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Health, homelessness severity, and substance use among sexual minority youth experiencing homelessness: A comparison of bisexual versus gay and lesbian youth

Daniel Siconolfi, PhD[a], **Joan S. Tucker, PhD**[b], **William G. Shadel, PhD**[a], **Rachana Seelam, MPH**[b], **Daniela Golinelli, PhD**[b]

[a]RAND Corporation; 4570 Fifth Ave., Suite 600, Pittsburgh, PA 15213. United States.

[b]RAND Corporation; Santa Monica, CA 90407. United States.

Abstract

Lesbian, gay, bisexual, and questioning (LGBQ) youth are overrepresented among youth experiencing homelessness (YEH), and health disparities among LGBQ youth are well-documented. LGBQ youth are typically aggregated as a single sexual minority group; however, research suggests that bisexual youth may have greater mental health, substance use, and physical health risks relative to their gay and lesbian peers. In a probability sample of LGBQ YEH in Los Angeles County (n = 183), we examined subgroup differences in homelessness severity, depression, physical health, and substance use, focusing on differences between bisexual and gay/lesbian youth due to the small subsample of questioning youth. Indicators of homelessness severity were standalone outcomes, and also were integrated as control variables with gender, age, race/ethnicity, and education in multivariable models. Bisexual youth were more likely to have become unaccompanied homeless persons as minors (OR = 4.35, 95% CI 1.85–10.23), and to have not recently utilized emergency shelters or transitional housing at least once in the past month (OR = 6.41; 95% CI 2.41–17.03). Bisexual youth were more likely to have probable depression (OR = 4.06, 95% CI 1.41–11.68). Among sexual minority YEH, bisexual youth may be at elevated risk for depression, in addition to more severe homelessness.

Keywords

sexual minorities; LGBTQ persons; homelessness; substance abuse; health; adolescent; young adult

INTRODUCTION

Sexual minorities (e.g., lesbian, gay, bisexual, or questioning; LGBQ) are disproportionately represented among youth experiencing homelessness (Dolamore & Naylor, 2017; Edidin, Ganim, Hunter, & Karnik, 2011; Institute of Medicine, 2011; Keuroghlian, Shtasel, & Bassuk, 2014; Saewyc, 2011). Both youth experiencing homelessness (YEH) and LGBQ

dsiconol@rand.org; 412-683-2300.

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youth evidence well-documented health disparities related to physical health, mental health, and substance use (Edidin et al., 2011; Fish, Turner, Phillips, & Russell, 2019; Institute of Medicine, 2011; Keuroghlian et al., 2014; Medlow, Klineberg, & Steinbeck, 2014; Russell & Fish, 2016; Saewyc, 2011). Substance use is particularly well-documented; prior research has found high rates of substance use, including tobacco product use, among LGBQ youth and homeless youth (Blosnich, Farmer, Lee, Silenzio, & Bowen, 2014; Emory et al., 2016; Greene, Ennett, & Ringwalt, 1997; Jamal et al., 2016; Johnson et al., 2016; Lee, Griffin, & Melvin, 2009; Tucker, Shadel, Golinelli, & Ewing, 2014; Wheldon, Kaufman, Kasza, & Moser, 2018). These disparities may be largely attributable to the social and structural stressors that YEH and LGBQ youth encounter, including social marginalization and discrimination, victimization, familial rejection, and health care inequities (Dolamore & Naylor, 2017; Edidin et al., 2011; Hatzenbuehler, 2014; Keuroghlian et al., 2014; Meyer, 2003; Saewyc, 2011). Given the dual exposures of homelessness and being a sexual minority, LGBQ YEH may be at especially greater risk for health disparities (Whitbeck, Chen, Hoyt, Tyler, & Johnson, 2004).

There is also reason to believe that even within this LGBQ population, disparities may exist in health and substance use. In the general literature, evidence of sexual minority health disparities has come from studies comparing LGBQ individuals to their heterosexual peers. However, disparities may not be uniform within LGBQ subpopulations. For example, research has identified greater substance use, poorer mental health, and poorer physical health among bisexual populations, not only relative to heterosexuals but also their lesbian and gay peers (Bostwick, Boyd, Hughes, & McCabe, 2010; Caputi, 2018; Dyar et al., 2018; Emory et al., 2016; Kerridge et al., 2017; McCabe, Hughes, Bostwick, West, & Boyd, 2009; Ross et al., 2018; Russell & Fish, 2016; Schuler, Rice, Evans-Polce, & Collins, 2018; Smalley, Warren, & Barefoot, 2016; Wheldon et al., 2018). Much less is known regarding potential within-group differences in health among LGBQ YEH specifically, as comparisons with heterosexual populations predominate the literature. While a few studies have examined within group health differences among LGBQ YEH (e.g. Keuroghlian et al., 2014; Shelton et al., 2018), these studies are relatively uncommon, typically have used convenience sampling which limits generalizability, and/or have not utilized multivariable models to simultaneously control for multiple covariates such as demographics or the severity of homelessness.

Differences in the health of bisexual populations, relative to their gay and lesbian peers, have largely been attributed to minority stress experiences of dual-marginalization or “double discrimination.” More specifically, research has found that bisexual persons can experience homophobia from their heterosexual peers in addition to biphobia from their gay and lesbian peers, and this dovetails with social isolation and broader social invisibility (Friedman et al., 2018; Friedman et al., 2014; Friedman & Dodge, 2016; Ross, Dobinson, & Eady, 2010). While a minority stress perspective can help explain the antecedents of these bisexual health disparities (c.f. Meyer, 2003), syndemics theory can help us to better understand whether and how these health disparities (as outcomes) are mutually-reinforcing or synergistic in their effects (Singer, 2000; Singer & Clair, 2003; Stall, Friedman, & Catania, 2008). Syndemics theory has primarily been applied to co-occurring health burdens in the context of HIV disparities among gay and bisexual men, but the theory also has wider applicability

to the health of bisexual persons (Friedman & Dodge, 2016) and also YEH (Bender, Thompson, Ferguson, & Langenderfer, 2014). Syndemics theory provides a framework to consider the constellations of problems such as depression, substance use, and sexual risk behavior documented among YEH and LGBQ youth (Edidin et al., 2011; Fish et al., 2019; Friedman & Dodge, 2016; Herrick, Stall, Egan, Schrager, & Kipke, 2014; Institute of Medicine, 2011; Keuroghlian et al., 2014; Medlow et al., 2014; Russell & Fish, 2016; Saewyc, 2011). Syndemics theory, in tandem with minority stress theory, may also have utility in explaining bisexual YEH disparities. Minority stress theory can shed light on the antecedent social contexts and experiences that fuel health disparities experienced by bisexual YEH. Syndemics theory provides a model to assess whether and how these disparities (e.g., homelessness, substance use, and victimization) exhibit a feedback loop, further exacerbating inequities within LGBQ subpopulations.

We note, however, that homelessness is less often integrated in syndemics models, and this is especially the case among research with YEH. Syndemics models thus far have tended to focus on psychosocial problems, such as mental health and substance use. Contextual factors such as homelessness have more often been integrated as an antecedent (i.e., as a form of adversity) or predictor of syndemics (e.g., Herrick et al., 2014; Stall et al., 2008), rather than as a component of the syndemic itself. This is surprising, given that homelessness has been shown to reinforce or exacerbate negative outcomes among youth, including mental health problems, substance use, sexual risk behavior, survival sex, and risk for physical and sexual victimization (Bender, Ferguson, Thompson, & Langenderfer, 2014; Bender, Thompson, et al., 2014; Pearson, Thrane, & Wilkinson, 2017; Rosario, Schrimshaw, & Hunter, 2012a, 2012b). The duration of homelessness, the extent to which YEH are sleeping on the streets, or the age of onset of homelessness (e.g., running away or leaving home) also have plausible associations with outcomes, as indicators of homelessness severity (Edidin et al., 2011; Kulik et al., 2011). For example, longer duration of homelessness may deplete potential resiliencies and exacerbate negative outcomes among YEH (Cleverley & Kidd, 2011).

Taken together, there is a dearth of within-group analysis of LGBQ health disparities among YEH, despite evidence suggesting that bisexual YEH may have even greater health inequities. Disaggregating LGBQ subpopulations whenever possible is a critical step in this next generation of sexual minority health research. Syndemics theory is a useful organizing framework to examine bisexual YEH disparities, because it can incorporate contemporaneous, overlapping health problems. However, before research with YEH can formally integrate and assess syndemics models, it is first necessary to identify the domains in which these disparities may exist among bisexual YEH (e.g., substance use, mental health, physical health, but also homelessness itself).

To further shed light on these potential health disparities among bisexual YEH, we undertook a series of within-group epidemiological comparisons in a probability sample of LGBQ YEH. We compared bisexual youth to lesbian and gay youth on indicators of homelessness severity, physical health, mental health, and substance use. Models for the other outcomes also controlled for the four homelessness severity indicators, in order to assess whether bisexual health differences held after controlling for homelessness severity. In addition to alcohol and marijuana use, we also examined alternative tobacco product use

(e.g., electronic or e-cigarettes) given the alarmingly high prevalence of tobacco use among YEH and relative lack of attention compared to other forms of substance use (Edidin et al., 2011; Tucker et al., 2014).

METHODS

The study design and sample are described in detail elsewhere (Tucker, Shadel, Golinelli, Seelam, & Siconolfi, 2019). Data are derived from a larger epidemiological study of tobacco product use among YEH in Los Angeles County, using probability sampling. Youth were recruited from street sites and service sites (e.g., shelters, drop-in sites) serving the population, over a nine-month period spanning 2017–2018. Eligibility criteria were 1) ages 13–25, 2) not currently living with a parent or guardian, 3) not currently receiving the majority of food and/or housing support from a family member or guardian, 4) having spent the previous night in a shelter, outdoor or public place, hotel or motel room rented with friends (because of no place else to go), or other place not intended as a residence, and 5) having used any cigarette, e-cigarette, or other tobacco product or electronic nicotine delivery system (ENDS) in the past 30 days (6% of youth were ineligible solely for this reason). Sampling used a multi-stage design, deriving a probability sample of YEH from 25 identified sites (12 service sites such as shelters and drop-in centers; 13 street sites such as sidewalks and parks). This yielded a probability sample of 354 YEH. To increase the size of the subsample of sexual and gender minority youth, supplemental recruitment was undertaken. Ten of the original 25 sites were selected, based on their original yield of ≥25% sexual minority youth in the first sampling wave. Eligibility criteria were the same as the original sample, with added criteria of identifying as LGBTQ. Of the n = 469 YEH in the combined primary and supplementary samples, n = 183 youth self-identified as gay, lesbian, bisexual, or questioning. This subsample of LGBQ YEH was used in the present analyses.

After providing verbal informed consent, youth completed an anonymous pencil-and-paper survey. All data were self-reported, and the survey typically took 40 minutes to complete. Remuneration was provided for completing the screening questionnaire ($3) and if eligible, the full survey ($20). The study was approved by the Institutional Review Board at the RAND Corporation.

Independent variables

Sociodemographics—Sexual orientation was measured with a single item, “Which of these terms best describes your sexual orientation? (Choose one)” with response choices of straight/heterosexual; gay; lesbian; bisexual; questioning; or asexual. For analyses, gay and lesbian youth were combined and compared to the bisexual group. We also explored prevalence of the outcomes in the relatively smaller group of YEH who identified as questioning. Because our focus was within-group differences among LGBQ youth, we did not include straight/heterosexual and asexual youth in these analyses. Gender was assessed with a single item with 4 response choices (“male,” “female,” “transgender male,” or “transgender female”). Due to small cell sizes and the distinction between sexual minority and gender minority identities, only cisgender male and cisgender female participants were included in these analyses. For race and ethnicity, participants chose one or more groups:

Black or African American, Caucasian/White, Hispanic or Latino/a, Asian, Native Hawaiian or other Pacific Islander, or American Indian or Alaska Native. These were collapsed into categories of Black non-Hispanic, White non-Hispanic, Hispanic or Latino/a, or multiracial/other; in recoding, Hispanic ethnicity superseded other categories. Educational attainment (8^{th} grade or less, some high school but no diploma, high school graduate or GED, some college but no degree, 2-year college degree, or 4-year college degree) was collapsed into three groups: did not complete high school, high school or GED, and some college or more.

Dependent variables/outcomes

Health status—Self-rated health was assessed using a single item ("In general, how would you rate your overall health?") and response choices were excellent, very good, good, fair, or poor. For analysis, we created a binary variable indicating fair/poor self-rated health, versus excellent/very good/good health. Depression was assessed using the PHQ-8 (Kroenke et al., 2009), which assesses depression symptoms over the past two weeks (e.g., anhedonia, lethargy). Ordinal responses to the PHQ-8 indicating the frequency of symptoms (not at all; several days; more than half of the days; nearly every day) are summed, and a score of 10 or higher indicates probable depression. The standard PHQ-8 cut point has good sensitivity and specificity for identifying depressive disorders (Kroenke et al., 2009; Kroenke et al., 2010). Internal consistency for the PHQ-8 was excellent in this sample (Cronbach's $\alpha = 0.90$), similar to other studies that have used the PHQ-8 and PHQ-2 with YEH and homeless populations (Pedersen et al., 2018; Tucker, Pedersen, Parast, & Klein, 2018).

Homelessness—We included 4 indicators to capture multiple facets of homelessness. Two indicators were derived from a multiple-choice item, assessing where participants had "spent the night in the past 30 days, because you had nowhere else to stay." Having slept outdoors was defined as sleeping outdoors, on the street, or in a park, at least once in the past 30 days. A single indictor for not having used an emergency shelter or transitional housing at least once in the past 30 days was also derived from the multiple choice item. We also created a dichotomous variable, derived from a continuous response, indicating whether participants had left home to live on their own before the age 18, ("How old were you the first time you left home and were living on your own, apart from a parent or guardian, even if it was just for a short period of time"). Finally, duration of the most recent episode was a numerical response with fields for days, weeks, months, and/or years; all were converted into days for analysis but are reported as years for easier interpretation. Exploratory factor analyses (not shown) suggested that these four indicators should be modeled independently in this sample.

Substance use—A binary indicator for each substance, assessing past 30 day use, was derived from an ordinal frequency-of-use question for each item. One or more days of use was coded as "any" use. This applied to combustible cigarettes (including regular cigarettes and natural cigarettes), electronic/e-cigarettes, combustible marijuana, and vaporized marijuana. Additionally, use of alternative tobacco products (ATPs) in the past month was assessed as both a count variable (number of ATPs used) and a dichotomous indicator (use of any ATP). These were based on separate items asking about their use of e-cigarettes or personal vaporizers (not including vaporizers used for marijuana), hookah, chewing tobacco,

cigars, cigarillos, and snus. We also assessed how often participants had smoked a discarded cigarette butt or filter, and/or smoked a cigarette remade from a discarded cigarette butt ("sniping"); these were combined into a single binary indicator. Finally, binge drinking was defined as five or more drinks of alcohol in a row.

Data analysis

Analyses used sampling weights to adjust for potential bias related to differential inclusion probabilities for participants (e.g., differential rates of visits to recruitment venues), given the sampling methodology (Tucker, Shadel, et al., 2019). First, we described the sample and explored the distributions of the indicators for health and mental health, homelessness severity, and substance use.

Among gay/lesbian and bisexual youth only, we then used logistic regression to calculate unadjusted odds ratios for the association between sexual orientation identity (gay or lesbian versus bisexual) and the outcomes of interest. Finally, we used multivariable logistic regression to examine associations between sexual orientation and the outcomes of interest, controlling for gender, age, race/ethnicity, educational attainment, and homelessness severity. Each model consistently used the same independent variables across outcomes (i.e., specified a priori on theoretical grounds) to facilitate comparisons of patterns or significant covariates across outcomes. However, we made an exception in the model for "Living on one's own before age 18" where we excluded the duration of homelessness episode due to potential temporality conflicts. We assessed multicollinearity using the variance inflation factor (VIF), which did not exceed 1.12.

Finally, we did not incorporate the Questioning sexual orientation group in the models because of their limited representation in the sample (<10%) and subsequently small cell sizes. However, we reported univariate statistics for this group and explored the prevalence of the outcomes relative to the other sexual orientation subgroups because there is a dearth of published data regarding this specific subgroup of YEH.

RESULTS

Weighted sample descriptives are detailed in Table 1. The majority of YEH identified as bisexual (61.6%), compared to gay or lesbian (29.4%) or questioning (9.0%). Similar proportions of participants identified as male (48.3%) and female (51.7%). The majority of youth (70.3%) identified as nonwhite; the largest racial/ethnic group was Black LGBQ youth (38.2%).

One-third (35.1%) of participants reported that their health was fair or poor, and 38.1% evidenced probable depression. Most youth had slept outdoors at least once in the past month (74.2%), and had not used an emergency shelter or transitional housing at least once in the past month (75.6%). More than half (58.1%) of those age 18 or older had become homeless and were living on their own before the age of 18. The average duration of the most recent homelessness episode was 1.3 years.

We also identified high prevalence of substance use. In this sample of past month tobacco users, 89% reported cigarette smoking. Use of other substances in the past month included combustible marijuana (87.0%), vaped marijuana (43.1%), and binge drinking (52.4%). Nearly half of youth reported past month use of discarded cigarettes or other tobacco (46.5%).

Unadjusted bivariate models and adjusted multivariable models are detailed in Tables 2–5. For models where both the unadjusted and adjusted associations between sexual orientation and the outcome were statistically significant, we only present the adjusted model results in-text because the adjusted versus unadjusted coefficients were similar in magnitude.

We compared differences in four indicators of homelessness severity (Table 2). In adjusted models, bisexual youth were more likely to have become homeless and living on their own as minors (OR = 4.35, $p = .001$). Bisexual youth were also more likely to have not recently utilized emergency shelters or transitional housing (OR = 6.41, $p < .001$). There were no sexual orientation differences in having slept outdoors in the prior 30 days, or in the duration of the most recent episode of homelessness.

In the adjusted models for the health indicators (Table 3), bisexual youth had increased odds of probable depression (OR = 4.06, $p = .009$) relative to their peers.

Substance use and related risk behaviors are shown in Tables 4–5. We did not develop models for combustible cigarettes due to small cell sizes attributed to very high prevalence of use across the sample. There were no significant differences between bisexual and lesbian/gay youth in their odds of using e-cigarettes or personal vaporizers, ATPs (dichotomous or count), or discarded cigarette butts in the past 30 days. There were also no sexual orientation differences in the odds of past-month combustible or vaped marijuana use, or past-month binge drinking.

While the subsample was not large enough for formal statistical comparisons between the questioning group and their lesbian/gay and bisexual peers, there were several indicators where questioning YEH appeared to fare more poorly (Table 1). Questioning YEH had the highest prevalence of probable depression (55.4%), having slept outdoors in the past month (80.3%), e-cigarette/vape use (33.0%), and having re-used discarded cigarette butts (55.0%). Questioning youth also had the longest recent homelessness episode (Mean = 2.56 years), more than a year longer than the average duration among their LGB peers.

Although not our main focus, multivariable models also identified other demographics and homelessness severity indicators (control variables) that were associated with the outcomes we examined (see Tables 2–5). Multiracial/other youth were more likely to have become homeless as minors, relative to white youth (OR = 6.76, $p = .016$). Black youth were less likely to have used discarded tobacco/cigarette butts (OR = 0.34, $p = .023$), or vaped marijuana (OR = 0.29, $p = .010$), compared to their white peers. Older age was associated with a longer duration of the most recent homelessness episode (b = 60.26, $p = .029$). Persons who had not completed high school, relative to those who completed some college or more, were less likely to have not used emergency shelters or transitional housing (OR = 0.27, $p = 0.40$). Finally, homelessness severity indicators were associated with several other

outcomes. Having slept outdoors at least once in the past month was associated with vaping marijuana (OR = 3.31, $p = .016$), not having used an emergency shelter or transitional housing at least once in the past month (OR = 5.89, $p = .001$), and with using discarded tobacco or cigarette butts (OR = 3.07, $p = .027$).

DISCUSSION

Among LGBQ YEH, depression, substance use behaviors, and indicators of homelessness severity were common. Overall, about 2 in 5 youth evidenced probable depression; 1 in 4 lesbian and gay youth, 2 in 5 bisexual youth, and 1 in 2 questioning youth had evidence of probable depression. These rates tend to be on the higher end of the range reported across studies of YEH in general (8% to 61%) (Medlow et al., 2014). Given that tobacco use is associated with depression symptoms (Chaiton, Cohen, O'Loughlin, & Rehm, 2009; Mathew, Hogarth, Leventhal, Cook, & Hitsman, 2017), the study inclusion criteria (recent tobacco use) may partially explain the elevated prevalence in this sample.

The indicators of homelessness severity are also cause for concern, with 3 in 4 youth having slept outdoors at least once in the past month, and only 1 in 4 having used transitional housing or emergency shelters at least once in that time period. On average, an LGBQ youth had been homeless for more than one year during their most recent episode of homelessness. In particular, the prevalence of sleeping outdoors is substantially higher than that reported in a multicity study by Shelton et al (25%; 2018). This may be due to a number of factors such as the wider recall period in our study (past 30 days vs. current), the milder climate in Los Angeles relative to other cities such as New York City, and differences in the availability of transitional housing/emergency shelter beds. The present survey had a limited set of non-tobacco related outcomes; therefore, we were unable to assess potential disparities in other relevant syndemic factors such as victimization, survival sex, and other sexual risk behaviors. These syndemic factors are likely present and relevant, given the high prevalence of probable depression and the extent of homelessness severity that we found.

We also found very high rates of cigarette smoking and use of alternative tobacco products in this sample of past month tobacco users. This aligns with high rates of tobacco product use previously found among homeless and/or LGBQ populations in general (Blosnich et al., 2014; Emory et al., 2016; Jamal et al., 2016; Johnson et al., 2016; Lee et al., 2009; Tucker et al., 2014; Wheldon et al., 2018). Half of LGBQ YEH binge drank in the prior month. Re-use of discarded cigarettes was common (about 1 in 2 youth), and may expose youth to other pathogens, contaminants, and uncertainty regarding the actual product being combusted (Tucker, Shadel, Golinelli, Mullins, & Ewing, 2015).

When sexual orientation differences were found, they were uniformly worse among bisexual youth, compared to lesbian and gay youth. Bisexual YEH were more than four times as likely to have left home for the first time as minors, and were also more likely to have not recently used transitional housing or emergency shelters. Finally, bisexual youth also had a four-fold greater odds of depression relative to their gay and lesbian peers, even after adjusting for multiple facets of homelessness severity. Prior research has attributed bisexual health disparities primarily to the dual marginalization that bisexual persons experience

(Dyar et al., 2018; Friedman & Dodge, 2016; Mustanski, Garofalo, & Emerson, 2010; Ross et al., 2010). The survey did not assess experiences of social marginalization (e.g., perceived or experienced stigma, discrimination) and therefore we cannot assess the extent to which these factors explain the disparities we found in this probability sample of YEH. Future research should incorporate these factors and assess whether they explain differences in health among LGBQ YEH.

In adjusted models, we did not find any substance use differences between bisexual youth and their gay or lesbian peers. Altogether, we found fewer health differences between bisexual youth and lesbian/gay youth than might be expected based on prior within-group research. A recent seven-city survey of LGBTQ youth experiencing homelessness also did not find many statistically significant differences between bisexual youth and their peers (Shelton et al., 2018). Among homeless LGBQ youth, health burdens may be somewhat more uniform given the high rates of health and mental health problems and adversities experienced by this population (Edidin et al., 2011; Emory et al., 2016; Johnson et al., 2016; Kulik et al., 2011; Medlow et al., 2014; Saewyc, 2011; Tucker et al., 2014; Wheldon et al., 2018). Publication bias, where prior null results are less likely to be published, is also plausible. While the present study was not designed to elucidate the mechanisms underlying subgroup differences in mental and physical health, substance use, or homelessness severity, prior research suggests that in addition to minority stressors, factors related to social network characteristics and co-occurring substance use are relevant (Golinelli, Tucker, & Shadel, 2016; Wenzel, Tucker, Golinelli, Green, & Zhou, 2010).

Although other demographic covariates (e.g., race/ethnicity) were primarily intended as controls, we identified several significant differences related to gender and race/ethnicity. For example, LGB YEH were less likely to vape marijuana if they were Black (compared to white youth), and more than six times as likely to become homeless as minors if they were multiracial/other (compared to white youth). These differences speak to potential heterogeneity in substance use patterns and homelessness severity among homeless LGB youth that warrant examination in future research. Prior research has suggested that multiple-minority YEH (e.g., black or multiracial LGB YEH) may have poorer outcomes, perhaps due to their greater risk for marginalization. For example, recent findings from youth in unstable housing and foster care found that Black LGBTQ youth in unstable housing fared more poorly on a number of outcomes (e.g., substance use, victimization) relative to their white LGBTQ peers also in unstable housing (Baams, Wilson, & Russell, 2019). However, the present results suggest that the potential effects of multiple-minority status may vary across different types of outcomes (e.g., current marijuana use versus age when first leaving home). Finally, multiple identities and lived experiences (e.g., race/ethnicity, sexual orientation, gender identity) can shape individuals' exposures to risks and threats to health, and also the availability of protective resources (Bowleg, 2012; Katz-Wise, Mereish, & Woulfe, 2017). Future research with YEH, particularly studies with larger samples powered for covariate interactions, for example, sexual orientation by race/ethnicity or gender, can shed light on a potential gradient in health outcomes within a marginalized population.

Finally, we note several limitations and strengths of this study. First, data were drawn from a study of tobacco using YEH in Los Angeles County and may not be generalizable to other settings. Although recent tobacco product use was a criterion for study eligibility, only 6% of youth were ineligible for the study due to non-use (Tucker, Shadel, et al., 2019). All data were self-report and subject to social desirability bias. However, to encourage honest reporting, questionnaires were self-completed by youth. With regard to sexual orientation, response choices were limited and did not include response options that youth may have otherwise endorsed (e.g., queer, pansexual). Similarly, response choices for gender identity were limited and did not include other identities (e.g., non-binary). For substance use, binge drinking was queried as 5 or more drinks in one sitting, which does not reflect gender-specific cutpoints (e.g., 4 drinks for females, 5 drinks for males) (National Institute on Alcohol Abuse and Alcoholism, 2004). We also note that definitions of homelessness have varied across prior studies, which may limit cross-study comparisons (Edidin et al., 2011). In the present study, we used broad but clearly-defined criteria that reflect the multiple experiences that would constitute homelessness for youth. Research to date with homeless adolescents has used convenience samples (Medlow et al., 2014); a major strength of our research is the use of probability sampling of youth from a large number of both service and street sites across Los Angeles County. Finally, because the study was focused on tobacco product use. and alternative tobacco product use more specifically, we did not have data on other syndemics indicators or psychosocial variables (e.g., discrimination, victimization) that might help to explicate the mechanisms underlying the significant differences we found. These are critical areas for future research. We also did not assess why or how YEH became homeless (e.g., runaway youth, versus rejected youth), which may differ by gender and have distinct implications for current health outcomes (Pearson et al., 2017).

CONCLUSION

Homeless LGBQ youth face well-documented health disparities and threats to their well-being. The social experiences that predispose adolescents and young adults to homelessness, such as family rejection, abuse, and aging out of youth services, have significant implications for health (Edidin et al., 2011; Kulik et al., 2011; Whitbeck et al., 2004). The indicators that we examined (e.g., mental health, substance use) can be considered as both markers of current health status and as risk factors for future poor health, including interrelated outcomes such as victimization, sexual health, and substance use.

With regard to their identities and their health, this population is not a monolith. Our research is largely descriptive and is intended to identify future areas for research. In turn, theoretically-guided research to identify mechanisms underlying disparities can be used to develop appropriate interventions focused on LGBQ YEH, service providers, and the larger policy climate that dictates the availability of shelter space, transitional housing, and supportive services for all LGBQ YEH. Additionally, future research can integrate a syndemics model to assess whether and how these disparities overlap, which can also identify promising behavioral and contextual targets for intervention.

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Table 1.

Sample descriptives (weighted).

	% or Mean (Weighted)			
	Gay/Lesbian (n=57)	**Bisexual (n=109)**	**Questioning[a] (n=17)**	**Total (n = 183)**
Sample proportion – full sample	29.4%	61.6%	9.0%	100.0%
Sample – bivariate/multivariable analysis	32.3%	67.7%	n/a	100.0%
Demographics				
Age – mean (SD)	22.09 (2.01)	21.59 (2.25)	21.50 (2.20)	21.73 (2.18)
Gender				
Male	54.7%	43.7%	58.7%	48.3%
Female	45.3%	56.3%	41.3%	51.7%
Race/ethnicity				
Hispanic/Latino	27.9%	16.5%	19.3%	20.1%
White non-Hispanic	14.2%	37.4%	27.3%	29.7%
Black non-Hispanic	44.4%	33.4%	50.2%	38.2%
Multiracial/other non-Hispanic	13.5%	12.7%	3.2%	12.1%
Educational attainment				
Less than HS	26.1%	30.9%	39.3%	30.3%
HS or GED	32.7%	38.1%	37.3%	36.4%
Some college or more	41.2%	31.0%	23.3%	33.3%
Health status				
Fair/poor self-rated health	20.8%	44.2%	20.1%	35.1%
Probable depression (PHQ8 ≥ 10)	24.9%	41.9%	55.4%	38.1%
Homelessness severity				
Slept outdoors (past 30 days)	70.5%	75.0%	80.3%	74.2%
Did not use emergency shelter or transitional housing (past 30 days)	55.9%	84.1%	81.1%	75.6%
Lived on their own before age 18[b]	37.6%	67.6%	60.3%	58.1%
Duration in years, most recent homelessness episode, mean (SD)	1.10 (1.77)	1.24 (1.72)	2.56 (3.13)	1.32 (1.93)
Substance use (past 30 days)				
Any combustible cigarettes	93.3%	86.3%	94.0%	89.0%
E-cigarette or nicotine vaporizer use	18.4%	26.8%	33.0%	24.9%
Marijuana - combustible	91.9%	86.2%	77.3%	87.0%
Marijuana - vape	46.5%	41.9%	39.5%	43.1%
Any ATP use	53.2%	69.7%	64.9%	64.4%
# of ATPs used – mean (SD)	0.96 (1.08)	1.41 (1.43)	1.51 (1.82)	1.29 (1.36)
Binge drinking	41.6%	57.1%	56.1%	52.4%
Substance use-related risk behaviors				
Used discarded cigarettes/tobacco (30 days)	44.1%	46.4%	55.0%	46.5%

[a]Descriptive analyses only; not included in multivariable models due to small cell sizes.

[b] Among participants ages ≥18

Table 2.

Unadjusted and adjusted associations of sexual orientation with homelessness severity indicators, among gay/lesbian and bisexual YEH.

	Slept outdoors			Lived on own before 18[f]			Did not use emergency/ transitional housing			Duration, most recent episode		
	OR (95% CI)	S.E.	*p*	OR (95% CI)	S.E.	*p*	OR (95% CI)	S.E.	*p*	b (95% CI)	S.E.	*p*
Unadjusted model												
Bisexual[a]	1.26 (0.52, 3.00)	0.56	.609	3.46* (1.54, 7.78)	1.43	.003	4.19* (1.67, 10.49)	1.96	.002	52.88 (−144.16, 249.92)	99.79	.597
Adjusted MV model												
Bisexual[a]	0.72 (0.23, 2.23)	0.42	.572	4.35* (1.85, 10.23)	1.90	.001	6.41* (2.41, 17.03)	3.20	<.001	40.41 (−231.28, 312.09)	137.51	.769
Gender[b]												
Female	0.82 (0.29, 2.34)	0.44	.712	1.14 (0.49, 2.63)	0.49	.764	0.91 (0.29, 2.83)	0.53	.865	−38.4 (−253.95, 177.14)	109.10	.725
Age	1.28 (0.95, 1.73)	0.20	.111	0.82* (0.67, 1.00)	0.08	.049	0.87 (0.67, 1.12)	0.11	.263	60.26* (6.19, 114.33)	27.37	.029
Race/ethnicity[c]												
Hispanic/ Latino	1.58 (0.39, 6.33)	1.12	.520	0.90 (0.31, 2.57)	0.48	.842	1.60 (0.43, 6)	1.08	.482	−167.56 (−472.6, 137.48)	154.40	.280
Black	1.17 (0.34, 4)	0.73	.806	0.94 (0.34, 2.58)	0.48	.897	0.56 (0.18, 1.8)	0.33	.334	−100.18 (−362.77, 162.41)	132.91	.452
Multiracial/ Other	1.37 (0.3, 6.2)	1.06	.684	6.76* (1.42, 32.22)	5.39	.016	2.99 (0.72, 12.36)	2.16	.131	−117.19 (−450.02, 215.65)	168.47	.488
Educational attainment[d]												
Did not complete HS	1.47 (0.46, 4.72)	0.87	.513	0.85 (0.30, 2.39)	0.45	.762	0.27* (0.08, 0.94)	0.17	.040	168.13 (−114.21, 450.48)	142.91	.241
High school; GED	1.89 (0.57, 6.33)	1.16	.301	0.4 (0.15, 1.06)	0.20	.067	0.43 (0.14, 1.35)	0.25	.147	7.72 (−249.57, 265)	130.23	.953
Slept outdoors[e]	--	--	--	2.14 (0.76, 6.02)	1.13	.148	5.89* (2.07, 16.71)	3.13	.001	28.59 (−210.01, 267.18)	120.77	.813
Lived on own before 18[f]	2.13 (0.73, 6.2)	1.16	.165	--	--	--	0.50 (0.20, 1.25)	0.23	.138	−45.85 (−284.8, 193.11)	120.95	.705
Did not use emergency or transitional housing[e]	6.56* (2.27, 18.97)	3.55	.001	0.50 (0.19, 1.31)	0.24	.157	--	--	--	76.40 (−225.96, 378.76)	153.04	.618

	Slept outdoors			Lived on own before 18[f]			Did not use emergency/ transitional housing			Duration, most recent episode		
	OR (95% CI)	S.E.	*p*	OR (95% CI)	S.E.	*p*	OR (95% CI)	S.E.	*p*	b (95% CI)	S.E.	*p*
Duration, most recent episode	1.00 (1.00, 1.00)	0.00	.780	--	--	--	1.00 (1.00, 1.00)	0.00	.601	--	--	--

[*] $p < .05$

[a] Reference group is gay & lesbian

[b] Reference group is male

[c] Reference group is white

[d] Reference group is “some college or more”

[e] Past 30 days

[f] Among participants ages ≥18; and duration of most recent homelessness episode not included as control variable due to temporality.

Table 3.

Unadjusted and adjusted associations of sexual orientation with physical and mental health indicators, among gay/lesbian and bisexual YEH.

	Fair/poor self-rated health			Probable depression		
	OR (95% CI)	**S.E.**	***p***	**OR (95% CI)**	**S.E.**	***p***
Unadjusted model						
Bisexual[a]	3.01* (1.28, 7.08)	1.31	.012	2.17 (0.75, 6.32)	1.18	.154
Adjusted MV model						
Bisexual[a]	2.18 (0.8, 5.92)	1.11	.127	4.06* (1.41, 11.68)	2.19	.009
Gender[b]						
Female	1.07 (0.47, 2.44)	0.45	.878	0.95 (0.36, 2.5)	0.47	.915
Age	1.05 (0.84, 1.31)	0.12	.673	1.07 (0.83, 1.37)	0.14	.621
Race/ethnicity[c]						
Hispanic/Latino	0.69 (0.21, 2.33)	0.43	.556	0.88 (0.27, 2.89)	0.53	.838
Black	1.20 (0.44, 3.25)	0.61	.723	0.64 (0.2, 1.98)	0.37	.435
Multiracial/Other	0.63 (0.14, 2.79)	0.48	.546	0.63 (0.16, 2.56)	0.45	.523
Educational attainment[d]						
Did not complete HS	1.98 (0.69, 5.73)	1.07	.205	0.86 (0.3, 2.43)	0.46	.775
High school; GED	2.32 (0.79, 6.81)	1.27	.124	1.16 (0.41, 3.28)	0.61	.778
Slept outdoors[e]	0.60 (0.22, 1.65)	0.31	.320	1.90 (0.61, 5.93)	1.10	.271
Lived on own before 18[f]	1.77 (0.78, 4.03)	0.74	.172	0.54 (0.22, 1.33)	0.25	.181
Did not use emergency or transitional housing[e]	1.77 (0.66, 4.74)	0.89	.259	0.29* (0.09, 0.93)	0.17	.037
Duration, most recent episode	1.00 (1.00, 1.00)	0.00	.911	1.00 (1.00, 1.00)	0.00	.322

*$p < .05$

[a]Reference group is gay & lesbian

[b]Reference group is male

[c]Reference group is white

[d]Reference group is “some college or more”

[e]Past 30 days

[f]Among participants ages ≥18

Table 4.

Unadjusted and adjusted associations of sexual orientation with use of alternative tobacco products and discarded tobacco, among gay/lesbian and bisexual YEH.

	Used any ATP products			# of ATP products used			Used discarded tobacco/cigarettes		
	OR (95% CI)	S.E.	*p*	b (95% CI)	SE	*p*	OR (95% CI)	S.E.	*p*
Unadjusted model									
Bisexual[a]	2.02 (0.87, 4.71)	0.87	.102	0.45 (−0.02, 0.91)	0.23	.058	1.10 (0.47, 2.55)	0.47	.827
Adjusted MV model									
Bisexual[a]	1.61 (0.62, 4.17)	0.78	.327	0.30 (−0.25, 0.85)	0.28	.286	0.79 (0.33, 1.91)	0.36	.598
Gender [b]									
Female	0.60 (0.24, 1.49)	0.28	.272	−0.41 (−0.93, 0.11)	0.26	.121	0.92 (0.4, 2.1)	0.39	.843
Age	0.85 (0.69, 1.04)	0.09	.115	−0.02 (−0.14, 0.11)	0.06	.807	1.23 (1, 1.53)	0.13	.053
Race/ethnicity [c]									
Hispanic/Latino	0.69 (0.22, 2.17)	0.40	.529	−0.03 (−0.84, 0.77)	0.41	.935	0.37 (0.1, 1.33)	0.24	.129
Black	0.62 (0.22, 1.79)	0.33	.379	−0.46 (−0.99, 0.07)	0.27	.090	0.34* (0.13, 0.86)	0.16	.023
Multiracial/Other	0.53 (0.15, 1.88)	0.34	.324	−0.17 (−0.98, 0.64)	0.41	.684	0.31 (0.09, 1.09)	0.20	.069
Educational attainment [d]									
Did not complete HS	0.77 (0.29, 2.08)	0.39	.608	0.00 (−0.53, 0.53)	0.27	.999	1.55 (0.57, 4.16)	0.78	.389
High school; GED	2.46 (0.85, 7.14)	1.34	.099	0.55 (−0.07, 1.18)	0.32	.082	1.36 (0.52, 3.58)	0.67	.528
Slept outdoors [e]	1.59 (0.63, 4.04)	0.76	.328	0.38 (−0.04, 0.79)	0.21	.076	3.07* (1.13, 8.29)	1.56	.027
Lived on own before 18 [f]	1.60 (0.68, 3.76)	0.70	.283	0.04 (−0.47, 0.55)	0.26	.883	1.49 (0.68, 3.24)	0.59	.316
Did not use emergency or transitional housing [e]	0.76 (0.27, 2.19)	0.41	.615	0.08 (−0.40, 0.57)	0.25	.741	0.70 (0.27, 1.84)	0.35	.470
Duration, most recent episode	1.00 (1.00, 1.00)	0.00	.747	0.00 (0.00, 0.00)	0.00	.308	1.00 (1.00, 1.00)	0.00	.614

*$p < .05$

[a]Reference group is gay & lesbian

[b]Reference group is male

[c]Reference group is white

[d]Reference group is “some college or more”

[e]Past 30 days

[f]Among participants ages ≥18

Table 5.

Unadjusted and adjusted associations of sexual orientation with marijuana and alcohol use indicators, among gay/lesbian and bisexual YEH.

	Marijuana - smoke			Marijuana - vape			Binge drinking		
	OR (95% CI)	S.E.	*p*	OR (95% CI)	S.E.	*p*	OR (95% CI)	S.E.	*p*
Unadjusted model									
Bisexual[a]	0.55 (0.17, 1.75)	0.32	.309	0.83 (0.36, 1.91)	0.35	.664	1.87 (0.79, 4.43)	0.82	.157
Adjusted MV model									
Bisexual[a]	0.52 (0.13, 2.03)	0.36	.350	0.88 (0.35, 2.22)	0.42	.791	1.96 (0.82, 4.66)	0.87	.129
Gender [b]									
Female	0.16* (0.04, 0.57)	0.10	.005	2.14 (0.93, 4.92)	0.91	.073	1.35 (0.60, 3.02)	0.56	.471
Age	1.15 (0.87, 1.51)	0.16	.328	1.08 (0.88, 1.32)	0.11	.473	1.18 (0.95, 1.46)	0.13	.134
Race/ethnicity [c]									
Hispanic/Latino	2.72 (0.26, 28.14)	3.25	.400	1.5 (0.42, 5.34)	0.97	.530	0.66 (0.21, 2.05)	0.38	.472
Black	0.27 (0.06, 1.17)	0.20	.081	0.29* (0.11, 0.74)	0.14	.010	0.72 (0.26, 1.99)	0.37	.529
Multiracial/Other	0.83 (0.16, 4.26)	0.69	.818	0.69 (0.19, 2.52)	0.46	.575	0.37 (0.10, 1.37)	0.25	.137
Educational attainment [d]									
Did not complete HS	0.75 (0.18, 3.22)	0.56	.702	0.95 (0.34, 2.66)	0.50	.922	0.90 (0.34, 2.4)	0.45	.835
High school; GED	1.6 (0.34, 7.52)	1.26	.553	1.11 (0.42, 2.94)	0.55	.838	2.15 (0.82, 5.64)	1.06	.122
Slept outdoors [e]	1.93 (0.62, 6.06)	1.13	.259	3.31* (1.25, 8.79)	1.65	.016	0.59 (0.25, 1.41)	0.26	.237
Lived on own before 18 [f]	0.82 (0.23, 3.02)	0.55	.771	0.49 (0.21, 1.14)	0.21	.099	0.68 (0.31, 1.51)	0.28	.342
Did not use emergency or transitional housing [e]	1.61 (0.42, 6.10)	1.09	.486	0.63 (0.25, 1.61)	0.30	.333	1.27 (0.51, 3.20)	0.60	.608
Duration, most recent episode	1.00 (1.00, 1.00)	0.00	.563	1.00 (1.00, 1.00)	0.00	.196	1.00 (1.00, 1.00)	0.00	.257

*$p < .05$

[a]Reference group is gay & lesbian

[b]Reference group is male

[c]Reference group is white

[d]Reference group is “some college or more”

[e]Past 30 days

[f]Among participants ages ≥18