

## Article

# An examination of health inequities among college students by sexual orientation identity and sex

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## Significance for public health

Health inequities based on sexual orientation identity and sex among college students is a critical public health concern. Based on the results of the current study, lesbian, gay, and bisexual (LGB) college students experienced multiple physical, sexual, interpersonal relations and safety, and mental health inequities. This understanding of health inequities experienced by LGB college students is critical as during these years of transition, students engage in protective (*e.g.*, physical activity) and risky (*e.g.*, lack of condom use) health behaviours, establishing habits that could last a lifetime. By intervening during the college years, targeted public health strategies and policies can be designed and implemented to reduce health inequities and improve health-related quality of life among LGB individuals during mid-to-later adulthood.

## Abstract

**Background.** Lesbian, gay, and bisexual (LGB) college students may have an increased number of health inequities compared to their heterosexual counterparts. However, to date, no research has provided a comprehensive examination of health-related factors by sexual orientation identity and sex among a national sample of college students. Thus, the purpose of this study was to examine physical, sexual, interpersonal relations/safety, and mental health inequities by sexual orientation identity and sex among a national sample of college students.

**Design and methods.** Participants (n=39,767) completed the National College Health Assessment II during the fall 2008/spring 2009 academic year. Hierarchical binary logistic regression analyses were used to examine health inequities by sexual orientation identity and sex.

**Results.** LGB students compared to heterosexual students, experienced multiple health inequities including higher rates of being verbally threatened and lower rates of physical activity and condom use.

**Conclusions.** An understanding of health inequities experienced by LGB college students is critical as during these years of transition, students engage in protective (*e.g.*, physical activity) and risky (*e.g.*, lack of condom use) health behaviours, establishing habits that could last a lifetime. Future research should be used to design and implement targeted public health strategies and policies to reduce health inequities and improve health-related quality of life among LGB college students.

## Introduction

Lesbian, gay, and bisexual (LGB) high school and college students may have an increased number of health inequities compared to their heterosexual counterparts, including higher rates of smoking, marijuana use, and depression.<sup>1-19</sup> Based on results from the Youth Risk

Behaviour Surveillance System (YRBSS), a national level school-based survey examining female and male high school adolescents, LGB students experienced several health inequities when compared to heterosexual students.<sup>19</sup> Inequities related to health-risk behaviours among LGB students included: i) behaviours that contributed to violence (*e.g.*, carried a weapon; being in a physical fight), ii) behaviours related to attempted suicide (*e.g.*, feeling sad or hopeless; suicide ideation), iii) tobacco use, iv) alcohol use, v) other drug use (*e.g.*, marijuana; cocaine), vi) sexual behaviours (*e.g.*, ever had sexual intercourse; lack of condom use), and vii) weight management (*e.g.*, unhealthy dietary intake; physical inactivity).<sup>19</sup>

While health inequities have been identified among a national level sample of high school adolescents, only limited research has been used to identify health inequities among college students.<sup>1-18</sup> For example, based on this previous research, a number of sexual health inequities among male college students were identified including: i) gay males compared to heterosexual males were more likely to have multiple sexual partners in the past year and to have taken an HIV test and ii) bisexual males compared to heterosexual males were more likely to have two or more sexual partners in the past year.<sup>12,15</sup> Additionally, lesbians compared to heterosexual and bisexual females were less likely to have a gynaecological exam in the past year; and lesbians and bisexual females compared to heterosexual females had greater odds of ever considering suicide.<sup>8,20</sup>

While previous research examining health inequities by sexual orientation identity among college students has been conducted, some limitations exist with this research. First, several studies did not examine variability between sexual orientation identity and sex (female and male).<sup>2,7-9,11,13-15,18</sup> Second, due to insufficient sample sizes some study designs combined sexual minority groups (*i.e.*, lesbians and bisexual females; gay and bisexual males) to compare to heterosexuals.<sup>2,4,6,14</sup> Third, some studies lacked a heterosexual comparison group targeting only sexual minority groups.<sup>21,22</sup> While these studies with varying methodological approaches certainly add to the literature regarding the health of LGB college students, a need exists to examine whether health inequities exist among sexual orientation identity and sex groups within the same population. Such knowledge is critical to the tailoring of population-specific health promoting interventions, which have proven to be more effective than non-tailored approaches.<sup>23</sup>

Another limitation of previous studies is that the use of small sample sizes caused for a lack of statistical power needed to conduct a comprehensive examination of physical, mental, sexual, and interpersonal relations and safety health inequities. Typically, research examining health inequities by sexual orientation identity and sex among college students focused on physical or mental health but not multiple areas of emphasis.<sup>1-14,17,18,24</sup> Two exceptions have included research in which multiple health inequities among college students by sexual orientation identity and sex were identified however,<sup>15,16</sup> both of these studies were conducted on populations within a narrowly defined geo-

graphic locale (*i.e.*, a south-eastern university and 10 universities in North Carolina). Understanding whether findings are consistent across a larger geographic area would allow for more generalizable conclusions of larger patterns of what, if any, health inequities exist.

Building on prior research and in light of the 2011 release of the Institute of Medicine report titled, *The Health of Lesbian, Gay, Bisexual, and Transgender People: Building a Foundation for Better Understanding*,<sup>24</sup> the examination of multiple physical, mental, sexual, and interpersonal relations and safety health inequities among a national sample of LGB and heterosexual college students is timely and warranted. By identifying whether college students experience multiple types of health inequities based on sexual orientation identity and sex, targeted public health strategies and policies can be designed and implemented to minimize health-risk behaviours and thus improve the health of college students. The purpose of this study was to examine whether health inequities by sexual orientation identity and sex existed among a national sample of college students. Based on previous research examining high school adolescents, it was expected that LGB college students compared to heterosexual college students would experience multiple physical, mental, sexual, and interpersonal relations and safety health inequities.

## Design and methods

### Participants and procedures

All procedures for this study were approved by the university's Institutional Review Board. The authors obtained permission from the American College Health Association (ACHA) to access the National College Health Assessment II (NCHA) Fall 2008 and Spring 2009 survey data and to conduct a secondary data analysis. The NCHA II paper-based survey included multiple-choice demographic and health-related questions and was distributed to 157 colleges in the United States during the Fall 2008 and Spring 2009 semesters. Of the 157 institutions either all students were surveyed, or a random sampling technique was used to obtain student data., resulting in a final sample of 113,790 college students.<sup>25,26</sup>

For the purposes of this study, health-related factors identified in previous research as being associated with positive and negative health outcomes among traditional college students were examined.<sup>27</sup> Thus, participants were 18-24 years and had to report sex and sexual orientation identity to be included in the study. In addition, to be included, each female participant had to report 28 physical, mental, sexual, and interpersonal and safety health-related factors and each male had to report 27 of these factors (males did not have to respond to the gynaecological examination item). Finally, all participants were required to report other demographic variables including race, level in school (undergraduate; graduate), enrolment status (full-time; part-time), and relationship status (in a relationship; not in a relationship). Based on the aforementioned inclusion criteria, the final sample size for analyses was 39,767.

## Measures

### Demographics

Demographic variables (Table 1) included age, sex, sexual orientation identity, race, level in school, enrolment status, relationship status, and employment status. All demographic variables were self-reported by sexual orientation identity and sex.

### Physical health-related factors

Participants reported on 10 physical health-related factors, including: i) cigarette use in the last 30 days, ii) alcohol use in the last 30 days, iii) marijuana use in the last 30 days, iv) binge drinking in the last 2 weeks, v) prescription drug misuse in the last 12 months, vi) typical daily fruit and vegetable servings, vii) moderate to vigorous aerobic physical activity in the past 7 days, viii) participation in strength training in the past 7 days, ix) days of sufficient sleep in the past 7 days, and x) height and weight, which was used to calculate body mass index (BMI). All factors were dichotomized for analyses. Participants who reported  $\geq 5$  days of at least 30 minutes of moderate PA, or  $\geq 4$  days of at least 20 minutes of vigorous PA, or a total of  $\geq 5$  days of at least 30 minutes of moderate plus vigorous PA were categorized as meeting the current MVPA recommendation for aerobic activity.<sup>28</sup> Participants who did

**Table 1. Demographic frequencies and percentages by sexual orientation identity and sex (n=39,767).**

Demographic variables	Females, n (%)			Males, n (%)		
	Heterosexual (n=25,558)	Lesbian (n=340)	Bisexual (n=1066)	Heterosexual (n=11,963)	Gay (n=560)	Bisexual (n=280)
Age						
18-20 years	14,225 (55.7)	198 (58.2)	590 (55.3)	6262 (52.3)	280 (50.0)	163 (58.2)
21-24 years	11,333 (44.3)	142 (41.8)	476 (44.7)	5701 (47.7)	280 (50.0)	117 (41.8)
Race						
White, non-Hispanic	19,542 (76.5)	221 (65.0)	735 (68.9)	9326 (78.0)	395 (70.5)	185 (66.1)
Racial and ethnic minorities	6016 (23.5)	119 (35.0)	331 (31.1)	2637 (22.0)	165 (29.5)	95 (33.9)
Level in College						
Undergraduate	23,816 (93.2)	321 (94.4)	1017 (95.4)	11,309 (94.5)	499 (89.1)	266 (95.0)
Graduate	1742 (6.8)	19 (5.6)	49 (4.6)	654 (5.5)	61 (10.9)	14 (5.0)
Enrolment status						
Full-time	24,568 (96.1)	325 (95.6)	1002 (94.0)	11,569 (96.7)	543 (97.0)	267 (95.4)
Part-time	990 (3.9)	15 (4.4)	64 (6.0)	394 (3.3)	17 (3.0)	13 (4.6)
Relationship status						
In a relationship	19,328 (75.6)	263 (77.4)	777 (72.9)	7839 (65.5)	248 (44.3)	124 (44.3)
Not in a relationship	6230 (24.4)	77 (22.6)	289 (27.1)	4124 (34.5)	312 (55.7)	156 (55.7)
Employment status						
Full-time	708 (2.8)	7 (2.1)	1018 (95.5)	336 (2.8)	20 (3.6)	7 (2.5)
Part-time	24,763 (96.9)	332 (97.6)	39 (3.7)	11,582 (96.8)	538 (96.1)	272 (97.1)

not meet the criteria were categorized as not meeting the current MVPA recommendation. Participants who reported  $\geq 2$  days of strength training were categorized as meeting the current strength training recommendation.<sup>28</sup> See Supplementary Table S1 for the dichotomizations.

### Sexual health-related factors

Female participants reported on 4 and male participants reported on 3 sexual health-related factors. The sexual health-related factors included: i) number of sexual partners in the last 12 months, ii) condom or other protective barrier use for oral sex and vaginal or anal intercourse in the last 30 days, iii) ever been tested for Human Immunodeficiency Virus (HIV), and iv) gynaecological exam in the last 12 months (females only). All sexual health-related factors were dichotomized for the analyses (Supplementary Table S1).

### Interpersonal relations and safety health-related factors

Participants reported on 7 interpersonal relations and safety health-related factors: i) physically assaulted in the last 12 months, ii) verbally threatened in the last 12 months, iii) sexual penetration without consent in the last 12 months, iv) victim of stalking in the last 12 months, v) in an emotionally, physically, or sexually abusive intimate relationship in the last 12 months, vi) perception of safety on the school campus, and vii) perception of safety in the community. All interpersonal relations and safety health-related factors were dichotomized for analyses (Supplementary Table S1).

### Mental health-related factors

Participants reported on 7 mental health-related factors: i) self-reported general health status, ii) ever felt so depressed that it was difficult to function, iii) ever seriously considered suicide, iv) ever attempted suicide, v) diagnosed with anxiety in the last 12 months, vi) ever diagnosed with depression, and vii) stress level in the last 12 months. All mental health-related factors were dichotomized for analyses (Supplementary Table S1).

### Statistical analyses

All data analyses were conducted using IBM SPSS Statistics (version 20.0) and SAS (version 9.3) Descriptive statistics were calculated for all demographic variables and health-related factors by sexual orientation identity and sex. Chi-square analyses were used to determine statistically significant differences in demographic variables between sexual orientation identity groups by sex. Race and enrolment status were significantly different among female sexual orientation identity groups; while race, level in college, and relationship status were significantly different among male sexual orientation identity groups.

A series of six hierarchical binary logistic regression analyses were used to examine the odds of physical, mental, sexual, and interpersonal relations and safety health-related factors occurring among sexual orientation identity groups by sex (Supplementary Table S2). Demographic variables significantly differing among sexual orientation identity groups within each sex were entered into the model in step 1. Main study health-related factor variables were then entered in step 2 (28 primary variables for females and 27 primary variables for males). A Bonferroni-adjusted alpha of 0.001 per test was used to maintain a family-wise error rate of 0.05 across all tests. Adjusted odds ratios and 95% confidence intervals were used to determine statistical significance.

## Results

The final sample included 39,767 college students with an average age of  $20.40 \pm 1.66$  years. The majority of the participants were hetero-

sexual (94.4%), female (67.8%), white (76.5%), 18-20 years of age (54.6%), undergraduates (93.6), enrolled full-time (96.2%), employed part-time (94.4%), and in a relationship (71.9%) (Table 1).

Frequencies and proportions of the health-related factors included in the logistic regression models were calculated by sexual orientation identity and sex (Supplementary Table S1). The overall model for each logistic regression analysis was statistically significant. Among females, the logistic regression results included: i) heterosexual females and lesbians: race in step 1,  $\chi^2$  (1,  $n=25,898$ )=22.31,  $P<0.0001$  and the addition of 28 health-related factors in step 2,  $\chi^2$  (28,  $n=25,898$ )=452.20,  $P<0.0001$ ; ii) heterosexual and bisexual females: race and enrolment status in step 1,  $\chi^2$  (2,  $n=26,624$ )=40.31,  $P<0.0001$  and the addition of 28 health-related factors in step 2,  $\chi^2$  (28,  $n=26,624$ )=920.93,  $P<0.0001$ ; and iii) lesbians and bisexual females: race and enrolment status in step 1,  $\chi^2$  (2,  $n=1406$ )=3.08,  $P<0.214$  and the addition of 28 health-related factors in step 2,  $\chi^2$  (28,  $n=1406$ )=215.22,  $P<0.0001$ . Among males, the logistic regression results included: i) heterosexual and gay males: race, level in college, and relationship status in step 1,  $\chi^2$  (3,  $n=12,523$ )=146.18,  $P<0.0001$  and the addition of 27 health-related factors in step 2,  $\chi^2$  (27,  $n=12,523$ )=736.57,  $P<0.0001$ ; ii) heterosexual and bisexual males: race and relationship status in step 1,  $\chi^2$  (2,  $n=12,243$ )=71.68,  $P<0.0001$  and the addition of 27 health-related factors in step 2,  $\chi^2$  (27,  $n=12,243$ )=242.97,  $P<0.0001$ ; and iii) gay and bisexual males: race, level in college and relationship status in step 1,  $\chi^2$  (3,  $n=840$ )=10.83,  $P<0.013$  and the addition of 27 health-related factors in step 2,  $\chi^2$  (27,  $n=840$ )=69.46,  $P<0.0001$ . Findings for each type of health-related factor (physical, sexual, interpersonal and safety, and mental) are reviewed next (see Supplementary Table S1 for adjusted odds ratios and 95% confidence intervals).

### Physical health-related factors

Heterosexual females compared to lesbians and bisexual females, as well as heterosexual males compared to gay males, were 35-49% more likely to binge drink in the last 2 weeks (Supplementary Table S2). Lesbians compared to heterosexual females were more likely to use cigarettes in the last 30 days (AOR=1.77) and bisexual females compared to heterosexual females were more likely to use cigarettes (AOR=1.52) and marijuana (AOR=1.57) in the last 30 days. Bisexual females compared to heterosexual females were 42% more likely to consume the recommended 5 fruits and vegetables each day. Gay males compared to heterosexual males had 1.56 greater odds of being insufficiently physically active and were less likely to participate in strength training 2 or more days each week (AOR=1.78). In addition, bisexual males compared to heterosexual males were less likely to participate in strength training 2 or more days each week (AOR=2.05). Finally, lesbians (AOR=1.83) and bisexual (AOR=1.34) females were more likely to have an unhealthy healthy BMI (*i.e.*,  $<18.5$  or  $>24.9\text{kg/m}^2$ ) compared to heterosexual females. However, gay males were 39% more likely to have a healthy BMI compared to heterosexual males.

### Sexual health-related factors

Bisexual females compared to heterosexual females (AOR=1.98) as well as gay (AOR=2.91) and bisexual (AOR=2.75) males compared to heterosexual males were more likely to have 2 or more sexual partners in the last 12 months. When compared to heterosexual females, lesbians had 5.57 greater odds and bisexual females had 1.29 greater odds of not using a condom or other protective barrier for oral sex and vaginal or anal intercourse in the last 30 days. Lesbians compared to bisexual females had 3.94 greater odds of not using condoms or protective barriers for oral sex and vaginal or anal intercourse in the last 30 days. Gay males compared to heterosexual males had 1.56 greater odds of not using a condom or other protective barrier for oral sex and vaginal or anal intercourse in the last 30 days. Heterosexual males compared to

gay and bisexual males were 48-74% less likely to have ever taken an HIV test and bisexual males compared to gay males were 46% less likely to have taken an HIV test. When compared to heterosexual females, lesbians had 3.08 greater odds and bisexual females had 1.26 greater odds of not having a gynaecological exam in the last 12 months. Lesbians had 2.17 greater odds of not having a gynaecological exam in the last 12 months when compared to bisexual females.

### Interpersonal relations and safety health-related factors

Lesbians compared to heterosexual females (AOR=1.71) as well as heterosexual males compared to gay males (AOR=0.54) had greater odds of being verbally threatened in the last 12 months. However, gay males compared to heterosexual males had greater odds of being a victim of stalking (AOR=1.79) and experiencing sexual penetration without consent (AOR=6.44) in the last 12 months. The other interpersonal relations and safety health-related factors were not significant in any of the models.

### Mental health-related factors

Bisexual females compared to heterosexual females (AOR=1.52) as well as gay (AOR=1.47) and bisexual (AOR=1.74) males compared to heterosexual males had greater odds of feeling too depressed to function. Bisexual females compared to heterosexual females were also more likely to be diagnosed with depression (AOR=1.87). Gay males compared to heterosexual males were more likely to experience tremendous stress or a more than average level of stress in the last 12 months (AOR=1.59). Lesbians (AOR=2.11) and bisexual (AOR=2.05) females compared to heterosexual females had greater odds of ever considering suicide. The other mental health-related factors did not contribute significantly to any of the logistic regression models.

## Discussion

To our knowledge, this was the first study to provide a comprehensive examination of health-related factors by sexual orientation identity and sex among a national sample of college students. Based on the results, multiple physical, sexual, interpersonal relations and safety, and mental health inequities existed based on sexual orientation identity and sex. More specifically, an overall trend was found that among female and male sexual minorities, negative health inequities were disproportionately higher than their heterosexual counterparts. Many of these significant relationships were also identified as having practical significance (*i.e.*, odds ratio  $\geq 2.0$  or  $\leq 0.50$ ) and will be highlighted below.<sup>29</sup> Additionally, while the results of the current study offer both unique and similar findings to previous studies examining college students by sexual orientation, a need exists to also discuss these results in relation to adults and high school adolescents.

Similar to previous research, a number of sexual health inequities among male college students were identified. First, gay and bisexual males compared to heterosexual males were more likely to have two or more sexual partners in the past year.<sup>12,15</sup> This finding was similar to research examining high school adolescents in which LGB students compared to heterosexual students had a greater prevalence of having sexual intercourse with four or more persons during their life.<sup>19</sup> Second, gay males compared to heterosexual males were more likely to have taken an HIV test within their lifetime,<sup>12</sup> a finding consistent with previous research examining adult males.<sup>30</sup> Finally, approximately 80% of heterosexual males, 62% of bisexual males, and 47% of gay males in the current study had never taken an HIV test. These findings are particularly concerning since approximately two thirds of new HIV infec-

tions are among gay and bisexual males and 26% of all new infections occur among individuals aged 13-24 years.<sup>31</sup>

Additionally, in the current study lesbians compared to heterosexual and bisexual females were less likely to: i) have a gynaecological exam in the past year and ii) use a condom or other protective barrier for oral sex and vaginal and anal intercourse.<sup>8,9</sup> These findings are in contrast to previous literature examining adult females by sexual orientation identity. For example, according to Conron and colleagues,<sup>30</sup> there were no differences among heterosexual, lesbian, and bisexual females in getting a Papanicolaou test within the prior three years. Furthermore, according to Koh and colleagues,<sup>32</sup> adult lesbians compared to heterosexual and bisexual females, had higher rates of condom use. Overall, approximately 47% of the entire sample (males and females combined) used a condom or other protective barrier sometimes, rarely, or never, which is a much lower rate than a previous study,<sup>22</sup> in which 72% of lesbian, gay, and bisexual students reported not using a condom in their last sexual encounter.

In the current study, one significant and unique interpersonal relations and safety health-related finding was identified as being practically significant. Gay males compared to heterosexual males had 6.44 greater odds of experiencing sexual penetration without consent. While no research to date has illustrated the aforementioned result specifically among male college students, results from a previous study examining adult males indicated that gay males compared to heterosexual males were more likely to experience sexual assault.<sup>30</sup> Understanding that in 2011, 21% of all hate crimes in the United States resulted from sexual orientation bias,<sup>33</sup> research examining interpersonal relations and safety health-related factors by sexual orientation identity deserves attention.

While several mental health inequities based on sexual orientation identity and sex were identified in the current study, only two findings were deemed as practically significant. Lesbians and bisexual females compared to heterosexual females had greater odds of ever considering suicide. These findings were previously reported in research examining college students,<sup>8,20</sup> high school adolescents,<sup>19</sup> and adults and thus,<sup>34</sup> identify the need for continued efforts addressing suicide ideation among sexual minorities.<sup>24</sup>

### Strengths and limitations

Overall, current findings extend research on college student health by sexual orientation identity in a number of ways: i) utilizing a large sample that encompassed an expansive geographic area; ii) separately examining multiple sexual orientation identity groups (*i.e.*, lesbian, gay, bisexual, and heterosexual); iii) separately examining females and males; and iv) examining multiple physical, sexual, interpersonal relations and safety, and mental health inequities within one sample, while controlling for all of the other variables in the model. Although the findings extend current insight into college students' health based on sexual orientation identity and sex, study limitations exist. Due to the cross-sectional design no causal relationships could be identified. Data were collected via a self-report measure, which could have resulted in biased responses from the participants. While previous studies utilizing the ACHA-NCHA II survey have indicated similar results to nationally representative survey studies,<sup>35</sup> the ACHA-NCHA database is considered a reference group and thus, not generalizable to the entire college student population.

## Conclusions

In conclusion, this study extends previous research examining health inequities among LGB college students. Sexual minority students, when compared to heterosexual students, experienced a greater

number of inequities for risky health-related factors. Future research should examine the underlying causal mechanisms of these inequities based on sexual orientation identity and sex. Using a social ecological approach, identifying key contributing factors, which may range from personal beliefs to social and community factors and beyond (e.g., societal norms, public policies), is necessary to best guide the development of future public health programmes aimed at bettering the health of all college students.

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