

## ORIGINAL ARTICLE

# Suicidal thoughts and behaviors among gender and sexual minorities: Adults ages 25–44 show highest rates of past month suicidal thoughts

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## Abstract

**Introduction:** Sexual and gender minority (SGM) people are at increased risk for suicidal thoughts and behaviors relative to their cisgender heterosexual peers. However, most research in this area has focused on youth, limiting our understanding of suicide risk among SGM adults.

**Methods:** To address this gap in the literature, the present study examined suicidal thoughts and behaviors among SGM adults across different age groups using a sample of 10,620 US adults.

**Results:** Consistent with the literature on youth, SGM adults showed higher rates of suicidal thoughts and behaviors than cisgender heterosexual adults. When examining prevalence rates across various age groups, young adults (18–25) showed greater suicidal thoughts and behaviors relative to adults ages 45+. However, adults ages 25–44 actually showed the highest rate of past month suicidal thoughts compared to adults ages 18–25.

**Conclusion:** These findings suggest that suicide risk for SGM extends beyond youth and highlights the need for more research on middle-age SGM adults. Additional resources for SGM adults that are not only tailored toward youth and young adults are warranted.

## KEYWORDS

age, gender identity, risk, sexual orientation, suicide

## INTRODUCTION

Suicide is a major public health concern (Knox, 2014; Martínez-Alés et al., 2022) and the twelfth leading cause of mortality among people within the United States (Garnett et al., 2022). In the United States suicide

rates increased 35% between 2000 and 2018 (Hedegaard et al., 2018), with the largest increase occurring among men aged 45–64 (Martínez-Alés et al., 2022). Despite a decrease in suicide rates from 2018 to 2019 (Hedegaard et al., 2021; Stone et al., 2021), the first drop in decades (Stone et al., 2021), suicide rates again increased from

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2020 to 2021 (Curtin et al., 2022). There were disparities in suicide rates from 2020 to 2021, with some marginalized groups experiencing an increase in suicide rates (Kegler et al., 2022; Stone et al., 2023).

Sexual and gender minority (SGM) people are particularly high risk for suicide (Hottes et al., 2016), with approximately 60.2% endorsing suicidal thoughts over the past week (Rogers et al., 2020) and 20% attempting suicide in their lifetime (Hottes et al., 2016). The Minority Stress Theory (Meyer, 2003) is widely used to explain this risk, arguing that SGM people face unique stressors and experiences which contribute to suicide risk, with a recent study finding that those who experience greater minority stress are 12 times more likely to attempt suicide compared to SGM youth with no reported minority stress (Green et al., 2021). An examination of suicidal thoughts and behaviors among youth with oppressed sexual identities showed that sexual minority youth were more likely to report considering suicide, making a suicide plan, and attempting suicide compared to their heterosexual counterparts (Bauder & Starkey, 2023; Johns et al., 2020). A recent meta-analysis revealed that among SGM adolescents and young adults, certain minority stressors such as bias-based victimization, bullying, and negative family treatment are associated with suicidal thoughts and behaviors, suggesting that this population might have unique experiences that increase suicide risk (de Lange et al., 2022). Importantly, this growing body of literature has primarily focused on youth and young adults, with few studies examining suicide risk among SGM adults ages 25+. This is a significant gap in the literature, as an estimated 2.6%–10.5% of adults ages 25+ identify as a SGM (Jones, 2022) and the few studies in this area suggest that this suicide risk likely persists into later adulthood (Hottes et al., 2016; Oi & Wilkinson, 2018). Recognizing this critical gap in the literature, Hottes et al. (2016) conducted a meta-analysis that specifically excluded studies that were restricted to youth or adolescents. This study demonstrated that SGM adults have higher rates of suicide attempts (11%–20%) relative to heterosexual adults (4%). Due to missing data, however, the authors were unfortunately unable to include age in their multivariate models; nonetheless, there was no significant correlation between age (assessed continuously) and suicide attempts, potentially suggesting that the significant suicide risk observed in youth/young adults persists throughout the lifespan. Other emerging studies are mixed, with one finding no significant impact of age on suicidal thoughts and behavior among SGM adults (Pate et al., 2023), with another finding that younger age cohorts had greater suicide risk than SGM in older age cohorts (Meyer et al., 2021). Other work in

this area has found that SGM adults who do not experience same sex encounters until adulthood have slower declines in suicidal thoughts than those who have same sex encounters in adolescence (Oi & Wilkinson, 2018). Thus, suicide risk for SGM people likely persists into adulthood, and this risk may be influenced by experiences earlier in life (Oi & Wilkinson, 2018). The current study adds to this sparse literature by utilizing a large sample that approximates the US census demographic distributions and by directly comparing young adults to other age groups.

Importantly, among people with SGM identities, some subgroups are particularly high risk for suicide. Among the highest risk groups are transgender youth with estimates of 82%–86% endorsing suicidal thoughts within the past 6 months and 56% engaging in suicidal behavior within their lifetime (Austin et al., 2022; James et al., 2016). These rates of suicidal behavior are almost *nine* times greater than the general population of US adults (Nock & Kessler, 2006). Concerning non-suicidal self-injury, both transgender and bisexual people are at greatest risk (Liu et al., 2019). Additionally, a meta-analysis that included primarily adult samples, demonstrated that 55% of transgender participants showed suicidal ideation and 20% attempted suicide in their lifetime, further supporting the notion that suicide risk in this population likely persists into adulthood. However, no study has examined age differences in suicide risk among the transgender population. This population remains heterogenous even with shared identity-based experiences, thus, an updated picture of suicide risk among this particularly vulnerable and continually expanding population is needed.

The present study aims to expand the current knowledge of suicide risk among SGM people by examining the difference in risk across age groups within a large sample. To address these critical gaps in the literature, the present study examined (1) the prevalence of lifetime and past month suicidal thoughts and behaviors among SGM adults relative to cisgender heterosexual adults; (2) whether there are age differences in suicide risk among SGM participants; and (3) prevalence rates of suicidal thoughts and behaviors among gender minority (i.e., transgender or gender-nonconforming) adults. Based on prior studies (Bouris et al., 2016; Hottes et al., 2016), we hypothesized that SGM adults would show greater rates of lifetime and past month suicidal thoughts and behaviors compared to cisgender heterosexual adults. Given research showing that this risk persists into adulthood (Ream, 2019), we hypothesized that SGM adults 25 years and older will experience heightened suicide risk similar to that observed in young adults ages 18–25. As most studies to date have compared SGM people to cisgender heterosexual peers, and no study has examined age

differences in suicide risk within SGM adults, we do not make specific directional hypotheses about specific age categories.

## METHODS

### Participants and procedures

Participants included 10,620 US adults recruited using Qualtrics Panels, a survey company that includes a list of several million adults who have volunteered to participate in research. Quota sampling methods were used to recruit a sample that approximates the 2010 US census demographic distributions ( $\pm 10\%$ ). Data were collected online in March and April of 2020. This study was reviewed and approved by the Institutional Review Board at The University of Utah. Several data integrity strategies were implemented, including only allowing respondents from one I.P. address, utilizing Captcha images to limit bot responses, utilizing a “soft launch” to assess for errors in survey design, eliminating survey responses completed in under 4 min, and including reverse-scored items to identify straight-line responding.

### Measures

#### Age

Age was collected and recoded to align with the National Institute of Health's data reporting for suicide rates among US adults (Garnett et al., 2022). Specifically, participants were classified into the following age categories: 18–24, 25–44, 45–64, and 65+ and age was examined as a categorical variable.

#### Sexual orientation and gender identity

Sexual orientation and gender identity were assessed with the following item: “Do you think of yourself as:” which participants could select one of the following responses: Straight; Gay or Lesbian; Bisexual; or Transgender, transsexual, or gender non-conforming. Participants who selected Transgender, transsexual, or gender non-conforming could then select from the following options: male to female, female to male, or gender non-conforming. In a separate item, participants were asked, “How do you describe yourself?” and were able to select from the following responses: Male, Female, Transgender, or Do not identify as male, female, or transgender. Therefore, participants could show

transgender status across two survey items. Participants were coded as transgender or a sexual minority if they selected any of the above items that do not correspond to being cisgender or heterosexual. As one item included transgender as an option listed with straight, gay or lesbian, and bisexual, we are unable to classify participants separately as being a gender and/or sexual minority due to some transgender participants selecting their gender identifier on the sexual orientation item. Therefore, these categories were collapsed into one group for the major study analyses, representing all participants who showed any item indicating that they are not cisgender and heterosexual. However, gender minority participant demographics were able to be examined by including all participants who showed transgender identity on either the sexual orientation or gender identity item.

### Self-injurious thoughts and behaviors interview – revised (SITBI-R)

We used the self-report version of the SITBI-R to assess lifetime and past month suicidal thoughts and behaviors (Fox et al., 2020). For suicidal thoughts, participants were presented a multiple select question, assessing if they have ever experienced any of following eight thoughts; (1) *I wish I could disappear or not exist*, (2) *I wish I could go to sleep and never wake up*, (3), *My life is not worth living*, (4) *I wish I was never born*, (5) *I wish I were dead*, (6) *Maybe I should kill myself*, (7) *I should kill myself*, and (8) *I am going to kill myself*. Participants could show as many of the thoughts as they had experienced in their lifetime. Participants who showed any of the above items were classified as having lifetime suicidal thoughts. For each thought showed, participants were asked a follow-up question about when they most recently had that specific thought. Response options included *more than one year ago*, *within the past year*, or *within the past month*. Any participant who showed experiencing any one of the above eight thoughts within the past month were identified as having past month suicidal thoughts. These data were then used to create a binary variable for past month suicidal thoughts.

Similarly, for suicidal behavior, participants were asked if they have engaged in any of the following: (1) *purposefully hurt yourself without wanting to die*, (2) *been very close to killing yourself, but at the last minute you decided not to do it before taking any action*, (3) *been very close to killing yourself but at the last minute, someone or something else stopped you before you took any action*, (4) *started to kill yourself and then you stopped after you had already taken some action*, (5) *started to kill yourself and then you decided to reach out for help after*

you had already taken some action, (6) tried to kill yourself and someone found you afterward and (7) tried to kill yourself and no one found you afterward. Consistent with prior studies and current definitions of suicide (Crosby et al., 2011), the current study used only items 4 through 7 to determine suicidal behavior. This item was multiple select, allowing participants to show as many options as they deem fit. Each showed behavior was followed up with a question to determine the recency of the behavior. Response options included *more than one year ago*, *within the past year*, or *within the past month*. These responses were then used to identify participants with past month suicidal behavior; any participant who showed any of the above behaviors (items 4–7) within the past month were considered as engaging in past month suicidal behavior. These data were then used to create a binary variable for past month and lifetime suicidal behavior. Of note, self-report administration of the SITBI-R has demonstrated strong validity and reliability (Fox et al., 2020).

## Data analyses

Data analyses were conducted with SPSS version 27. First, descriptive analyses were conducted on (1) all adults, (2) SGM adults, and (3) transgender adults for lifetime and past month suicidal thoughts and behavior. Then, chi-squared analyses were conducted to compare cisgender heterosexual and SGM participants on lifetime and past month suicidal thoughts and behaviors. Finally, chi-squared analyses were used to compare SGM participants ages 18–24 to other age groups (25–44, 45–64, and 64+) on lifetime and past month suicidal thoughts and behavior. Separate models were conducted to compare young adults (18–24) to each of the other age groups, such that three chi-squared tests were conducted each for lifetime suicidal ideation, lifetime suicide attempts, past month suicidal ideation, and past month suicide attempts. Bonferroni corrections were used to account for multiple comparisons. Given the large sample, we also used Cramer's *V* to examine the magnitude of these differences.

## RESULTS

### Participant characteristics

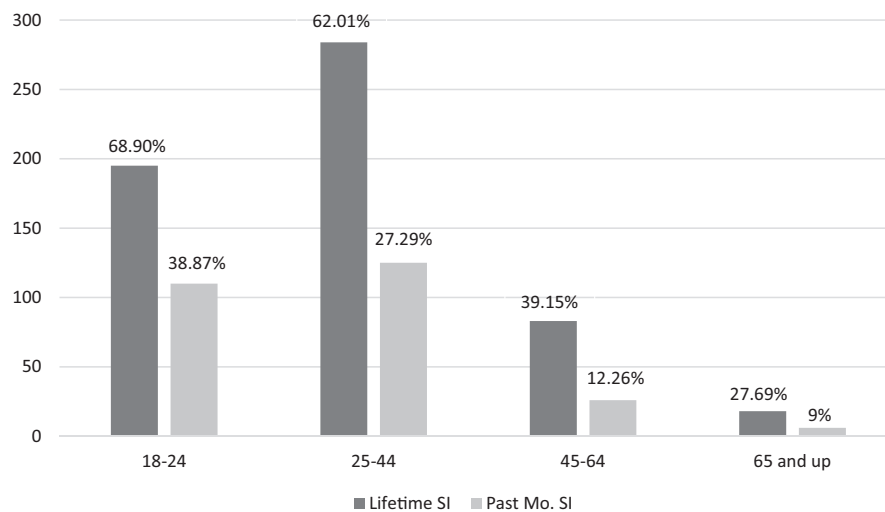
Full participant characteristics can be found in Table 1, and a bar chart of lifetime and past month suicidal ideation of SGM adults by age group can be found in Figure 1.

TABLE 1 Participant characteristics (*N* = 1018).

Participant characteristics	<i>n</i> (%)
Age	
18–24	283 (27.8)
25–44	458 (45.0)
45–64	212 (20.83)
65+	65 (6.39)
Sexual orientation	
Sexual minority	1018 (9.59)
Heterosexual	9602 (90.41)
Gender identity	
Gender minority	94 (0.89)
Cisgender	10,526 (99.11)
Ethnicity	
Hispanic or Latino	3715 (35.0)
Not Hispanic or Latino	6910 (65.0)
Race	
Caucasian or White	6577 (61.9)
African American or Black	1307 (12.3)
Asian	703 (6.6)
Native American or American Indian	398 (3.7)
Native Hawaiian or Pacific Islander	89 (0.8)
Relationship status	
Unmarried	2852 (26.8)
Unmarried, in a committed relationship	751 (7.1)
Unmarried, relationship, living together	1068 (10.1)
Married but not living together	193 (1.8)
Married and living together	5226 (49.2)
Widowed	338 (3.2)
Other	197 (1.9)
Education	
Some high school	422 (4.0)
GED	288 (2.7)
High school diploma	1980 (18.6)
Some college	2523 (23.7)
Associate's degree	1374 (12.9)
Bachelor's degree	2460 (23.2)
Graduate degree	1578 (14.9)

The mean age of participants was 46.10 years old with a range from 18 to 96 years old ( $\sigma = 16.87$ ). When grouped into NIH age categories, there were 283 adults ages 18–24 (27.8%), 458 adults ages 25–44 (45.0%), 212 adults ages 45–64 (20.83%), and 65 adults over age 65 (6.39%). Participants were mostly heterosexual ( $n = 9602$ , 90.41%) and cisgender ( $n = 10,526$ , 90.41%).

**FIGURE 1** Lifetime and past month suicidal ideation across age among SGM adults ( $n = 1018$ ).



**TABLE 2** Past month and lifetime suicidal thoughts and behavior chi-squared analyses.

Comparison group	Variable	$\chi^2$	$p$	Effect size
Sexual and gender minority	Lifetime SI	302.79	<0.001	0.17
	Lifetime SA	299.30	<0.005	0.17
	Past month SI	219.50	<0.001	0.14
	Past month SA	69.13	<0.05	0.14

Note: Cisgender heterosexual participants include all participants who did not show same-gender attraction and who did not identify as being a gender minority.

## Cisgender heterosexual versus SGM suicidal thoughts and behaviors

Results comparing rates of suicidal thoughts and behaviors among SGM and cisgender heterosexual adults can be found in [Table 2](#). SGM participants reported higher rates of lifetime suicidal thoughts ( $\chi^2(1) = 302.79$ ,  $p < 0.001$ ,  $df = 1$ ,  $V = 0.17$ ) and suicidal behavior ( $\chi^2(1) = 299.30$ ,  $p < 0.001$ ,  $df = 1$ ,  $V = 0.17$ ) compared to heterosexual cisgender adults. Specifically, SGM adults were two times more likely to report suicidal thoughts (57% vs. 30%) and 3.5 times more likely to report suicidal behavior (18% vs. 4.7%) compared to heterosexual cisgender adults within their lifetime. SGM adults also reported higher rates of past month suicidal thoughts ( $\chi^2(1) = 219.50$ ,  $p < 0.001$ ,  $df = 1$ ,  $V = 0.14$ ) and past month suicidal behavior ( $\chi^2(1) = 69.13$ ,  $p < 0.001$ ,  $df = 1$ ,  $V = 0.14$ ) compared to heterosexual cisgender adults. Specifically, SGM were 2.6 times more likely to report suicidal thoughts (26% vs. 10%) and four times more likely to report suicidal behavior (4% vs. 1%) within the past month compared to cisgender heterosexual adults.

## Age comparison among SGM adults

We compared young adults (18–24) to other age categories in separate models (i.e. 18–24 compared to 25–44; 18–24

compared to 45–64; 18–24 compared to 65+). Adults aged 25–44 had similar rates of lifetime suicidal thoughts ( $\chi^2 = 3.64$ ,  $p = 0.056$ ,  $df = 1$ ) and behavior ( $\chi^2 = 0.70$ ,  $p = 0.404$ ,  $df = 1$ ) as participants ages 18–24. However, adults ages 25–44 had *higher rates of past month* suicidal thoughts compared to young adults aged 18–24 ( $\chi^2 = 10.83$ ,  $p = 0.001$ ,  $df = 1$ ,  $V = 0.12$ ). There was no significant difference between the two groups on past month suicidal behavior ( $\chi^2 = 0.73$ ,  $p = 0.394$ ,  $df = 1$ ). In comparisons of young adults ages 18–24 to adults aged 45–64 and to adults aged 65+, young adults show higher rates of past month and lifetime suicidal thoughts and behaviors (see [Table 3](#)).

## Suicidal thoughts and behaviors among transgender adults

Only 94 (0.9%) transgender participants were captured in this study. Due to the low sample size, we are unable to examine age differences in suicidal thoughts and behaviors among transgender participants specifically. Nonetheless, we report descriptive data on prevalence given the limited research on transgender adults. Among transgender participants, 58.5% ( $n = 55$ ) showed suicidal thoughts and 26.6% ( $n = 25$ ) showed suicidal behavior over their lifetime. Further, 29.8% ( $n = 28$ ) showed past month suicidal thoughts and 4.3% ( $n = 4$ ) showed past month suicidal

Comparison group	Variable	$\chi^2$	<i>p</i>	Effect size
25–44 year olds	Lifetime SI	3.64	0.056	–
	Lifetime SA	0.70	0.404	–
	Past month SI	10.83	0.001	0.12
	Past month SA	0.73	0.394	–
45–64 year olds	Lifetime SI	43.58	<0.001	0.30
	Lifetime SA	23.37	<0.001	0.22
	Past month SI	43.06	<0.001	0.29
	Past month SA	6.59	<0.01	0.12
65+	Lifetime SI	37.81	<0.001	0.33
	Lifetime SA	8.51	<0.005	0.16
	Past month SI	20.90	<0.001	0.25
	Past month SA	4.10	<0.05	0.11

TABLE 3 Comparing adults aged 18–24 to adults of other age groups.

behavior. Comparatively, among cisgender participants, 32.4% ( $n=3413$ ) showed suicidal thoughts and 5.9% ( $n=619$ ) showed suicidal behavior over their lifetime. 11.8% ( $n=1238$ ) of cisgender participants showed past month suicidal thoughts and 1.2% ( $n=130$ ) showed suicidal behavior within the past month.

## DISCUSSION

Studies consistently show that SGM youth and young adults have an increased risk for suicide compared to cisgender and heterosexual peers (Hottes et al., 2016). However, much of this research (Bouris et al., 2016) has focused on youth/young adults and less is known about suicide risk across adulthood for SGM people, with only recent work beginning to examine the impact of age for this population (Meyer et al., 2021; Pate et al., 2023). The current study filled this gap by examining rates of suicidal thoughts and behaviors across various age groups of SGM U.S. adults from a large sample. Noteworthy findings include (1) all SGM participants showed higher rates of lifetime and past month suicidal thoughts and behaviors relative to cisgender heterosexual participants, and (2) adults ages 25–44 had *higher* rates of past month suicidal thoughts and similar rates of past month suicidal behavior compared to young adults (ages 18–24).

Consistent with prior studies, the current study found that, 57% of SGM participants showed suicidal thoughts and 18.4% showed suicidal behavior across their lifetime. These numbers are consistent with rates found in previous studies (Rogers et al., 2020), again supporting the notion that SGM are at increased risk for suicide. This suicide risk seems to persist into adulthood, as 26.6% of SGM participants showed suicidal thoughts within the past month. These findings suggest that SGM adults do

not only experience this risk within their lifetime, or only during adolescence/emerging adulthood. Rather, *over one in four* SGM adults face risk suicide risk within the *past month*, highlighting the importance of studying suicide risk across the lifespan of SGM people.

Coupled with these findings, the current study found that adults aged 25–44 showed the highest levels of past month suicidal thoughts, even higher than young adults (18–24). This finding is in contrast to previous work indicating higher risk than adults ages 34–21 and 52–59 (Meyer et al., 2021; Ream, 2019). Our results indicate the need for more research examining suicide rates among SGM adults 25+, as the risk of suicide might persist later into adulthood. With the majority of interventions and resources targeted to SGM youth and young adults (e.g., The Trevor Project), adults ages 25–44 likely do not have access to the targeted interventions or resources they might need. Importantly, SGM people experience unique stressors such as homophobia, transphobia, and targeted political discrimination well past adolescence and emerging adulthood (McNeil et al., 2017). Studies have shown that this discrimination is strongly associated with suicidal thoughts and behavior among transgender adults (McNeil et al., 2017), whereas quick access to interventions was found to be protective (McNeil et al., 2017; Trujillo et al., 2017). Research has shown that SGM-targeted interventions may be more acceptable and feasible to the SGM community (Drysdale et al., 2021); thus, resources for SGM youth are likely critical in helping these high-risk individuals access care. However, our findings underscore the importance of continued engagement with SGM people into adulthood, as this suicide risk persists across the lifespan and there are limited resources for SGM adults experiencing suicidal thoughts.

Importantly, data collected for the current study occurred during the COVID-19 pandemic. Prior to the

COVID-19 pandemic, SGM people faced significant adversity, with evidence that the pandemic exacerbated this adversity (Gibb et al., 2020). Thus, it is possible that our findings were impacted by the context of the COVID-19 pandemic. Another important contextual consideration is related to the cultural climate and discrimination experienced across generations of SGM adults over time. Specifically, the age group experiencing the highest levels of past month suicidal thoughts, adults ages 25–44, belong to a generation born after the height of the US AIDS epidemic (A timeline of HIV and AIDS, 2022). As such, this group of participants was exposed to deaths of gay men at an alarming rate (Gil et al., 2021; Hagai & Crosby, 2016; Klarman, 2012), a public health crisis that was overtly neglected for this population by government officials at the time. Thus, entering another epidemic, such as that of COVID-19, may have unique risks for this particular age group. Concurrent with COVID was a period of greatly heightened sociopolitical turmoil in the United States, where the rights of SGM people were threatened. Many SGM people felt very unsafe from 2016 to 2020, especially in late 2019/early 2020 when this survey occurred. Future work would benefit from exploring this possibility. Additionally, research by The Movement Advancement Project (2020) found that SGM people disproportionately lost employment during the COVID-19 pandemic and nearly 50% expressed severe concern with becoming ill in the workplace compared to <30% of heterosexual adults. This exposure also came with concerns surrounding affordable health care, with nearly 40% of SGM households reporting barriers to medical care during the pandemic (Farmer, 2021). Indeed, the pandemic had a significant impact on SGM people, who continue to face marked oppression and health disparities (Gil et al., 2021). Thus, although we did not explicitly include items about COVID exposure or the impact of COVID in our study, our findings may be another reflection of the unique negative impact the COVID-19 pandemic had on SGM adults. Replicating these findings now that the height of the pandemic has passed would lend further support to our findings.

The following additional limitations should be considered when interpreting our results. First, the present study had a cross-sectional design, negating the possibility of procuring predictive findings or making causal inferences (Sedgwick, 2014). Another set of limitations is related to our assessment of gender identity and sexual orientation. Recent work demonstrates that current assessment of SGM identity is limited by not allowing for fluidity in identity and a lack of clarity in which SGM dimensions are being assessed (Suen et al., 2020). In the present study, the first question assessing for sexual orientation also assessed for transgender identity, meaning that some participants may have only chosen to show

a minoritized gender identity (i.e., transgender or non-binary), with no information on their sexual identity. As a result, we were only able to group SGM into one category rather than looking at sexual minorities and gender minorities separately. It is likely that some participants identified differently than the response choices for both sexual orientation and gender identity, as the present study only included straight, lesbian or gay, or bisexual as responses. This leaves out a large variety of different identities, which may have underestimated the number of SGM people in the present sample. We also were unable to examine the different sexual and gender identities separately from one another, which could have been informative given studies that demonstrate certain groups, such as those who identify as bisexual, having a greater risk of suicidal thoughts and behaviors (Pompili et al., 2014; Salway et al., 2019). The present study utilized secondary data analysis from a larger study designed to examine gun ownership and suicide risk (see Bryan et al., 2022; Wastler et al., 2022). As such, assessment of gender identity and sexual orientation was not the primary focus at the time of data collection, and future studies will include a separate assessment of sexual orientation and gender identity. Finally, we did not collect data on the total number of past suicide attempts for participants, rather, we only collected data on if they had ever attempted suicide. It may be the case that number of attempts could vary based on age or sexual orientation, and including this information in the future could expand our knowledge of this high-risk group.

Despite these limitations, the present study provides further support for the notion that SGM adults are at greater lifetime and past month risk for suicidal thoughts and behaviors compared to cisgender heterosexual adults. Further, the present study adds to the literature, suggesting that this risk persists into adulthood, with adults aged 25–44 endorsing the highest rates of past month suicidal thoughts. This highlights the need for continued support and dedicated resources for our adult SGM communities, in addition to the ongoing efforts to reduce suicide risk among SGM youth.

#### **CONFLICT OF INTEREST STATEMENT**

The authors have no conflict of interest to declare.

#### **DATA AVAILABILITY STATEMENT**

The data that support the findings of this study are available from the corresponding author upon reasonable request.

#### **CONSENT**


This study was approved by an institutional IRB and participant consent was obtained.

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