaged in greater lifetime levels of 12-Step participation had lower levels of past year AUD and SUD severity

suggests that 12-Step programs may be a valuable resource for SGMI experiencing AUD and SUD. This study also found that gay and queer respondents with AUD were more likely, and lesbian respondents with SUD were less likely, than other respondents to have ever participated in 12-Step programs, perhaps suggesting fewer challenges for gay and queer participants with AUD and greater challenges for lesbian participants with SUD in initiating participation in 12-Step programs than members of other SGM groups. This study also found that age may be a particularly important consideration when supporting SGMI in accessing 12-Step programs, so future research should examine if younger SGMI accessing 12-Step programs may need additional support relative to their older counterparts.

Acknowledgement:

The PRIDE Study is a community-engaged research project that serves and is made possible by LGBTQIA+ community involvement at multiple points in the research process, including the dissemination of findings. We acknowledge the courage and dedication of The PRIDE Study participants for sharing their stories; the careful attention of PRIDENet Participant Advisory Committee (PAC) members for reviewing and improving every study application; and the enthusiastic engagement of PRIDENet Ambassadors and Community Partners for bringing thoughtful perspectives as well as promoting enrollment and disseminating findings. For more information, please visit <https://pridestudy.org/pridenet>.

Funding:

This study was co-funded by the National Institute on Drug Abuse and the Office of Research on Women's Health through R01DA052016 awarded to Dr. Annesa Flentje. Research reported in this publication was supported by pilot funding awarded to Dr. Briana McGeough under a National Institute on Alcohol Abuse and Alcoholism (NIAAA) grant to the Alcohol Research Group, 5P50AA005595. Dr. Sarah Zemore's work on this project was partially supported by NIAAA under R01AA027920; Dr. Annesa Flentje's work on this project was partially supported by K23DA039800 from the National Institute on Drug Abuse. Research reported in this article was partially funded through a Patient-Centered Outcomes Research Institute (www.pcori.org; PPRN-1501-26848) to Dr. Mitchell R. Lunn. The statements in this article are solely the responsibility of the authors and do not necessarily represent the official views of the of Patient-Centered Outcomes Research Institute, its Board of Governors or Methodology Committee, or the National Institutes of Health, National Institute on Alcohol Abuse and Alcoholism, or the National Institute on Drug Abuse.

References

- Alcoholics Anonymous World Services, Inc. (2018). LGBTQ Alcoholics in A.A. [Brochure]. https://www.aa.org/sites/default/files/literature/P-32_0824.pdf
- Allen JL, & Mowbray O (2016). Sexual orientation, treatment utilization, and barriers for alcohol related problems: Findings from a nationally representative sample. *Drug and Alcohol Dependence*, 161, 323–330. 10.1016/j.drugalcdep.2016.02.025 [PubMed: 26936411]
- Association, A. P. (2013). Diagnostic and statistical manual of mental disorders (DSM-5®). American Psychiatric Pub.
- Barbosa C, Cowell AJ, & Dowd WN (2021). Alcohol consumption in response to the COVID-19 Pandemic in the United States. *Journal of Addiction Medicine*, 15(4), 341–344. 10.1097/ADM.0000000000000767 [PubMed: 33105169]
- Batchelder AW, Stanton AM, Kirakosian N, King D, Grasso C, Potter J, Mayer KH & O'Cleirigh C (2021). Mental health and substance use diagnoses and treatment disparities by sexual orientation and gender in a community health center sample. *LGBT health*, 8(4), 290–299. 10.1089/lgbt.2020.0293 [PubMed: 34080895]
- Blanco C, Iza M, Rodríguez-Fernández JM, Baca-García E, Wang S, & Olfson M (2015). Probability and predictors of treatment-seeking for substance use disorders in the US. *Drug and Alcohol Dependence*, 149, 136–144. 10.1016/j.drugalcdep.2015.01.031 [PubMed: 25725934]
- Boyd CJ, Veliz PT, Stephenson R, Hughes TL, & McCabe SE (2019). Severity of alcohol, tobacco, and drug use disorders among sexual minority individuals and their “not sure” counterparts. *LGBT Health*, 6(1), 15–22. 10.1089/lgbt.2018.0122 [PubMed: 30638419]

- Evans-Polce RJ, Veliz PT, Boyd CJ, Hughes TL, & McCabe SE (2020). Associations between sexual orientation discrimination and substance use disorders: differences by age in US adults. *Social Psychiatry and Psychiatric Epidemiology*, 55, 101–110. 10.1176/appi.ajp.2020.20010005 [PubMed: 30903234]
- Gmel G, Rehm J, Room R, & Greenfield TK (2000). Dimensions of alcohol-related social and health consequences in survey research. *Journal of Substance Abuse*, 12(1–2), 113–138. 10.1016/S0899-3289(00)00044-4 [PubMed: 11288466]
- Hai AH, Franklin C, Park S, DiNitto DM, & Aurelio N (2019). The efficacy of spiritual/religious interventions for substance use problems: A systematic review and meta-analysis of randomized controlled trials. *Drug and Alcohol Dependence*, 202, 134–148. 10.1016/j.drugalcdep.2019.04.045 [PubMed: 31349206]
- Hall JM (1996). Lesbians' participation in Alcoholics Anonymous: Experiences of social, personal, and political tensions: Addiction mutual-help movements in a comparative perspective. *Contemporary Drug Problems*, 23(1), 113–138. <https://heinonline.org/HOL/P?h=hein.journals/condp23&i=147>
- Hughto JMW, Quinn EK, Dunbar MS, Rose AJ, Shireman TI, & Jasuja GK (2021). Prevalence and co-occurrence of alcohol, nicotine, and other substance use disorder diagnoses among US transgender and cisgender adults. *JAMA Network Open*, 4(2), e2036512. 10.1001/jamanetworkopen.2020.36512 [PubMed: 33538824]
- Humphreys K, Barreto NB, Alessi SM, Carroll KM, Crits-Christoph P, Donovan DM, Kelly JF, Schottenfeld RS, Timko C, & Wagner TH (2020). Impact of 12 step mutual help groups on drug use disorder patients across six clinical trials. *Drug and Alcohol Dependence*, 215, 108213. 10.1016/j.drugalcdep.2020.108213 [PubMed: 32801112]
- Jerome RC, & Halkitis PN (2014). An exploratory investigation of treatment strategies for Black gay, bisexual, and heterosexual men-who-have-sex-with-men who use methamphetamine. *Journal of LGBT Issues in Counseling*, 8(1), 2–24. 10.1080/15538605.2014.853636
- Jann Ben (2007). Making regression tables simplified. *The Stata Journal* 7(2): 227–244
- Kelly JF, Bergman BG, Hoepfner BB, Vilsaint C, & White WL (2017). Prevalence and pathways of recovery from drug and alcohol problems in the United States population: Implications for practice, research, and policy. *Drug and Alcohol Dependence*, 181, 162–169. 10.1016/j.drugalcdep.2017.09.028 [PubMed: 29055821]
- Kelly JF, & Yeterian JD (2011). The role of mutual-help groups in extending the framework of treatment. *Alcohol Research & Health*, 33(4), 350–355. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3860535/> [PubMed: 23580019]
- Kennedy D, Lakonishok J, & Shaw WH (1992). Accommodating outliers and nonlinearity in decision models. *Journal of Accounting, Auditing & Finance*, 7(2), 161–190. 10.1177/0148558X9200700205
- Kroes AD, & Finley JR (2023). Demystifying omega squared: Practical guidance for effect size in common analysis of variance designs. *Psychological Methods*. 10.1037/met0000581
- Labbe AK, Greene C, Bergman BG, Hoepfner B, & Kelly JF (2013). The importance of age composition of 12-step meetings as a moderating factor in the relation between young adults' 12-step participation and abstinence. *Drug and Alcohol Dependence*, 133(2), 10.1016/j.drugalcdep.2013.07.021. 10.1016/j.drugalcdep.2013.07.021
- McCabe SE, West BT, Hughes TL, & Boyd CJ (2013). Sexual orientation and substance abuse treatment utilization in the United States: Results from a national survey. *Journal of Substance Abuse Treatment*, 44(1), 4–12. 10.1016/j.jsat.2012.01.007 [PubMed: 22444421]
- McGeough BL, Karriker-Jaffe KJ, & Zemore SE (2021). Rates and predictors of Alcoholics Anonymous attendance across sexual orientations. *Journal of Substance Abuse Treatment*, 129, 108400. 10.1016/j.jsat.2021.108400 [PubMed: 34080558]
- McGeough BL, Pacey M, Zemore SE, Lunn MR, Obedin-Maliver J, Lubensky ME, & Flentje A (2023). Understanding the social and community support experiences of sexual and gender minority individuals in 12-Step programs. *Journal of Gay & Lesbian Social Services*, 0(0), 1–22. 10.1080/10538720.2023.2172759

- Meyer IH (2013). Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. *Psychology of Sexual Orientation and Gender Diversity*, 1(S), 3–26. 10.1037/2329-0382.1.S.3
- MRC Cognition and Brain Sciences Unit. (2009). FAQ/Effect Size - CBU statistics Wiki. <https://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/effectSize>
- Sanders JM (2020). Seeking acceptance: LGBTQ and membership in Alcoholics Anonymous (AA). *Alcoholism Treatment Quarterly*, 38(4), 430–445. 10.1080/07347324.2020.1738295
- Schuler MS, Rice CE, Evans-Polce RJ, & Collins RL (2018). Disparities in substance use behaviors and disorders among adult sexual minorities by age, gender, and sexual identity. *Drug and Alcohol Dependence*, 189, 139–146. 10.1016/j.drugalcdep.2018.05.008 [PubMed: 29944989]
- UCLA OARC (2021). How can I use countfit in choosing a count model. Retrieved November 27, 2023, from <https://stats.oarc.ucla.edu/stata/faq/how-can-i-use-countfit-in-choosing-a-count-model/>
- U.S. Census Bureau. United States Census Bureau Quick Facts. (2023). <https://www.census.gov/quickfacts/fact/table/US/>
- Witbrodt J, & Kaskutas LA (2005). Does diagnosis matter? Differential effects of 12-Step participation and social networks on abstinence. *The American Journal of Drug and Alcohol Abuse*, 31(4), 685–707. 10.1081/ADA-68486 [PubMed: 16320441]
- Zemore SE, Lui C, Mericle A, Hemberg J, & Kaskutas LA (2018). A longitudinal study of the comparative efficacy of Women for Sobriety, LifeRing, SMART Recovery, and 12-step groups for those with AUD. *Journal of Substance Abuse Treatment*, 88, 18–26. 10.1016/j.jsat.2018.02.004 [PubMed: 29606223]
- Zemore SE, Mericle AA, Martinez P, Bergman BG, Karriker-Jaffe KJ, Patterson D, & Timko C (2024). Disparities in Alcoholics Anonymous participation from 2000 to 2020 among U.S. residents with an alcohol use disorder in the National Alcohol Survey. *Journal of Studies on Alcohol and Drugs*, 85(1), 32–40. 10.15288/jsad.23-00086 [PubMed: 37650830]
- Zemore SE, Subbaraman M, & Tonigan JS (2013). Involvement in 12-Step activities and treatment outcomes. *Substance Abuse*, 34(1), 60–69. 10.1080/08897077.2012.691452 [PubMed: 23327505]
- Zollweg SS, Belloir JA, Drabble LA, Everett B, Taylor JY, & Hughes TL (2023). Structural stigma and alcohol use among sexual and gender minority adults: A systematic review. *Drug and Alcohol Dependence Reports*, 8, 100185. 10.1016/j.dadr.2023.100185 [PubMed: 37663525]

Table 1.

Descriptive statistics (N = 1,353)

Sexual Orientation	Frequency	Percent (%)
Asexual	94	6.95
Bisexual	400	29.56
Gay	408	30.16
Lesbian	240	17.74
Pansexual	217	16.04
Queer	536	39.62
Questioning	31	2.29
Same-Gender Loving	61	4.51
Heterosexual	27	2.00
Another	45	3.33
Two-Spirit	8	0.59
Multiple	564	41.69
Total Respondents (N)	1,186	

Gender Identity	Frequency	Percent (%)
Cisgender Man	298	22.03
Cisgender Woman	276	20.40
Gender Expansive	449	33.19
Transgender Man	116	8.57
Transgender Woman	47	3.47
Total Respondents (N)	1,186	

Race/Ethnicity*	Frequency	Percent (%)
American Indian	58	4.29
Asian	57	4.21
Black	60	4.43
Hawaiian	6	0.44
Latino/a/x	99	7.32
Middle Eastern/North African	19	1.40
White	1,254	92.68
Another	38	2.81
Multiple	20	6.60
Total Respondents (N)	1,334	

	Mean	Std. Dev.	Min.	Max.
Age	37.94	13.96	19	80
Past-Year Alcohol Use Disorder*	1.23	2.11	0	11

	Mean	Std. Dev.	Min.	Max.
Lifetime Alcohol Use Disorder *	4.36	3.32	0	11
Past-Year Substance Use Disorder *	1.10	2.38	0	11
Lifetime Substance Use Disorder *	3.19	3.85	0	11
Total Respondents (N)	1,353			

	Not at all important n (%)	A little important n (%)	Somewhat important n (%)	Very important n (%)	Extremely important n (%)
Religion	868 (65.21)	186 (13.97)	139 (10.44)	91 (6.84)	47 (3.53)
Spirituality	349 (28.22)	247 (18.56)	324 (24.34)	224 (16.83)	187 (14.05)
Total Respondents (N)	1,331				

Resource	Frequency	Percent (%)
Any 12-Step	295	21.80
Health Care	208	15.37
Social Service	54	3.99
Specialty Treatment	143	10.57
Other Mutual Help Group	100	7.39
Total Respondents (N)	1,353	

Note:

* Respondents were allowed to provide multiple answers, so the total number of responses do not equal the N of the study

* To be included in the study, all participants needed to endorse at least two lifetime symptoms of alcohol use or substance use disorder as measured with the WHO WMH-CIDI-SAM.

Table 2.

Rates and Unadjusted ZINB models of 12-Step Participation and Attendance

	12-Step Participation															
	AUD (n = 1,074)						SUD (n = 659)									
	Any vs. No Participation			Level of Participation			Any vs. No Participation			Level of Participation						
% α	OR \pm	p	95% CI	# Mtg $^{\mu}$	IRR	p	95% CI	% α	OR \pm	p	95% CI	# Mtg $^{\mu}$	IRR	p	95% CI	
Sexual Orientation																
Asexual	17.95	1.42		(0.76, 2.63)	3.86	0.99	(0.69, 1.42)	21.43	1.37		(0.62, 3.01)	4.67	1.19		(0.76, 1.87)	
Bisexual	15.58	1.66	<.01	(1.14, 2.42)	3.80	0.98	(0.79, 1.22)	18.42	1.68	<.05	(1.06, 2.67)	3.80	1.01		(0.76, 1.34)	
Gay	33.96	0.63	<.01	(0.46, 0.67)	4.44	1.06	(0.90, 1.25)	37.24	0.64	<.05	(0.43, 0.94)	4.54	1.16		(0.93, 1.43)	
Lesbian	23.68	1.15		(0.78, 1.69)	4.60	1.16	(0.95, 1.43)	22.03	1.48		(0.90, 2.43)	4.23	1.09		(0.82, 1.45)	
Pansexual	13.61	1.62		(0.98, 2.68)	3.17	0.76	(0.55, 1.06)	19.82	1.20		(0.70, 2.09)	3.32	0.84		(0.58, 1.21)	
Queer	20.23	1.11		(0.81, 1.52)	3.60	0.80	(0.67, 0.95)	21.77	1.23		(0.83, 1.85)	3.59	0.84		(0.66, 1.06)	
<i>Overall Average</i>	<i>24.39</i>				<i>4.21</i>			<i>27.31</i>				<i>4.16</i>				
Gender																
Cisgender Man	36.32	Ref			4.60	Ref		41.55	Ref			4.69	Ref			
Cisgender Woman	19.91	2.31	<.001	(1.51, 3.55)	3.83	0.99	(0.71, 1.16)	23.93	2.24	<.01	(1.29, 3.90)	4.11	0.86		(0.64, 1.16)	
Gender Expansive	17.30	2.57	<.001	(1.74, 3.79)	3.17	0.65	(0.52, 0.81)	21.10	2.53	<.001	(1.56, 4.09)	3.37	0.68	<.01	(0.52, 0.89)	
Transgender Man	28.26	1.46		(0.85, 2.48)	4.65	1.01	(0.78, 1.31)	27.42	1.89		(0.97, 3.67)	4.47	0.95		(0.67, 1.34)	
Transgender Woman	25.00	1.71		(0.76, 3.86)	4.44	0.96	(0.63, 1.45)	25.00	2.12		(0.78, 5.78)	4.17	0.88		(0.50, 1.53)	
<i>Overall Average</i>	<i>24.39</i>				<i>4.21</i>			<i>27.31</i>				<i>4.16</i>				
Meeting Attendance																
AUD (n = 1,053)						SUD (n = 653)										
Any vs. No			Level			Any vs. No			Level							
% α	OR \pm	p	95% CI	# Mtg $^{\mu}$	IRR	p	95% CI	% α	OR \pm	p	95% CI	# Mtg $^{\mu}$	IRR	p	95% CI	
Sexual Orientation																
Asexual	17.95	1.41		(0.75, 2.66)	330	1.16	(0.44, 3.07)	21.43	1.46		(0.63, 3.36)	398	1.27		(0.34, 4.76)	
Bisexual	15.89	1.57	<.05	(1.07, 2.31)	228	0.77	(0.43, 1.40)	20.00	1.61		(0.99, 2.61)	211	0.76		(0.35, 1.62)	

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Gay	33.02	0.62	<.01	(0.45, 0.87)	377	1.18	(0.74, 1.90)	39.29	0.55	<.01	(0.36, 0.86)	358	1.19	(0.65, 2.21)
Lesbian	24.21	1.07		(0.71, 1.60)	394	1.31	(0.74, 2.32)	22.88	1.49		(0.88, 2.51)	366	1.26	(0.57, 2.78)
Pansexual	13.61	1.68	<.05	(1.01, 2.79)	195	0.68	(0.31, 1.50)	22.52	1.05		(0.60, 1.85)	189	0.66	(0.29, 1.53)
Queer	20.23	1.15		(0.81, 1.54)	259	0.74	(0.47, 1.17)	22.98	1.27		(0.83, 1.94)	263	0.83	(0.45, 1.50)
<i>Overall Average</i>	<i>24.02</i>				<i>327</i>			<i>28.38</i>				<i>329</i>		
Gender														
Cisgender Man	35.04	Ref			414	Ref		44.37	Ref			393	Ref	
Cisgender Woman	19.91	2.25	<.001	(1.44, 3.53)	385	0.93	(0.49, 1.76)	24.79	2.67	<.01	(1.44, 4.94)	332	0.84	(0.37, 1.92)
Gender Expansive	17.57	2.54	<.001	(1.70, 3.80)	203	0.48	<.01	22.02	3.06	<.001	(1.79, 5.24)	233	0.57	(0.28, 1.17)
Transgender Man	28.26	1.39		(0.79, 2.43)	361	0.87	(0.40, 1.87)	30.65	1.93		(0.93, 3.99)	307	0.77	(0.29, 2.03)
Transgender Woman	25.00	1.63		(0.70, 3.82)	298	0.71	(0.21, 2.35)	25.00	2.62		(0.88, 7.77)	301	0.75	(0.16, 3.66)
<i>Overall Average</i>	<i>24.02</i>				<i>327</i>			<i>28.38</i>				<i>329</i>		

Notes.

\pm OR means adjusted odds of no participation or attendance, so greater unadjusted odds indicates lower odds of participating in or attending 12-Step programs.

$\alpha_{\%}$ is percentage of members who have ever participated in 12-Step programs or attended 12-Step meeting

$Q_{\#Act}$ is the mean number of 12-Step activities (full scale 0-7) that individuals who have ever participated in 12-Step programs have engaged in in their lifetimes (possible options for analytic group are 1-7)

$\mu_{\# Mtg}$ is the mean number of 12-Step meetings that individuals who have ever attended a 12-Step meeting have attended in their lifetimes

Table 3.

Adjusted ZINB Models of 12-Step Participation and Attendance

	12-Step Participation											
	AUD (n = 1,053)						SUD (n = 653)					
	Any vs. No Participation		Level of Participation		Any vs. No Participation		Level of Participation		Any vs. No Participation		Level of Participation	
AOR [±]	p	95% CI	IRR	p	95% CI	AOR [±]	p	95% CI	IRR	p	95% CI	
Sexual Orientation												
Asexual	1.39		(0.57, 3.43)	0.94		(0.68, 1.23)	2.41		(0.71, 8.17)	1.06		(0.72, 1.56)
Bisexual	1.30		(0.76, 2.24)	0.98		(0.80, 1.20)	1.84		(0.90, 3.75)	1.02		(0.78, 1.33)
Gay	0.48	<.05	(0.27, 0.89)	0.98		(0.78, 1.23)	0.75		(0.33, 1.72)	1.00		(0.76, 1.32)
Lesbian	1.25		(0.64, 2.43)	1.12		(0.84, 1.49)	2.49	<.05	(1.05, 5.90)	1.16		(0.82, 1.62)
Pansexual	1.76		(0.90, 3.43)	0.84		(0.64, 1.12)	1.25		(0.57, 2.74)	0.96		(0.71, 1.30)
Queer	0.52	<.05	(0.32, 0.86)	0.95		(0.79, 1.13)	1.02		(0.54, 1.94)	0.98		(0.78, 1.24)
Gender												
Cisgender Man	Ref			Ref			Ref			Ref		
Cisgender Woman	0.80		(0.32, 1.98)	0.96		(0.66, 1.39)	0.46		(0.14, 1.49)	0.82		(0.54, 1.25)
Gender Expansive	0.82		(0.37, 1.82)	0.84		(0.62, 1.15)	0.75		(0.28, 2.06)	0.86		(0.62, 1.21)
Transgender Man	0.66		(0.26, 1.68)	1.11		(0.82, 1.49)	0.88		(0.27, 2.85)	0.99		(0.70, 1.39)
Transgender Woman	0.95		(0.25, 3.53)	0.78		(0.49, 1.26)	0.49		(0.093, 2.60)	0.69		(0.39, 1.21)
AUD Symptoms	0.73	<.001	(0.67, 0.78)	1.05	<.001	(1.03, 1.08)	0.79	<.001	(0.74, 0.85)	1.04	<.001	(1.02, 1.07)
SUD Symptoms	0.93	<.01	(0.88, 0.97)	1.01		(1.00, 1.03)	0.88	<.01	(0.80, 0.96)	1.03	<.05	(1.00, 1.06)
Age	0.96	<.001	(0.94, 0.97)	1.01	<.001	(1.01, 1.02)	0.98	<.05	(0.96, 1.00)	1.01	<.001	(1.01, 1.02)
Spirituality												
Not at all	Ref			Ref			Ref			Ref		
A little	0.57		(0.29, 1.13)	1.12		(0.83, 1.40)	0.58		(0.24, 1.41)	1.32		(0.91, 1.90)
Somewhat	0.50	<.05	(0.27, 0.93)	1.24		(0.96, 1.60)	0.43	<.05	(0.19, 0.95)	1.31		(0.94, 1.83)
Very	0.36	<.01	(0.19, 0.69)	1.37	<.05	(1.06, 1.76)	0.35	<.05	(0.16, 0.79)	1.59	<.01	(1.15, 2.18)
Extremely	0.35	<.01	(0.18, 0.68)	1.53	<.001	(1.20, 1.95)	0.22	<.001	(0.095, 0.50)	1.63	<.01	(1.19, 2.24)
Specialty Treatment												
No	Ref			Ref			Ref			Ref		
Yes	0.067	<.001	0.031, 0.15	1.07		(0.93, 1.23)	0.065	<.001	(0.031, 0.14)	1.05		(0.89, 1.23)

12-Step Participation													
AUD (n = 1,053)							SUD (n = 653)						
Any vs. No Participation			Level of Participation				Any vs. No Participation			Level of Participation			
AOR [±]	p	95% CI	IRR	p	95% CI	AOR [±]	p	95% CI	IRR	p	95% CI	P	95% CI
Meeting Attendance													
AUD (n = 1,053)							SUD (n = 653)						
Any vs. No			Level				Any vs. No			Level			
AOR [±]	p	95% CI	β	p	95% CI	AOR [±]	p	95% CI	β	p	95% CI	P	95% CI
Sexual Orientation													
Asexual	1.36	(0.55, 3.39)	0.66		(0.24, 1.78)	2.36		(0.60, 9.30)	0.47		(0.12, 1.92)		
Bisexual	1.23	(0.71, 2.13)	0.64		(0.37, 1.11)	1.73		(0.84, 3.55)	0.50		(0.20, 1.03)		
Gay	0.52	<.05	(0.29, 0.96)	1.12	(0.61, 2.11)	0.84		(0.37, 1.91)	0.79		(0.39, 1.60)		
Lesbian	1.11	(0.56, 2.17)	1.08		(0.43, 2.71)	2.01		(0.57, 2.17)	0.64		(0.20, 1.98)		
Pansexual	1.89	((0.97, 3.68)	0.88		(0.41, 1.90)	1.09		(0.50, 2.37)	1.29		(0.57, 2.94)		
Queer	0.59	((0.35, 0.97)	1.63		(0.95, 2.79)	1.12		(0.57, 2.17)	1.31		(0.65, 2.64)		
Gender													
Cisgender Man	Ref		Ref			Ref			Ref				
Cisgender Woman	0.87	((0.34, 2.20)	1.08		(0.37, 3.13)	0.61		(0.18, 1.99)	0.73		(0.20, 2.74)		
Gender Expansive	0.88	((0.39, 1.98)	0.86		(0.37, 1.98)	1.02		(0.37, 2.83)	0.83		(0.33, 2.08)		
Transgender Man	0.71	((0.27, 1.83)	1.27		(0.49, 3.25)	0.92		(0.27, 3.15)	0.67		(0.20, 2.28)		
Transgender Woman	1.08	((0.29, 4.04)	1.21		(0.30, 4.93)	0.82		(0.15, 4.50)	0.23		(0.043, 1.23)		
AUD Symptoms	0.73	<.001	((0.68, 0.79)	1.14	<.01	(1.06, 1.24)	0.83	<.001	(0.72, 0.89)	1.18	<.001	(1.10, 1.26)	
SUD Symptoms	0.91	<.001	((0.87, 0.96)	1.05	<.05	(1.00, 1.10)	0.85	<.01	(0.78, 0.89)	1.04		(0.96, 1.14)	
Age	0.97	<.001	(0.95, 0.98)	1.05	<.001	(1.04, 1.07)	0.98		(0.96, 1.00)	1.05	<.001	(1.03, 1.08)	
Spirituality													
Not at all	Ref		Ref			Ref			Ref				
A little	0.55	(0.28, 1.09)	1.01		(0.45, 2.25)	0.82		(0.33, 2.03)	1.34		(0.48, 3.71)		
Somewhat	0.58	(0.31, 1.07)	1.48		(0.71, 3.10)	0.53		(0.24, 1.17)	1.56		(0.62, 3.88)		
Very	0.38	<.01	(0.20, 0.74)	1.39	(0.68, 2.81)	0.44		(0.19, 1.01)	1.97		(0.84, 4.61)		
Extremely	0.33	<.01	(0.17, 0.66)	1.54	(0.75, 3.16)	0.26		(0.11, 0.60)	2.46	<.05	(1.07, 5.65)		
Specialty Treatment													

12-Step Participation											
AUD (n = 1,053)						SUD (n = 653)					
Any vs. No Participation			Level of Participation			Any vs. No Participation			Level of Participation		
AOR [±]	p	95% CI	IRR	p	95% CI	AOR [±]	p	95% CI	IRR	p	95% CI
No	Ref		Ref			Ref			Ref		
Yes	0.081	(0.033, 0.20)	1.35		(0.84, 2.17)	0.01	<.001	(0.011, 0.14)	1.43		(0.81, 2.50)

Notes.

[±]AOR means adjusted odds of no participation or attendance, so greater adjusted odds indicates lower odds of participating in or attending 12-Step programs.

All models control for lifetime AUD and symptoms, age, importance of spirituality, and lifetime participation in specialty substance use treatment.