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Stigma and Health-Related Quality of Life in Sexual Minorities

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Abstract

Introduction: Stigma against sexual minorities is well documented, but its long-term consequences for health-related quality of life (HRQL) are unknown. This study examined stigma-related predictors of sexual orientation disparities in HRQL and their contribution to young adult HRQL disparities.

Methods: In 2013, participants (N=7,304, aged 18–31 years) reported sexual orientation (completely heterosexual [CH], mostly heterosexual, bisexual, and lesbian/gay). The EQ5D-5L, preference weighted for the U.S. population, was used to assess HRQL (range, –0.109 [worse than dead] to 1 [full health]). In prior waves conducted during adolescence, participants reported past-year bullying victimization (range, 1 [never] to 5 [several times/week]) and subjective social status (SSS) in their school (range, 1 [top] to 10 [bottom]). Analyses conducted in 2016 used longitudinal, multivariable linear and logistic regression to assess the contribution of bullying victimization and SSS in adolescence to sexual orientation disparities in HRQL in young adulthood, controlling for confounders and stratified by gender.

Results: Compared with CHs, both female and male sexual minorities reported more bullying victimization and lower SSS in adolescence and lower HRQL in young adulthood (HRQL score among women: mostly heterosexual, 0.878; bisexual, 0.839; lesbian, 0.848; CH, 0.913; HRQL score among men: mostly heterosexual, 0.877; bisexual, 0.882; gay, 0.890; CH, 0.925; all *p*-values <0.05). When bullying and SSS were added into multivariable models, orientation group effect estimates were attenuated substantially, suggesting bullying and lower SSS in adolescence partly explained HRQL disparities in young adulthood.

Conclusions: Stigma-related experiences in adolescence may have lasting adverse effects on sexual minority health in adulthood.

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INTRODUCTION

Health-related quality of life (HRQL) is an important global measure of health status, allowing for monitoring of population trends over time and comparisons across subpopulations to identify disparities.¹ In addition, HRQL measures provide important information needed for cost-effectiveness evaluation of programs and policies designed to improve population health or redress disparities.² Sexual orientation-related disparities are increasingly recognized as a priority public health concern,³ yet only a handful of studies have examined sexual orientation differences in quality of life and fewer still in HRQL specifically.

In the Nurses' Health Study 2 (NHS2), a national cohort of U.S. women, lesbian and bisexual compared with heterosexual women aged 31–49 years scored lower on the SF-36 measure⁴ of HRQL.⁵ In the representative California Quality of Life Survey of adults aged 18–72 years, bisexual women and heterosexual men with same-sex sexual experience, compared with same-gender heterosexuals with no same-sex experience, scored lower on the SF-12 measure⁶ of HRQL, though no significant differences in HRQL were found for other sexual minority subgroups.⁷ Two studies of young adult university students, one conducted in Nigeria⁸ using the WHO QOL-BREF⁹ and another conducted in Cuba, Norway, India, and South Africa¹⁰ using other quality of life measures^{11,12} found that both female and male sexual minorities scored lower on quality of life than same-gender heterosexuals.

A number of social-contextual factors have been found to influence HRQL, including absolute and relative poverty, social stratification, social exclusion, and more.¹ In marginalized populations, such as sexual minorities, stigma-related social-contextual experiences, including bullying victimization and low subjective social status, may also be important influences on HRQL. In the general population, bullying victimization in childhood has been negatively associated longitudinally with quality of life. For instance, Takizawa and colleagues¹³ found in the prospective British National Child Development Study that bullying victimization in childhood was associated with reduced quality of life at age 50 years and the more frequent the bullying had been, the larger the decrements in quality of life. In a study of sexual orientation-related bullying, Patrick et al.¹⁴ found in cross-sectional analyses that roughly 13% of U.S. youth in Grades 8–12 reported being bullied because of their perceived sexual orientation, and these youth had substantially reduced quality of life compared with non-bullied youth. Subjective social status, defined as internalized perceptions of one's social ranking relative to peers or others in society,¹⁵ has also been found to be a predictor of HRQL in adults^{16,17} and adolescents.¹⁸

In prior research, gender has been found to modify sexual orientation-related associations with psychological indicators, such as anxiety and conduct problems,^{19,20} and health outcomes, including alcohol use,^{21,22} illicit drug use,²³ eating disorder symptoms,²⁴ and obesity.²⁵ With regard to quality of life, Patrick and colleagues¹⁴ found evidence of effect modification by gender, where the reduction in quality of life for girls who were bullied for their perceived sexual orientation was of larger magnitude than seen in boys bullied for their perceived sexual orientation.

Despite the growing literature on sexual-orientation health disparities,³ little is known about long-term effects of stigma-related social-contextual experiences in adolescence on sexual minority HRQL. Furthermore, it is not known whether gender may moderate sexual orientation-related differences in HRQL. Given these gaps in the literature, the aims of this study were to (1) examine sexual orientation disparities in HRQL in young adulthood; (2) evaluate the contribution of stigma-related social-contextual experiences in adolescence to sexual orientation disparities in HRQL in young adulthood; and (3) assess gender moderation of associations between sexual orientation and HRQL.

METHODS

Study Population

Participants were from the U.S. Growing Up Today Study (GUTS), a prospective cohort study of children of women in NHS2. The cohort was initiated in 1996 with 16,882 girls and boys aged 9–14 years (GUTS1) and expanded in 2004 with the addition of 10,923 children, aged 9–15 years, of NHS2 nurses (GUTS2). Questionnaires have been sent to all participants annually or biennially. The sample is predominantly white (93%) and has a restricted socio-economic range as all participants' mothers have 4-year nursing degrees. In 2013, the year in which the outcomes for the present study were collected, GUTS participants were aged 18–31 years. The study protocol was approved by the IRB of the Brigham and Women's Hospital.

Measures

Sexual orientation identity was assessed in 2013 (when aged 18–31 years) with the item *Which one of the following best describes your feelings?* Response categories were: *completely heterosexual, mostly heterosexual, bisexual, mostly homosexual, completely homosexual/ gay/lesbian, and not sure*. For analysis, mostly and completely homosexual/gay/lesbian were combined into a “gay/lesbian” category, and individuals identifying as unsure were excluded.

In 2013, HRQL was assessed using the validated and generic EQ5D-5L measure of current health status.^{26,27} EQ5D-5L consists of five dimensions (mobility, self-care, usual activities, pain or discomfort, and anxiety/depression). For each dimension, participants endorse one of five levels of functioning (no problems, slight problems, moderate problems, severe problems, and unable to/ extreme problems). As EQ5D-5L value sets are not yet available for the U.S., the present study relied on a crosswalk value set, which maps EQ5D-5L responses to EQ-5D-3L.²⁸

All five dimensions in EQ5D-3L are then used to create a summary score, which is preference weighted for U.S. populations using a valuation set derived from a probability sample of U.S. adults.²⁹ This allows for the calculation of health utility scores calibrated to reflect the degree to which different health statuses are valued by the U.S. population overall. Health utility scores for the U.S. population range from health states worse than dead (−0.109), as characterized by a sample of U.S. adults,²⁹ to full health (1).³⁰ Although there is no standard, researchers have advocated minimum thresholds for clinically

important differences in EQ5D health utility that have ranged from 0.02 to 0.07 points.^{30,31} A benefit of EQ5D-5L is that its scores are appropriate for use in cost-effectiveness studies, such as those evaluating interventions to reduce disparities.²

Bullying victimization was measured in 2001 for GUTS 1 (age 14–19 years) and in 2011 for GUTS 2 (age 16–22 years) with an item from the WHO's Health Behaviour of School-Aged Children Survey in 28 nations³²: *During the past year, how often have you been bullied?* Response options were scored from 1 (*never*) to 5 (*several times per week*).

Subjective social status was measured in 2001 for GUTS 1 and 2011 for GUTS 2 with an item from MacArthur Scale of Subjective Social Status—Youth Version, which has been validated in GUTS.³³ Participants were asked to rank their subjective social status in their school on a scale from 1 (top status) to 10 (lowest status). Though most participants were in high school at the time they received this survey item on subjective social status, those who had completed high school at that point were asked to reflect back on their high school experience to answer the question.

Potential confounders included were age (in years) and GUTS cohort (GUTS1 versus GUTS2). Mother's report of their child as either girl or boy at the time of enrollment was used as a proxy for participant gender.

Statistical Analysis

In analyses conducted in 2016, mean differences were examined in HRQL, bullying victimization, and subjective social status by sexual orientation identity. Analyses then followed a two-step approach recommended for analyzing health utility scores with bimodal distributions, such as those seen in U.S. populations.^{34,35} First, the health utility index was dichotomized (1 vs <1) and analyzed by sexual orientation identity group (ref=completely heterosexual) using generalized estimating equations with log-link to estimate risk ratios and 95% CIs. Second, the continuous health utility score was restricted to those with lower HRQL, defined as health utility scores < 1, and the linear association between sexual orientation identity and lower HRQL was estimated, again using generalized estimating equations and the robust sandwich estimator to account for sibling clustering in the cohort.³⁶ Models were adjusted first for potential confounders (age and cohort) and second for potential mediators (bullying victimization and subjective social status).

It is important to note that the study aim was to identify stigma-related social-contextual experiences in adolescence that might help to explain sexual orientation disparities in HRQL in young adulthood. Accordingly, analyses incorporated both sexual orientation and HRQL measured in young adulthood in 2013, whereas stigma-related social-contextual experiences were assessed at earlier waves during participants' adolescence.

To investigate possible differences by GUTS cohort, possible effect modification was examined by GUTS cohort and patterns of associations and magnitude of effect estimates when analyses were stratified by cohort. The authors found no statistically significant interactions with GUTS cohort, and no differences in patterns of associations nor magnitude of effect estimates when stratified by cohort.

Possible effect modification by gender of the association between sexual orientation identity and health utility was tested using gender by sexual orientation interaction terms. Based on significant interaction terms in linear models and previously observed gender differences in EQ5D-derived health utility scores,³⁷ final models were stratified by gender. The analytic sample included 5,083 female and 2,221 male participants.

RESULTS

This analysis was based on HRQL outcome data reported in 2013 ($n=12,748$). Those who did not provide sexual orientation identity information in 2013 ($n=264$) or HRQL information ($n=2,429$) were excluded from the present study. In addition, those missing information on age ($n=6$) and potential mediators (bullying and subjective social status in school, $n=2,745$) were excluded from analyses; the final analytic sample included 7,304 participants. Participants included in the analytic sample were slightly younger relative to those who were excluded (25.7 vs 26.1 years, $p<0.0001$); more likely than those excluded to be female (69.6% vs 58.5%, $p<0.0001$); and were marginally more likely to be white (92.4% vs 91.4%, $p=0.05$).

As shown in Table 1, mean health utility score was 0.905 for women and 0.919 for men and varied by sexual orientation identity such that sexual minorities had lower mean health utility scores compared with completely heterosexuals among both women and men (p -values <0.0001). In addition, the proportion with less than full health (health utility score <1) among both female and male sexual minorities was higher than among same-gender completely heterosexuals (p -values <0.0001).

Table 2 presents the risk ratios and 95% CIs for the association between sexual orientation identity and risk of having poorer HRQL (health utility score <1 vs 1). Model 1 demonstrated that, after accounting for age and cohort, female and male sexual minorities had elevated risk of less than full health relative to completely heterosexuals. Among both female and male participants, the addition of bullying victimization and subjective social status to the model (Model 2) substantially attenuated the associations between sexual orientation identity and HRQL, although all associations remained statistically significant. No significant gender by sexual orientation interactions were observed.

Table 3 provides results for the multivariable linear regression of HRQL restricted to those with less than full health (health utility score <1). For women, the patterns were similar to those presented in Table 2: Sexual minority women, on average, had lower HRQL compared with their completely heterosexual counterparts, and these relationships were attenuated but remained significant after accounting for bullying victimization and subjective social status. Among men, the findings differed, as it was men who identified as mostly hetero-sexual had a significantly lower HRQL relative to their completely heterosexual counterparts, an association that was attenuated but still significant after adjusting for hypothesized mediators; no such differences were observed for bisexual or gay men. Adjusted mean HRQL values based on Model 2 in Table 3 for each sexual orientation group (assigning mean values for age, bullying victimization, and subjective social status and assigning cohort as GUTS1) were as follows for men who identified as completely heterosexual (0.845);

mostly heterosexual (0.830); bisexual (0.847); and gay (0.845) and for women who identified as completely hetero-sexual (0.836); mostly heterosexual (0.828); bisexual (0.808); and lesbian (0.811).

For analyses within the subsample with less than full health, a significant gender by sexual orientation interaction was observed. Specifically, in the fully adjusted model that included the hypothesized mediators and gender by sexual orientation identity interaction terms, lesbians experienced a -0.025 -point decrement in HRQL relative to completely heterosexual women beyond the decrement gay men experienced relative to completely heterosexual men (interaction term $p < 0.02$). A suggestion of a similar gender by sexual orientation identity interaction was observed where bisexual women appeared to experience worse decrements in HRQL than those experienced by bisexual men, although the interaction term did not reach statistical significance (interaction $\beta = -0.031$, $p = 0.09$).

DISCUSSION

Although HRQL is a valuable indicator of the general health of communities and can facilitate monitoring of population trends and identifying disparities across populations,¹ few studies have examined sexual orientation-related disparities in HRQL. The present study found that in young adults, HRQL was lower in all sexual minority subgroups compared with same-gender heterosexuals. The present study was conducted with participants during a period of life—age 18–31 years—when HRQL is typically very high,³⁰ yet sexual orientation-related decrements in HRQL of clinically important magnitude were still observed.³¹

Prior research on quality of life using a variety of measures in adults have similarly found lower scores in sexual minorities than heterosexuals.^{5,7,8,10} No prior studies with sexual minorities have used the EQ5D-5L, so the specific instrument scores reported in prior studies are not directly comparable to the present study. Findings can be compared, however, to studies with other populations where the EQ5D has been administered. In the present study, the magnitude of the observed differences in EQ5D utility scores for sexual minorities compared with same-gender heterosexuals, as presented in Table 1, were as large as 0.074 for bisexual women and 0.048 for mostly heterosexual men. These disparities are on par with or in some cases larger than those observed in other studies comparing across groups defined by race/ethnicity, age, income, education, and some adverse health conditions.³⁰ For instance, working with nationally representative data from the Medical Expenditures Panel Survey, Lubetkin et al.³⁰ estimated the decrement in EQ5D utility scores associated with having black, Latino/a, or American Indian/Alaskan Native (versus white) race/ethnicity were on average 0.005. Decrements in EQ5D utility score associated with being aged 40–59 years (vs 18–39 years); living at 100%–199% of poverty (vs >400% of poverty); or having <12 years of education (vs >16 years of education) were -0.051 , -0.056 , and -0.058 , respectively. Furthermore, the researchers estimated the decrements in EQ5D utility score associated with having diabetes, asthma, or high blood pressure were -0.047 , -0.040 , and -0.050 , respectively.

There is reason to be concerned that widespread stigma experienced by sexual minorities³ could impact HRQL. The present study found in prospective analyses that elevated experiences of bullying victimization and low subjective social status in school during adolescence partly explained, with substantial attenuation of effect estimates, the observed reduced HRQL in young adulthood associated with minority sexual orientation. These results add to the findings of Takizawa and colleagues,¹³ who found prospective negative associations between bullying victimization in childhood and adult quality of life, and to those of Patrick et al.,¹⁴ who found cross-sectionally in adolescents that being bullied because of one's perceived sexual orientation was negatively associated with quality of life.

The present study also examined for the presence of effect modification by gender. In models estimating risk of reporting less than full health in the complete sample, no evidence was found of statistically significant gender by sexual orientation interactions; however, a gender by orientation interaction was observed in the model restricted to the subsample reporting utility scores <1. Specifically, it was found that lesbians fared worse on HRQL than gay men relative to their same-gender heterosexual peers. A suggestion of a similar pattern of effect modification by gender was also observed for bisexuals, but it did not reach statistical significance ($p=0.09$), perhaps due to the small number of bisexual men ($n=16$). The finding of gender interactions in linear but not relative risk models may be a consequence of the latter modeling method having reduced statistical power to detect interaction effects.

The present study's finding of effect modification by gender of sexual orientation health disparities is consistent with prior research with GUTS focused on other health outcomes.^{21–24,25} The finding is also consistent with Patrick and colleagues,¹⁴ who similarly found gender to modify associations in their adolescent sample such that girls bullied for their perceived sexual orientation fared worse than similarly bullied boys with regard to quality of life. Why gender moderates associations between sexual orientation and HRQL is not clear, but in other research gender differences have been observed in strategies for coping with stressful experiences (e.g., stigma) such that women are more likely than men to engage in maladaptive ruminative coping.³⁸ In addition, it is plausible that observed gender moderation may be linked in part to underlying developmental or biological sex differences in stress response.³⁹

Limitations

The present study has several important limitations. GUTS is made up of children of nurses in NHS2, and as a result the socioeconomic range is somewhat truncated, as all NHS2 participants have 4-year nursing degrees. In addition, the GUTS cohort is more than 90% white race/ethnicity; therefore, findings may not be generalizable to very low or high socioeconomic groups nor to communities of color. Mothers were asked to report at enrollment if their child was a girl or boy, and that report was used as a proxy measure for gender; it is likely that a mother's classification of her child at age 9–15 years will reflect most children's gender during adolescence. There may be other important stigma-related social-contextual influences on HRQL, such as child abuse victimization, parental rejection,

or other factors. There was a substantial amount of missing data, resulting in differences in gender of participants included versus excluded from analyses.

Strengths of the study include the large sample of young people living throughout the U.S. and the longitudinal design. An additional strength is that it is the first to examine sexual orientation-related disparities using the EQ5D-5L, a measure designed to produce findings that can be easily integrated into cost-effectiveness studies, for instance, studies evaluating the effects of anti-stigma and other types of intervention programs and policies to reduce sexual orientation-related health disparities. Cost-effectiveness evaluations can be valuable tools to inform policymakers' decisions regarding resource allocation to support new programs and policies to reduce health disparities.² Such evaluations would be a fruitful direction for future sexual orientation-related health research.

CONCLUSIONS

Findings of the present study point to several clear implications. The HRQL disparities evident by young adulthood may signal long-term problems, as stigma-related social-contextual factors were associated with lower HRQL years later. Further longitudinal research is needed to understand longer-term health impacts of stigma against sexual minorities and to understand why the effects on HRQL appear to be more severe in young women than in young men. Effective interventions are needed to reduce stigma against sexual minorities. Although some anti-stigma intervention programs have been developed,^{40,41} and policy changes to reduce discrimination have been adopted by the U.S. federal government, states, and municipalities,⁴² determining effectiveness and cost effectiveness of these interventions on improving HRQL in sexual minorities will require systematic evaluation with appropriate HRQL measures, like the EQ5D-5L. Ideally, prospective observational studies of HRQL disparities will facilitate identification of cost-effective anti-stigma programs and policies currently underway or soon to be in the field.

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Table 1.
Sample Characteristics by Gender and Sexual Orientation in U.S. Cohort of Young Adults ($n=7,304$)

Variables	Total	Completely heterosexual	Mostly heterosexual	Bisexual	Lesbian/Gay	<i>p</i> -value
Female, % (<i>n</i>)	100 (5,083)	80.6 (4,099)	15.4 (780)	2.3 (119)	1.7 (85)	
Age in years, M (SD)	25.9 (3.5)	25.8 (3.5)	26.3 (3.2)	24.9 (3.4)	26.4 (3.4)	0.0674
Cohort, ^a % (<i>n</i>)						
GUTS1	60.1 (3,057)	59.3 (2,430)	65.6 (512)	52.1 (62)	62.4 (53)	0.1459
GUTS2	39.9 (2,026)	40.7 (1,669)	34.4 (268)	47.9 (57)	37.7 (32)	0.1459
Bullying victimization ^b in adolescence, M (SD)	1.3 (0.6)	1.3 (0.6)	1.3 (0.6)	1.4 (0.8)	1.4 (0.8)	0.0009
Subjective social status ^c in adolescence, M (SD)	3.5 (1.6)	3.4 (1.6)	3.8 (1.7)	4.4 (2.0)	4.0 (1.7)	<0.0001
EQ5D-5L Health Utility Index ^d in young adulthood						
Mean health utility score, M (SD)	0.905 (0.093)	0.913 (0.090)	0.878 (0.094)	0.839 (0.108)	0.848 (0.102)	<0.0001
Percent with less-than-full health (health utility <1), % (<i>n</i>)	58.1 (2,955)	54.2 (2,223)	72.2 (563)	84.0 (100)	81.2 (69)	<0.0001
Health utility score in those with less-than-full health (health utility score < 1), M (SD)	0.836 (0.060)	0.839 (0.056)	0.830 (0.065)	0.809 (0.089)	0.813 (0.079)	<0.0001
Male, % (<i>n</i>)	100 (2,221)	86.3 (1,917)	7.9 (175)	0.7 (16)	5.1 (113)	
Age in years, M (SD)	25.3 (3.5)	25.3 (3.5)	25.3 (3.6)	23.1 (3.5)	25.2 (3.5)	0.3363
Cohort, ^a % (<i>n</i>)						
GUTS1	54.9 (1,219)	55.1 (1,057)	56.6 (99)	37.5 (6)	50.4 (57)	0.2894
GUTS2	45.1 (1,002)	44.9 (860)	43.4 (76)	62.5 (10)	49.6 (56)	0.2894
Bullying victimization ^b in adolescence, M (SD)	1.3 (0.6)	1.3 (0.6)	1.4 (0.8)	1.3 (0.6)	1.5 (0.8)	<0.0001
Subjective social status ^c in adolescence, M (SD)	3.4 (1.7)	3.3 (1.7)	3.7 (1.9)	3.9 (2.0)	3.8 (2.1)	0.0002
EQ5D-5L Health Utility Index ^d in young adulthood						
Mean health utility score, M (SD)	0.919 (0.093)	0.925 (0.090)	0.877 (0.104)	0.882 (0.087)	0.890 (0.091)	<0.0001
Percent with less-than-full health (health utility <1), % (<i>n</i>)	50.0 (1,111)	47.0 (901)	69.7 (122)	75.0 (12)	67.3 (76)	<0.0001
Health utility score in those with less-than-full health (health utility score < 1), M (SD)	0.838 (0.064)	0.840 (0.062)	0.823 (0.077)	0.843 (0.060)	0.837 (0.059)	0.2609

Note: Boldface indicates statistical significance ($p < 0.05$); *p*-values were based on chi-square tests for categorical variables and ANOVA for continuous variables.

^aGUTS1 cohort was established in 1996, when participants were aged 9–14 years; GUTS2 cohort was established in 2004, when participants were aged 9–15 years; all participants are children of women participating in Nurses' Health Study 2 cohort.

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^b Bullying victimization in adolescence was assessed with the question *During the past year, how often have you been bullied?* with response options 1 (never) to 5 (several times/week).

^c Subjective social status in school in adolescence was assessed with the MacArthur Scale of Subjective Social Status—Youth version. Higher scores indicate lower subjective social status (range: 1=top to 10=bottom).

^d EQ5D Health Utility Index was based on the EQ5D-5L instrument, preference-weighted for U.S. populations (range: -0.109 [worse than dead] to 1 [full health]).

GUTS, Growing Up Today Study.

Table 2.

Multivariable Relative Risk of Less-Than-Full Health^a in Young Adulthood by Sexual Orientation in U.S. Cohort (*n*=7,304)

Variables	Female (<i>n</i> =5,083)		Male (<i>n</i> =2,221)	
	Model 1, RR (95% CI)	Model 2, RR (95% CI)	Model 1, RR (95% CI)	Model 2, RR (95% CI)
Sexual orientation (Ref=CH)				
Mostly heterosexual	1.33 (1.26, 1.40)	1.05 (1.03, 1.08)	1.47 (1.32, 1.63)	1.20 (1.12, 1.30)
Bisexual	1.55 (1.43, 1.69)	1.08 (1.02, 1.15)	1.73 (1.31, 2.30)	1.32 (1.02, 1.69)
Lesbian/gay	1.50 (1.34, 1.66)	1.08 (1.01, 1.15)	1.41 (1.23, 1.61)	1.17 (1.06, 1.28)
Bullying victimization ^b in adolescence		1.02 (1.01, 1.04)		1.05 (1.01, 1.09)
Subjective social status ^c in adolescence		1.01 (1.00, 1.01)		1.02 (1.01, 1.04)

Note: Boldface indicates statistical significance ($p < 0.05$). Model 1 was adjusted for age (years) and GUTS cohort (GUTS1 versus GUTS2). Model 2 was adjusted for age (years); GUTS cohort (GUTS1 versus GUTS2); and hypothesized mediators (bully victimization in adolescence and subjective social status).

^aLess-than-full health was defined as health utility score < 1 ; models estimate relative risk of health utility score < 1 versus health utility score = 1.

^bBullying victimization in adolescence was assessed with the question *During the past year, how often have you been bullied?* with response options 1 (never) to 5 (several times/week).

^cSubjective social status in school in adolescence was assessed with the MacArthur Scale of Subjective Social Status—Youth version. Higher scores indicate lower subjective social status (range: 1=top to 10=bottom).

CH, completely heterosexual; GUTS, Growing Up Today Study; RR, risk ratio.

Table 3.

Multivariable Linear Associations Between Sexual Orientation and HRQL^a in Young Adults With Less-Than-Full Health^b in U.S. Cohort ($n=4,066$)

Variables	Female ($n=2,955$)				Male ($n=1,111$)			
	Model 1		Model 2		Model 1		Model 2	
	Beta (SE)	p-value	Beta (SE)	p-value	Beta (SE)	p-value	Beta (SE)	p-value
Sexual orientation (Ref=CH)								
Mostly heterosexual	-0.009 (0.003)	0.0017	-0.008 (0.003)	0.0060	-0.017 (0.006)	0.0052	-0.015 (0.006)	0.0166
Bisexual	-0.031 (0.006)	<0.0001	-0.028 (0.006)	<0.0001	0.002 (0.018)	0.9237	0.002 (0.018)	0.9167
Lesbian/gay	-0.026 (0.007)	0.0003	-0.025 (0.007)	0.0007	-0.003 (0.008)	0.6491	0.000 (0.008)	0.9799
Bullying victimization ^c in adolescence			-0.011 (0.002)	<0.0001			-0.012 (0.003)	<0.0001
Subjective social status ^d in adolescence			-0.002 (0.001)	0.0021			-0.002 (0.001)	0.0587

Note: Boldface indicates statistical significance ($p<0.05$). Model 1 was adjusted for age (years) and GUTS cohort (GUTS1 versus GUTS2). Model 2 was adjusted for age (years); GUTS cohort (GUTS1 versus GUTS2); and hypothesized mediators (bully victimization in adolescence and subjective social status).

^aHRQL was assessed with health utility index score from EQ5D-5L measure.

^bLess-than-full health was defined as health utility score <1.

^cBullying victimization in adolescence was assessed with the question *During the past year, how often have you been bullied?* with response options 1 (never) to 5 (several times/week).

^dSubjective social status in school in adolescence was assessed with the MacArthur Scale of Subjective Social Status—Youth version. Higher scores indicate lower subjective social status (range: 1=top to 10=bottom).

CH, completely heterosexual; GUTS, Growing Up Today Study; HRQL, health-related quality of life.