



# Prevalence of youth experiencing homelessness and its association with suicidal thoughts and behaviors: Findings from a population-based study

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## ABSTRACT

Although various studies have examined factors associated with suicidal behaviors among youth, few studies have investigated the association between youth experiencing homelessness (YEH) and suicidal thoughts and behaviors (STBs) using a large nationally representative sample. The objectives of this study were to investigate prevalence of YEH and its association with STBs. Data for this study came from the 2021 Youth Risk Behavior Survey. An analytic sample of 17,033 youth aged 14–18 (51.7 % male) was analyzed using binary logistic regression. Of the 17,033 youth examined, 3 % experienced homelessness during the past 30 days, 21.3 % experienced suicidal ideation, 17.3 % made a suicide plan, and 10.9 % attempted suicide during the past 12 months. Controlling for demographic characteristics and feeling sad or hopeless, YEH was associated with 2.48 times higher odds of experiencing suicidal ideation ( $AOR=2.48, p<.001$ ), 2.46 times higher odds of making a suicide plan ( $AOR=2.46, p<.001$ ), and 4.38 times higher odds of making a suicide attempt ( $AOR=4.38, p<.001$ ). The findings of this study highlight the importance of identifying youth who are at risk of experiencing homelessness to ensure early interventions are put in place to prevent suicidal behaviors.

## 1. Introduction

Suicide has been identified as the second leading cause of death among children aged 10–14 years and third leading cause of death among youth aged 15–24 years in the United States (U.S.) in 2021 (Centers for Disease Control and Prevention (CDC), 2021). Available data from the CDC indicate that, although the rate of death by suicide in the U.S. declined from 13.9 % per 100,000 population in 2019 to 13.5 % per 100,000 in 2020 (Ehlman et al., 2022), suicidal thoughts and behaviors (STBs, i.e., suicidal ideation, suicide planning, and suicide attempt) among youth remain a significant public health concern (Hill et al., 2021; Lindsey et al., 2019; Raifman et al., 2020). Gaylor et al. (2023) examined data from the national Youth Risk Behavior Survey (YRBS) and found that in 2021, 22.2 % of youth experienced suicidal ideation, 17.6 % made a suicide plan, and 10 % made at least one suicide attempt during the past 12 months.

Researchers have identified a number of risk factors associated with STBs among youth, including depression and anxiety (Covert and Fraire,

2021; Crawford et al., 2019; Jacobs et al., 2023; Pharris et al., 2023), sexual violence (Baiden et al., 2020b; Roley-Roberts et al., 2023; Scheer et al., 2021; Yang, 2023), school bullying (Iyanda et al., 2022; Sutter et al., 2023), and cyberbullying (Islam et al., 2022; Reed et al., 2015). Alcohol use (Baiden et al., 2019a; Wong et al., 2013), cigarette smoking (Baiden et al., 2020a; Peprah et al., 2023), and marijuana use (Jacobs et al., 2023) have also been found to be associated with suicidal behaviors among youth. However, one risk factor that has received relatively less attention in research is youth experiencing homelessness (YEH; Slesnick et al., 2021).

YEH has been identified as a serious concern in the U.S. (Morton et al., 2018). Prevalence estimates of YEH in the U.S. vary across studies and can sometimes be challenging to estimate due to the lack of a consistent definition of homelessness and the transient nature of homelessness status. (Cutuli et al., 2020; Edidin et al., 2012; Farmer et al., 2021; Morton et al., 2018). According to the McKinney-Vento Homeless Assistance Act 10, the term “homeless children and youths” refers to “individuals who lack a fixed, regular, and adequate nighttime

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residence” (McKinney-Vento Homeless Assistance Act, 2015). It also includes youth living in motels, hotels, trailer parks, camping grounds, emergency or transitional shelters, cars, public spaces, abandoned buildings, substandard housing, and bus or train stations. For the purposes of this paper, we defined YEH as any youth who lacked a fixed, regular, and adequate nighttime residence and whose primary nighttime residence involved living in a supervised shelter or emergency housing, transitional housing, hotels, motels, or places not meant for human nighttime habitation (e.g., in a car, under a bridge, park, campground, or abandoned buildings).

The prevalence of YEH in the U.S. has been estimated to range between 3 and 13 % (Cutuli et al., 2020; McKinnon et al., 2023; Morton et al., 2018; Smith-Grant et al., 2022). Available research indicates racial disproportionality among YEH population (Fothergill et al., 2012; Gattis and Larson, 2017; Morton et al., 2017; Page, 2016), with some estimates suggesting that Black youth account for nearly half of the YEH population in the U.S. (Carrasco, 2019; Edwards, 2020). Other studies have also found that although lesbian, gay, bisexual, transgender, or queer (LGBTQ+) youth account for less than 20 % of the general youth population in the U.S. (Kann et al., 2018; Underwood et al., 2020), LGBTQ+ youth are overrepresented among YEH population making up between 15 and 40 % of the homeless youth population (Dolamore and Naylor, 2018; Ormiston, 2022; Rosario et al., 2012b, 2012a; Siconolfi et al., 2020).

Compared to youth with stable housing, YEH are at an elevated risk for poor mental health outcomes, including depression and anxiety (Burke et al., 2022; Gattis and Larson, 2016, 2017), cognitive impairment (Barone et al., 2019; Fry et al., 2017), and suicidal behaviors (Gattis and Larson, 2016; Gewirtz O'Brien et al., 2020; Smith-Grant et al., 2022). YEH have also been found to have an increased risk of teenage pregnancy (Aparicio et al., 2019), risky sexual health behaviors such as sex without a condom (Aparicio et al., 2021; Caccamo et al., 2017; Halverson et al., 2022; Henriques et al., 2022; Tevendale et al., 2009), sex under the influence of drugs (Hartmann et al., 2021), and trading sex for drugs (Chassman et al., 2022). Other studies have also found that YEH are more likely to experience general violence (Côté et al., 2024; Heerde et al., 2022), intimate partner violence (Kennedy et al., 2015), sexual violence (Cutuli et al., 2020; Heerde et al., 2015), and sex trafficking (Middleton et al., 2018, 2022; Wright et al., 2021), and engage in substance use (Dawson-Rose et al., 2020). These adversities cumulatively have been shown to affect cortisol response to cognitive tasks (Cutuli et al., 2010) and academic performance (Edwards, 2020) of YEH more than their counterparts who have stable housing. Kull et al. (2019) found that compared to their stably housed counterparts, YEH are almost five times more likely to not complete high school.

Although this growing body of research has contributed to expanding our understanding of homelessness, it appears that gaps remain, with earlier work reporting significant methodological challenges, including small and unrepresentative sample sizes (Cutuli et al., 2010; Gattis and Larson, 2016; Gauvin et al., 2019; Slesnick et al., 2021). Moreover, current understanding of the link between homelessness and suicidal behaviors in the U.S. largely comes from general samples of adult populations (Dell et al., 2023; Fulginiti et al., 2022; Henkind et al., 2023) or veteran populations (Edwards et al., 2021, 2022; Tsai et al., 2018). Few studies in the U.S. have investigated the association between YEH and suicidal behaviors drawing on data from a nationally representative sample. Existing studies that have investigated the association between YEH and suicidal behaviors either used self-selected, small, and non-probability samples (Gattis and Larson, 2016; Gauvin et al., 2019; Slesnick et al., 2021) or youth from specific geographical locations in the U.S. (Gewirtz O'Brien et al., 2020; McCallops et al., 2021; Smith-Grant et al., 2022; Yoder et al., 2010), thereby limiting generalizability of study findings.

## 1.1. Current study

Although various studies have examined factors associated with STBs among youth, to our knowledge, few studies have investigated the association between YEH and suicidal behaviors using a large nationally representative sample. Thus, drawing on data from a large nationally representative sample of youth, this study seeks to add to the existing literature by investigating 1) the prevalence of YEH and STBs, 2) the association between demographic characteristics and YEH, and 3) the cross-sectional association between YEH and STBs after controlling for demographic characteristics and feeling sad or hopeless. Based on the review of the extant literature, we hypothesized that: 1) youth who self-identified as a sexual minority would be more likely to experience homelessness when compared to their counterparts who self-identified as straight, 2) youth who self-identified as non-Hispanic Black would be more likely to experience homelessness when compared to their non-Hispanic White counterparts, and 3), controlling for demographic characteristics and feeling sad or hopeless, YEH would be more likely to experience suicidal ideation, make a suicide plan, and attempt suicide when compared to their counterparts not experiencing homelessness.

## 2. Methods

### 2.1. Data source

Data for this study came from the 2021 Youth Risk Behavior Survey (YRBS). The YRBS is a cross-sectional, school-based national survey conducted by the CDC every two years to ascertain the prevalence, patterns, and co-occurrence of health risk behaviors that contribute to the leading causes of death and disability among youth in the U.S. and to monitor progress toward achieving the Healthy People objectives. The YRBS recruited 9th to 12th graders from public and private schools to complete self-administered surveys. Detailed information about the YRBS, including the objectives, methodology, and sampling procedure, has been provided elsewhere (Brener et al., 2013; Kann et al., 2018; Mpofu et al., 2023; Underwood et al., 2020) and by the authors (Baiden et al., 2020b, 2021, 2022, 2023, 2024; Baiden and Tadeo, 2020). The 2021 YRBS is a comprehensive instrument comprised of approximately 100 items. The YRBS has been used extensively and has been found to demonstrate test-retest reliability of weighted kappa mean scores of 58 % or higher among community middle school (Zullig et al., 2006) and high school (Raghupathy and Hahn-Smith, 2012) youth. Additional information about the validity of the items in the YRBS has been provided in a review by (Brener et al., 2013). The study protocol for conducting the YRBS was approved by the CDC's Institutional Review Board (IRB), and the data are publicly available. The current study was deemed exempt from IRB approval by the lead author's institution as the data had already been de-identified and contained no personal information. This study was conducted in accordance with the ethical guidelines laid down in the current version of the Declaration of Helsinki (World Medical Association, 2013).

### 2.2. Sample

The YRBS recruited 9th to 12th graders from both public and private schools to complete self-administered surveys. The YRBS utilized a three-stage cluster sample design to create a nationally representative sample of high school youth. First, schools were selected systematically with probability proportional to enrollment in grades 9 through 12 using a random start from primary sampling units (PSUs), made up of entire counties, groups of smaller adjacent counties, or parts of larger counties. PSUs were categorized into different strata based on their metropolitan statistical area status (e.g., urban or rural) and the percentages of non-Hispanic Black (Black) and Hispanic youth in each PSU. For the second-stage sampling, secondary sampling units were sampled with probability proportional to school enrollment size. The third and final

stage of sampling comprised of a random sampling of one or two classrooms in each of grades 9 through 12 from either a required subject (e.g., English or social studies) or a required period (e.g., homeroom or second period). All students in sampled classes were eligible to participate. Schools, classes, and students who refused to participate were not replaced in the sampling design.

There were 17,232 youth aged 12–18 years in the 2021 YRBS. Respondents aged 12 and 13 were excluded from the analysis due to the small sample size (unweighted  $n = 199$ ). This resulted in an analytic sample of 17,033 youth aged 14–18 years. The percentage of missing data on variables ranged from less than 1 % for sex to 25.5 % for YEH. Missing data analysis was conducted to assess whether a group of respondents with observed data on one variable significantly differed from a group of respondents with missing data on another variable. Chi-square test revealed that youth who self-identified as sexual minority, and racial/ethnic minority were more likely to have missing data on suicide attempt and YEH. Missing data were analyzed using Multiple Imputation using Chained Equations (MICE) (Van Buuren, 2018). We followed the four steps recommended by Azur et al. (2011) in imputing missing data and generated 20 imputed datasets. This number is generally considered sufficient to improve the model's robustness (Azur et al., 2011; Graham et al., 2007). A similar approach has been used by the authors in handling missing data in previous studies (Baiden et al., 2020b, 2021, 2022, 2023, 2024; Baiden and Tadeo, 2020). A slight majority of the sample were males (51.7 %). About three in four youth (75 %) self-identified as straight, 3.1 % as lesbian/gay, 11.1 % as bisexual, and 10.8 % indicated other/questioning. A little over half (54.6 %) of the youth self-identified as non-Hispanic White, 13.9 % as non-Hispanic Black, 19.1 % as Hispanic, 5.0 % as Asian, 1.4 % as American Indian/Alaska Native, Native Hawaiian/Pacific Islanders (AI/AN NH/PI), and 6 % with another racial identity.

## 2.3. Variables

### 2.3.1. Outcome variables

Three outcome variables examined in this study included suicidal ideation, suicide plan, and suicide attempts, each measured as a binary variable. Suicidal ideation was measured based on response to the question, "During the past 12 months, did you ever seriously consider attempting suicide?" Youth who answered "yes" were coded as 1, whereas youth who answered "no" were coded as 0. Suicide plan was measured based on response to the question, "During the past 12 months, did you make a plan about how you would attempt suicide?" Youth who answered "yes" were coded as 1, whereas youth who answered "no" were coded as 0. Suicide attempts was measured based on response to the question, "During the past 12 months, how many times did you actually attempt suicide?" Youth who attempted suicide at least once during the past 12 months were coded as 1, whereas youth who did not attempt suicide during the past 12 months were coded as 0.

### 2.3.2. Explanatory variable

The main explanatory variable investigated in this study was homelessness and was measured as a binary variable based on response to the question, "During the past 30 days, where did you usually sleep?" with the following response options, "In my parent's or guardian's home," "In the home of a friend, family member, or other person because I had to leave my home or my parent or guardian cannot afford housing," "In a shelter or emergency housing," "In a motel or hotel," "In a car, park, campground, or other public place," "I do not have a usual place to sleep," and "Somewhere else." For the purposes of this study and following the recommendation of the CDC and other scholars (Cutuli et al., 2020; McKinnon et al., 2023; Smith-Grant et al., 2022), youth who indicated they usually sleep in their parent's or guardian's home were considered not to be homeless and were coded as 0, otherwise, they were considered to be homeless and were coded as 1.

### 2.3.3. Covariates STBs

Feeling sad or hopeless was also included in this study as a covariate based on research demonstrating an association between symptoms of depression, hopelessness, and STBs (Baiden et al., 2020a, Baiden et al., 2020b; Pharris et al., 2023; Yang, 2023). Feeling sad or hopeless was measured based on the question, "During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?" Youth who answered "yes" were coded as 1, whereas those who answered "no" were coded as 0.

### 2.3.4. Demographic characteristics

Age, sex, sexual identity, and race/ethnicity were also included as demographic characteristics. Age was measured in years, whereas sex was coded as a binary variable with male as the reference category. Sexual identity was measured as a nominal variable and coded into: "Straight," "Lesbian/gay," "Bisexual," and "Other/Questioning," with "Straight" as the reference category. Race/ethnicity was coded as a nominal variable into the following categories: "Non-Hispanic White," "Non-Hispanic Black," "Hispanic," "Asian," "American Indian/Alaska Native, Native Hawaiian/Pacific Islanders (AI/AN NH/PI)," and "Other race/ethnicity." Youth who self-identified as non-Hispanic Whites were considered as the reference category.

## 2.4. Data analyses

Data were analyzed using descriptive, bivariate, and multivariable analytic techniques. First, the general distribution of all the variables included in the analysis was examined using percentages. To address hypotheses 1 and 2, we used unadjusted binary logistic regression to examine the bivariate association between demographic characteristics and the odds of experiencing homelessness. For hypothesis 3, we employed multivariable binary logistic regression to examine the cross-sectional association between homelessness and STBs while controlling for demographic characteristics and feeling sad or hopeless. Odds ratios (ORs) and adjusted odds ratios (AORs) are reported together with their 95 % Confidence Intervals (CI). To control for familywise error and minimize the likelihood of increasing Type I error, Bonferroni-Holm correction for multiple comparisons (Holm, 1979) was applied by dividing the  $p$ -value by the number of tests (i.e., 3),  $0.05/3 = 0.017$ . Variables were considered significant if the  $p$ -value was less than 0.017. Stata's "svyset" command was used to account for the weighting and complexity of the cluster sampling design employed by the YRBS. All analyses were performed using STATA 17 MP (Stata Corp., College Station, Texas, USA).

## 3. Results

### 3.1. Sample characteristics

Table 1 below shows the general distribution of the study variables. Of the 17,033 youth examined, 3 % experienced homelessness, 21.3 % experienced suicidal ideation, 17.3 % made a suicide plan, and 10.9 % attempted suicide during the past 12 months. About four in ten youth (39.8 %) reported feeling sad or hopeless almost every day for two weeks or more in a row that they stopped doing some usual activities.

### 3.2. Bivariate association between demographic characteristics and odds of experiencing homelessness

Table 2 shows the results of the bivariate association between demographic characteristics and the odds of experiencing homelessness. We found that each additional year increase in age was associated with 1.30 times higher odds of experiencing homelessness ( $OR=1.30$ ,  $p=.001$ ). Compared to youth who self-identified as straight, youth who self-identified as bisexual ( $OR=1.98$ ,  $p=.001$ ) or other/questioning

**Table 1**  
Sample characteristics (imputed  $n = 17,033$ ).

| Variables                       | Frequency (Weighted%) |
|---------------------------------|-----------------------|
| <b>Outcome variables</b>        |                       |
| Suicidal ideation               |                       |
| No                              | 13,398 (78.7)         |
| Yes                             | 3635 (21.3)           |
| Suicide plan                    |                       |
| No                              | 14,089 (82.7)         |
| Yes                             | 2944 (17.3)           |
| Suicide attempt                 |                       |
| No                              | 15,170 (89.1)         |
| Yes                             | 1863 (10.9)           |
| <b>Explanatory variable</b>     |                       |
| Experienced homelessness        |                       |
| No                              | 16,524 (97.0)         |
| Yes                             | 509 (3.0)             |
| <b>Demographic variables</b>    |                       |
| Age                             |                       |
| 14 years                        | 3403 (20.0)           |
| 15 years                        | 4427 (26.0)           |
| 16 years                        | 4276 (25.1)           |
| 17 years                        | 3904 (22.9)           |
| 18 years                        | 1023 (6.0)            |
| Sex                             |                       |
| Male                            | 8802 (51.7)           |
| Female                          | 8231 (48.3)           |
| Sexual identity                 |                       |
| Straight                        | 12,773 (75.0)         |
| Lesbian/gay                     | 530 (3.1)             |
| Bisexual                        | 1895 (11.1)           |
| Other/questioning               | 1835 (10.8)           |
| Race/ethnicity                  |                       |
| Non-Hispanic White              | 9305 (54.6)           |
| Non-Hispanic Black              | 2361 (13.9)           |
| Hispanic                        | 3258 (19.1)           |
| Asian                           | 860 (5.0)             |
| Native American/American Indian | 236 (1.4)             |
| Other race/ethnicity            | 1013 (6.0)            |
| <b>Covariate</b>                |                       |
| Feeling sad or hopeless         |                       |
| No                              | 10,255 (60.2)         |
| Yes                             | 6778 (39.8)           |

**Table 2**  
Bivariate association between demographic factors and youth experiencing homelessness ((imputed  $n = 17,033$ )).

| Variables  | OR (95 % C.I.)   | p-value |
|--|------------------|---------|
| Age in years                                     | 1.30 (1.12–1.51) | .001    |
| Sex (Male)                                       |                  |         |
| Female   | 0.86 (0.65–1.13) | .266    |
| Sexual identity (Straight)                       |                  |         |
| Lesbian/gay                                      | 2.09 (1.13–3.87) | .020    |
| Bisexual   | 1.98 (1.33–2.94) | .001    |
| Other/questioning                                | 1.91 (1.29–2.82) | .002    |
| Race/ethnicity (Non-Hispanic White)              |                  |         |
| Non-Hispanic Black                               | 2.56 (1.72–3.82) | <.001   |
| Hispanic   | 1.02 (0.66–1.57) | .921    |
| Asian  | 0.38 (0.15–0.96) | .041    |
| American Indian/Native Hawaiian/Pacific Islander | 4.40 (2.06–9.39) | <.001   |
| Other  | 1.38 (0.79–2.42) | .249    |

Note: Reference category is indicated in parenthesis. OR indicates odds ratio.

( $OR=1.91, p=.002$ ) were more likely to experience homelessness. The odds of experiencing homelessness were 4.40 times higher for youth who self-identified as AI/AN NH/PI ( $OR=4.40, p<.001$ ) and 2.56 times higher for youth who self-identified as non-Hispanic Black ( $OR=2.56, p<.001$ ) both when compared to their counterparts who self-identified as non-Hispanic Whites. Sex was not significantly associated with the odds of experiencing homelessness.

### 3.3. Unadjusted logistic regression results examining the association between study variables and STBs

Table 3 shows the unadjusted logistic regression results of the association between each variable and STBs. In the unadjusted model, compared to youth who had not experienced homelessness, YEH had 2.73 times higher odds of reporting suicidal ideation ( $OR=2.73, p<.001$ ), 2.81 times higher odds of making a suicide plan ( $OR=2.81, p<.001$ ), and 4.88 times higher odds of making a suicide attempt ( $OR=4.88, p<.001$ ).

### 3.4. Multivariable binary logistic regression

Table 4 shows the multivariable logistic regression results examining the cross-sectional association between YEH and STBs. Controlling for demographic characteristics and feeling sad or hopeless, YEH was associated with 2.48 times higher odds of experiencing suicidal ideation ( $AOR=2.48, p<.001$ ), 2.46 times higher odds of making a suicide plan ( $AOR=2.46, p<.001$ ), and 4.38 times higher odds of making a suicide attempt ( $AOR=4.38, p<.001$ ). Each additional year increase in age was associated with 11 % lower odds of attempting suicide ( $AOR=0.89, p<.001$ ). Sex was not significantly associated with any of the three STBs. However, youth who self-identified as sexual minorities had more than doubled the odds of experiencing all three STBs when compared to their counterparts who self-identified as straight. Compared to youth who self-identified as non-Hispanic Whites, youth who self-identified as Hispanic ( $AOR=0.83, p=.003$ ) or Asian ( $AOR=0.79, p=.012$ ) had lower odds of experiencing suicidal ideation. Youth who self-identified as non-Hispanic Black had 1.73 times higher odds of making a suicide attempt when compared to their non-Hispanic White counterparts ( $AOR=1.73, p<.001$ ). Controlling for YEH and demographic characteristics, youth who felt sad or hopeless had 12.8 times higher odds of experiencing suicidal ideation ( $AOR=12.80, p<.001$ ), 10.35 times higher odds of making a suicide plan ( $AOR=10.35, p<.001$ ), and 8.35 times higher odds of making a suicide attempt ( $AOR=8.35, p<.001$ ).

## 4. Discussion

Drawing on data from a large, nationally representative sample of youth in the U.S., the objectives of this study were to investigate: 1) the prevalence of YEH and STBs, 2) the association between demographic characteristics and YEH, and 3) the cross-sectional association between YEH and STBs after controlling for demographic characteristics and feeling sad or hopeless. We found that 21.3 % of youth experienced suicidal ideation, 17.3 % made a suicide plan, and 10.9 % attempted suicide during the past 12 months. We also found that 3 % of youth reported experiencing homelessness during the past 30 days. The proportion of YEH reported in this study is roughly consistent with the 4 % found in some past studies of youth ages 13–17 (Cutuli et al., 2020; McKinnon et al., 2023), but at the same time lower than the 6 % found in other studies (Smith-Grant et al., 2022). The 30-day prevalence of YEH found in this study may be underestimated as various studies have found that estimating the prevalence of YEH is more challenging and fraught with methodological constraints (Edidin et al., 2012; Farmer et al., 2021). Unlike adults experiencing homelessness, YEH are less likely to access homeless services, less likely to identify as homeless when asked, and more likely to resist being found to be homeless (Cutuli et al., 2020; Morton et al., 2018; Narendorf et al., 2016).

The finding that youth who self-identified as bisexual or other/questioning were almost two times more likely to experience homelessness partly supports our first hypothesis and corroborates past research that has documented the overrepresentation of LGBTQ+ youth among YEH population (Coolhart and Brown, 2017; Côté et al., 2024; Cutuli et al., 2020; DeChants et al., 2022; Dolamore and Naylor, 2018; Robinson, 2018; Rosario et al., 2012a, 2012b; Saewyc et al., 2021). Cutuli et al. (2020) examined the association between youth

**Table 3**  
Unadjusted logistic regression results examining the association between study variables and suicidal thoughts and behaviors (imputed  $n = 17,033$ ).

| Variables                           | Suicidal ideation   |         | Suicide plan        |         | Suicide attempt    |         |
|-------------------------------------|---------------------|---------|---------------------|---------|--------------------|---------|
|                                     | OR (95 % C.I.)      | p-value | OR (95 % C.I.)      | p-value | OR (95 % C.I.)     | p-value |
| Experienced homelessness (No)       |                     |         |                     |         |                    |         |
| Yes                                 | 2.73 (2.14–3.48)    | <0.001  | 2.81 (2.01–3.91)    | <0.001  | 4.88 (3.49–6.82)   | <0.001  |
| <b>Demographic variables</b>        |                     |         |                     |         |                    |         |
| Age in years                        | 1.00 (0.95–1.05)    | .917    | 0.97 (0.91–1.03)    | .343    | 0.93 (0.88–0.99)   | .017    |
| Sex (Male)                          |                     |         |                     |         |                    |         |
| Female                              | 2.58 (2.33–2.85)    | <0.001  | 2.34 (2.14–2.57)    | <0.001  | 2.15 (1.77–2.61)   | <0.001  |
| Sexual identity (Straight)          |                     |         |                     |         |                    |         |
| Lesbian/gay                         | 3.83 (2.92–5.028)   | <0.001  | 3.82 (2.88–5.06)    | <0.001  | 3.19 (2.27–4.49)   | <0.001  |
| Bisexual                            | 5.67 (4.81–6.69)    | <0.001  | 5.09 (4.37–5.94)    | <0.001  | 4.91 (3.97–6.08)   | <0.001  |
| Other/questioning                   | 3.14 (2.63–3.74)    | <0.001  | 3.06 (2.57–3.65)    | <0.001  | 3.08 (2.39–3.96)   | <0.001  |
| Race/ethnicity (Non-Hispanic White) |                     |         |                     |         |                    |         |
| Non-Hispanic Black                  | 0.94 (0.75–1.20)    | .632    | 1.06 (0.85–1.34)    | .588    | 1.61 (1.20–2.17)   | .002    |
| Hispanic                            | 0.96 (0.84–1.09)    | .512    | 1.13 (0.96–1.32)    | .132    | 1.18 (0.93–1.49)   | .164    |
| Asian                               | 0.73 (0.60–0.89)    | .003    | 1.00 (0.74–1.36)    | .996    | 0.71 (0.47–1.07)   | .096    |
| Native American/American Indian     | 1.11 (0.75–1.64)    | .591    | 1.43 (0.95–2.14)    | .083    | 1.51 (0.91–2.50)   | .105    |
| Other race/ethnicity                | 1.09 (0.88–1.34)    | .418    | 1.26 (0.99–1.60)    | .055    | 1.34 (0.96–1.88)   | .085    |
| <b>Covariate</b>                    |                     |         |                     |         |                    |         |
| Feeling sad or hopeless (No)        |                     |         |                     |         |                    |         |
| Yes                                 | 15.64 (13.56–18.03) | <0.001  | 12.59 (10.38–15.26) | <0.001  | 10.04 (7.01–14.38) | <0.001  |

Note: Reference category is indicated in parenthesis.  
OR = Odds Ratio.

**Table 4**  
Multivariable logistic regression results examining the association between youth experiencing homelessness and suicidal thoughts and behaviors (imputed  $n = 17,033$ ).

| Variables                           | Suicidal ideation   |         | Suicide plan       |         | Suicide attempt   |         |
|-------------------------------------|---------------------|---------|--------------------|---------|-------------------|---------|
|                                     | AOR (95 % C.I.)     | p-value | AOR (95 % C.I.)    | p-value | AOR (95 % C.I.)   | p-value |
| Experienced homelessness (No)       |                     |         |                    |         |                   |         |
| Yes                                 | 2.48 (1.87–3.30)    | <0.001  | 2.46 (1.76–3.43)   | <0.001  | 4.38 (3.04–6.31)  | <0.001  |
| <b>Demographic variables</b>        |                     |         |                    |         |                   |         |
| Age in years                        | 0.97 (0.92–1.02)    | .208    | 0.93 (0.87–1.00)   | .046    | 0.89 (0.84–0.94)  | <0.001  |
| Sex (Male)                          |                     |         |                    |         |                   |         |
| Female                              | 1.15 (0.99–1.33)    | .059    | 1.05 (0.92–1.20)   | .433    | 0.97 (0.79–1.21)  | .805    |
| Sexual identity (Straight)          |                     |         |                    |         |                   |         |
| Lesbian/gay                         | 2.45 (1.78–3.37)    | <0.001  | 2.47 (1.82–3.35)   | <0.001  | 2.01 (1.40–2.89)  | <0.001  |
| Bisexual                            | 3.11 (2.63–3.67)    | <0.001  | 2.83 (2.39–3.35)   | <0.001  | 2.84 (2.30–3.52)  | <0.001  |
| Other/questioning                   | 2.14 (1.75–2.60)    | <0.001  | 2.07 (1.69–2.53)   | <0.001  | 2.08 (1.60–2.72)  | <0.001  |
| Race/ethnicity (Non-Hispanic White) |                     |         |                    |         |                   |         |
| Non-Hispanic Black                  | 0.95 (0.76–1.19)    | .646    | 1.11 (0.90–1.36)   | .329    | 1.73 (1.30–2.30)  | <0.001  |
| Hispanic                            | 0.83 (0.73–0.93)    | .003    | 1.04 (0.87–1.25)   | .623    | 1.11 (0.89–1.38)  | .339    |
| Asian                               | 0.79 (0.65–0.95)    | .012    | 1.16 (0.87–1.56)   | .306    | 0.77 (0.53–1.12)  | .172    |
| Native American/American Indian     | 1.19 (0.72–1.95)    | .496    | 1.61 (1.05–2.49)   | .031    | 1.56 (0.94–2.58)  | .084    |
| Other race/ethnicity                | 0.78 (0.61–0.99)    | .042    | 0.97 (0.74–1.28)   | .848    | 1.06 (0.75–1.49)  | .753    |
| <b>Covariate</b>                    |                     |         |                    |         |                   |         |
| Feeling sad or hopeless (No)        |                     |         |                    |         |                   |         |
| Yes                                 | 12.80 (11.06–14.83) | <0.001  | 10.35 (8.48–12.64) | <0.001  | 8.35 (5.82–11.97) | <0.001  |

Note: Reference category is indicated in parenthesis.  
AOR = Adjusted Odds Ratio.

homelessness and poor functioning among youth from eight U.S. states and found that LGBTQ+ youth were 143 % more likely to experience homelessness when compared to their counterparts who self-identified as straights. Rejection from family members has consistently been identified as the driving factor for youth who identify as LGBTQ+ choosing or being forced to leave their family home (Bruce et al., 2014; DeChants et al., 2022; Robinson, 2018). Compared to their counterparts who self-identified as straight, LGBTQ+ youth are more likely to be kicked out of home and become homeless at a younger age (Ecker, 2016; Saewyc et al., 2021). In their study, Rosario et al. (2012b) found that among YEH, one in three LGBTQ+ youth left home because of parental disapproval of their sexuality. Other scholars have attributed the overrepresentation of LGBTQ+ youth among YEH to physical or sexual abuse at home (DeChants et al., 2022; Ecker, 2016).

The finding that youth who self-identified as non-Hispanic Black or AI/NH/PI were more likely to experience homelessness supports our

second hypothesis. The legacy of redlining practices of systematically segregating Blacks into poorer areas of cities while divesting from their communities, history of foster care agents taking Black children from their parents, systemic racism, and educational challenges confronting Black youth have been cited as some of the reasons that accounts for the overrepresentation of Black youth among the homeless youth population in the U.S. (Edwards, 2020). For instance, using data from a prospective study cohort of urban African-American first graders from the Woodlawn Community Area of Chicago, Fothergill et al. (2012) examined the relationship between homelessness and prior structural, family, school, and behavioral influences. The authors found that lower school bonds, depressed mood, violent behavior, and running away before age 15 strongly predicted homelessness in young adulthood for both males and females.

Our third hypothesis was supported in that, controlling for demographic characteristics and risk factors, YEH was associated with

2.48 times higher odds of experiencing suicidal ideation, 2.46 times higher odds of making a suicide plan, and 4.38 times higher odds of making a suicide attempt. The importance of understanding the association between YEH and STBs cannot be overemphasized. Several factors have been cited in trying to understand the link between homelessness and STBs, including feelings of hopelessness, negative coping, poor mental health, stigma, and victimization (Flach and Razza, 2022; Gauvin et al., 2019; Kidd et al., 2017; Kidd and Carroll, 2007). First, some scholars have noted that feelings of hopelessness and negative coping strategies among individuals experiencing homelessness could help explain the link between homelessness and STBs (Cleverley and Kidd, 2011). A narrative review conducted by Toolis and Hammack (2015) found that feelings of alienation, hopelessness, helplessness, and lack of social support were associated with suicidality among youth experiencing homelessness, irrespective of gender. Given the established link between lack of social support and STBs (Baiden and Fuller-Thomson, 2016; Forster et al., 2020; Fulginiti et al., 2022) and perceived feelings of hopelessness and STBs (Bailey et al., 2023; Elledge et al., 2021; Wolfe et al., 2019), it is possible that YEH who also lack adequate social support may experience feelings of hopelessness, and consequently, engage in suicidal behaviors. Indeed, *perceived burdensomeness*, which is the idea that one's existence is a burden to family, friends, and society, and *thwarted belongingness*, which refers to the feeling that one is alienated from others and not an integral part of a family, circle of friends, or other valued group (Joiner, 2005) are two psychological states found to be predictors of STBs among youth (Hill et al., 2019; Van Wyk, 2022; Vélez-Grau et al., 2023). In the present study, we controlled for feelings of sadness or hopelessness and found that controlling for other factors, youth who reported feeling sad or hopeless were between 8 and 12 times more likely to report suicidal ideation, make a suicide plan, or make a suicide attempt.

Second, the extant literature suggests that mental health problems pose a significant risk to youth experiencing homelessness, with some studies indicating that YEH have twice the rate of mental health diagnoses (Barr et al., 2017; Kidd et al., 2017). Given the barriers to accessing mental health services among the homeless population (Morisseau-Guillot et al., 2020), mental health problems are more likely to go untreated, which in itself may increase the risk of STBs (Barrett et al., 2018). Furthermore, Kidd et al. (2017) examined data from the 2015 National Canadian Homeless Youth Survey and found that early age at first episode of homelessness was significantly associated with early onset of mental health symptoms, substance use, and suicide attempts. One important question that warrants attention is whether homelessness precedes mental health and STBs or vice versa. Whereas the cross-sectional nature of our data precludes us from answering this question, we believe that understanding the association between YEH and STBs is an important first step toward the development of interventions aimed at reducing STBs among youth.

Third, the findings of this study should be interpreted within the context of the impact of COVID-19 pandemic on housing, homelessness, and mental health services. The economic crises brought about by the pandemic drastically deepened existing inequities in income with low-wage workers, racial/ethnic minorities, women, and single parents with children bearing the greatest brunt (Bovell-Ammon et al., 2023; LaBrenz et al., 2021; Onyeaka et al., 2022; Parenteau et al., 2023). Various studies have found that the rates of mental health problems including STBs among youth increased significantly during the pandemic compared to pre-pandemic levels (Bridge et al., 2023; Ehlman et al., 2022; Fushimi, 2023; Hill et al., 2021), with some estimates suggesting weekly emergency department visit for suspected suicide attempts between February to March 2021 among youth aged 12–17 years in the U.S. were 50.6 % higher compared with the same period in 2019 (Yard et al., 2021). What is instructive to note is that the rates and impact of mental health during the COVID-19 pandemic were not evenly distributed across all income levels, with higher levels of depressive symptoms significantly affecting individuals from low-income

households and racial/ethnic minority youth (Bray et al., 2021; Bridge et al., 2023; Mitchell and Li, 2021).

Research indicates that in addition to being at increased risk of contracting COVID-19 due to their lack of safe housing (Farnish and Schoenfeld, 2022), individuals experiencing homelessness are also more likely to develop severe symptoms if they are infected with the virus due to higher rates of comorbidities such as obesity, asthma, and other respiratory conditions among this population (Fournier et al., 2009; Rosa Solorio et al., 2006; Sakai-Bizmark et al., 2019). YEH also face barriers to social inclusion, and often have limited social networks and supports (Thulien et al., 2021). These individuals are also less likely to have access to health insurance (Harpin et al., 2017), or lack mental healthcare even for those with health insurance (Narendorf, 2017), meaning that they may not have the necessary mental health counselling services particularly when in crises or experiencing STBs. Other studies have found that during COVID-19 pandemic, individuals experiencing homelessness were particularly vulnerable to worsening mental health and exhibiting high rates of comorbid mental health disorders and substance use (Fuchs et al., 2021; Parenteau et al., 2023). Tucker et al. (2020) examined the impact of COVID-19 pandemic on recently homeless youth and young adults and found that about one in two respondents reported experiencing poor mental health such as loneliness, anxiety, depression, hopelessness, and sleep problems during the past week, with 16–28 % reporting an increased use of alcohol, tobacco, and marijuana since the onset of the pandemic. Noble et al. (2022) explored the lived experiences of youth living in emergency shelters in Toronto, Canada, during the COVID-19 pandemic and found that the COVID-19 pandemic increased distress among YEH while also limiting access to mental health services.

#### 4.1. Study implications

The findings of this study build upon past literature on the identification of youth who are at risk for engaging in STBs. Gaining insight from the association between YEH and STBs is an important contribution of the present study. In addition, the findings of the present study indicate that youth who self-identified as bisexual, or other/questioning, and those who self-identified as non-Hispanic Blacks or AI/NH/PI were more likely to experience homelessness. There is a need to develop homeless service interventions that take into account the unique needs of sexual minority and racial/ethnic minority youth. Moreover, interventions geared towards sexual and racial/ethnic minority YEH should screen for suicidality, given the findings that youth who self-identified as sexual minorities, non-Hispanic Blacks, and Hispanics were more likely to make suicide attempts. School administrators may leverage these findings in the development of initiatives to reduce suicide risks, including training teachers to recognize warning signs and refer out for additional support, and creating safe spaces to discuss both risk factors (e.g., YEH) and protective factors of suicide. Mental health counselors and social workers can play important roles in preventing STBs among YEH by regularly screening for STBs and identifying youth who might be at risk of experiencing homelessness. Youth with a history of suicidal ideation or suicide attempts should always be taken seriously and referred for appropriate counseling and intervention in a timely manner.

In parallel, findings from our study highlight disparities in risk of STBs by sexual identity and race/ethnicity. Discrimination, stigma, and exposure to exclusionary policies have been linked to worse mental health outcomes for LGBTQ+ youth (Wolff et al., 2016) and racial/ethnic minority youth (Metzger et al., 2023). Therefore, it is important for school personnel and other professionals that interact with youth should ensure that they are providing environments that are LGBTQ-affirming and anti-racist. This can help to build rapport and show support for youth, particularly before addressing sensitive topics such as homelessness or mental health concerns.

#### 4.2. Limitations

This study has some limitations that are worth noting. First, the use of cross-sectional data prevents us from making any causal inferences between YEH and suicidal behaviors. YEH was measured in reference to the past 30 days, whereas STBs were measured in reference to the past 12 months. Thus, it is possible that some youth may have experienced STBs before they experienced homelessness. Also, given the transient nature of YEH, we were unable to assess how long youth might have been homeless. Hence, only association can be inferred. Future studies that employ longitudinal designs might offer additional insight into the temporal association between YEH and STBs. Second, the use of secondary data limits our ability to examine other theoretically relevant factors that are known to influence homelessness and STBs, such as household poverty, childhood physical abuse and neglect, time since homelessness, and mental health diagnosis. Future studies should take into account these theoretically important factors to understand the true association between YEH and STBs. Third, although nationally representative, data for this study is based on self-reports and may be subject to recall bias. However, the possibility of recall bias or false reporting was addressed in the YRBS by screening the data for responses that conflicted in logical terms (Mpofu et al., 2023). Lastly, the analysis was limited to youth who attended school and were present on the days of data collection. Hence, the findings of the current study cannot be generalizable to out-of-school youth, as research has documented high rates of absenteeism and school dropout among youth experiencing homelessness (Kull et al., 2019; Stargel and Easterbrooks, 2022). Also, data of youth ages 12 and 13 years had not been analyzed, thus limiting the generalizability of the findings.

#### 4.3. Conclusion

In conclusion, this study sought to investigate the prevalence of YEH and STBs, the association between demographic characteristics and YEH, and the cross-sectional association between YEH and STBs after controlling for demographic characteristics and feeling sad or hopeless. It should be noted that the findings of the present study are limited to youth currently attending school. The findings of the present study indicate that youth who self-identified as bisexual or other/questioning, and those who self-identified as non-Hispanic Blacks or AI/NH/PI were more likely to experience homelessness. Furthermore, YEH were more likely to experience suicidal ideation, make a suicide plan, and make a suicide attempt when compared to their stably housed counterparts. The findings of this study highlight the importance of identifying youth who are at risk of experiencing homelessness to ensure early interventions are put in place to prevent STBs. Moreover, targeted strategies are needed to address ongoing racial, ethnic, and LGBTQ+ disparities in homelessness and STBs.

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None to disclose.

#### CRedit authorship contribution statement

**Philip Baiden:** Conceptualization, Data curation, Formal analysis, Methodology, Writing – review & editing. **Catherine A. LaBrenz:** Writing – original draft, Writing – review & editing. **Marisa N. Broni:** Conceptualization, Writing – review & editing. **John F. Baiden:** Methodology, Writing – review & editing. **Omolola E. Adepoju:** Writing – original draft, Writing – review & editing.

#### Declaration of competing interest

The authors declare that they have no conflicts of interests with respect to the authorship and/or the publication of this paper.

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