

Physical Health Disparities Across Dimensions of Sexual Orientation, Race/Ethnicity, and Sex: Evidence for Increased Risk Among Bisexual Adults

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Abstract Accumulating evidence suggests that sexual minority individuals are at increased risk for physical health conditions compared to heterosexual individuals. However, we know little about physical health disparities affecting bisexual individuals, a population at increased risk for psychiatric and substance use conditions compared to both heterosexual and lesbian/gay populations. Using a large, nationally representative sample, we examined physical health disparities for bisexual individuals. To advance research on sexual minority health disparities, we further: (1) compared prevalence rates of physical health conditions across three dimensions of sexual orientation (i.e., identity, attractions, behavior) and (2) examined whether disparities differed by sex and race/ethnicity. Results indicated that sexual minority individuals were at increased risk for many physical health conditions. Notably, individuals with bisexual identity, attractions, and/or behavior were at increased risk for more physical health conditions than other sexual minority groups. The number and types of physical health disparities affecting

bisexually identified individuals and individuals with same- and opposite-sex attractions and/or sexual partners varied across sex and race/ethnicity, with the most consistent disparities emerging for individuals who reported same- and opposite-sex sexual partners. Our findings highlight the substantial physical health disparities affecting sexual minorities and the heightened risk conferred by all facets of bisexuality.

Keywords Physical health · Health disparities · Sexual orientation · Bisexual

Introduction

Sexual minority individuals (e.g., those who identify as lesbian, gay, or bisexual; report same-sex attractions; and/or engage in same-sex sexual behavior) experience chronic stress due to their non-heterosexual identities and sexuality (Meyer, 1995). This chronic minority stress arises from a range of experiences, such as discrimination, victimization, and interpersonal rejection based on one's sexual orientation (Meyer, 2003). Minority stress has been identified as a major mechanism underlying the substantial sexual orientation-related disparities observed in mental health (Bränström, Hatzenbuehler, & Pachankis, 2016; Eaton, 2014; Hatzenbuehler, McLaughlin, Keyes, & Hasin, 2010) and substance use (Lehavot & Simoni, 2011; McCabe, Bostwick, Hughes, West, & Boyd, 2010; Slater, Godette, Huang, Ruan, & Kerridge, 2017).

Growing evidence suggests that minority stress also underlies physical health disparities among sexual minorities (Frost, Lehavot, & Meyer, 2015; Lick, Durso, & Johnson, 2013). At present, evidence suggests that sexual minority women are at increased risk for the following health conditions relative to heterosexual women: arthritis (Cochran & Mays, 2007; Fredriksen-Goldsen, Kim, & Barkan, 2012), diabetes (Blosnich,

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Hanmer, Yu, Matthews, & Kavalieratos, 2016), gastrointestinal problems (Cochran & Mays, 2007) and abdominal pain (Roberts et al., 2013), cardiovascular disease (Blosnich et al., 2016; Diamant & Wold, 2003), heart attack (Fredriksen-Goldsen, Kim, Shui, & Bryan, 2017), high cholesterol (Blosnich et al., 2016), hypertension (Blosnich et al., 2016; Case et al., 2004), hepatic disease (Cochran & Mays, 2007), obesity (Blosnich et al., 2016; Jun et al., 2012), and stroke (Fredriksen-Goldsen et al., 2017). Some studies also indicate differential risk for lesbian and bisexual women; for instance, bisexual women are at increased risk for diabetes and hypertension relative to lesbian women (Dilley, Simmons, Boysun, Pizacani, & Stark, 2010).

Among sexual minority men, evidence suggests that they are at increased risk for the following health conditions relative to heterosexual men: angina pectoris (Fredriksen-Goldsen et al., 2017), arthritis (Fredriksen-Goldsen, Kim, Barkan, Muraco, & Hoy-Ellis, 2013), diabetes (Conron, Mimiaga, & Landers, 2010; Wallace, Cochran, Durazo, & Ford, 2011), cardiovascular disease (Blosnich et al., 2016; Cochran & Mays, 2007; Hatzenbuehler, McLaughlin, & Slopen, 2013), hypertension (Cochran & Mays, 2007; Everett & Mollborn, 2013; Wallace et al., 2011) and high blood pressure (Hatzenbuehler et al., 2013), hepatic disease, gastrointestinal problems (Cochran & Mays, 2007), stroke (Blosnich et al., 2016), and being underweight (Laska et al., 2015). Studies have similarly indicated differential risk for gay and bisexual men; for instance, bisexual men are at increased risk for diabetes relative to gay men (Fredriksen-Goldsen et al., 2013).

Limitations of Sexual Orientation-Related Physical Health Disparities Research

Evidence clearly indicates the presence of significant physical health disparities affecting sexual minority individuals. However, far less research has examined sexual orientation-related disparities in physical health (other than disparities in HIV/AIDS) relative to other sexual orientation-related disparities, leaving many unanswered questions about physical health disparities affecting sexual minorities. Additionally, serious methodological concerns currently limit our ability to fully understand these disparities (Institute of Medicine, 2011). Specifically, previous research has frequently: (1) used unidimensional definitions to characterize sexual orientation, (2) treated sexual minorities as a single homogeneous group (e.g., comparing lesbian/gay/bisexual to heterosexual), and (3) failed to use approaches that account for intersectionality.

First, health disparities research has often used a single dimension to operationalize sexual orientation, with most focusing on disparities by sexual identity (Institute of Medicine, 2011; Patterson, Jabson, & Bowen, 2017). However, using only a single dimension to operationalize sexual orientation obfuscates potentially nuanced differences in physical health risk among a heterogeneous sexual minority population. For example, heterosexually

identified individuals with both male and female sexual partners are at increased risk for cardiovascular disease, hypertension, diabetes, hepatic disease, arthritis, and gastrointestinal problems relative to exclusively heterosexual individuals (Cochran & Mays, 2007). It is not uncommon for dimensions of sexual orientation to be discrepant within individuals (e.g., identifying as heterosexual, having only opposite-sex sexual partners, and same-sex attractions; Lund, Thomas, Sias, & Bradley, 2016; Nield, Magnusson, Brooks, Chapman, & Lapane, 2015; Pathela et al., 2006). All sexual minorities, regardless of whether their sexual minority status is based on identity, attractions, and/or behavior, experience chronic minority stress (i.e., invisible stigma; Juster, Smith, Ouellet, Sindi, & Lupien, 2013; Pachankis, 2007; Ragins, Singh, & Cornwell, 2007)—the major mechanism theorized to underlie physical and mental health disparities affecting sexual minorities (Hatzenbuehler, 2009; Hatzenbuehler & Pachankis, 2016). Therefore, sexual minority identity, having any level of same-sex attractions, and having same-sex sexual partners are all likely to be associated with increased risk for physical health disorders. How researchers define sexual orientation is important and can lead to meaningful differences in study findings. Thus, it is critical to inclusively examine health disparities across all dimensions of sexual orientation to develop a more complete understanding of the physical health disparities affecting sexual minorities.

Second, research has often examined sexual minority individuals as a homogeneous group (Institute of Medicine, 2011; Kaestle & Ivory, 2012; Wolff, Wells, Ventura-DiPersia, Renson, & Grov, 2017) despite significant heterogeneity among sexual minority individuals, both in minority stress experiences and in mental health/substance use outcomes (see Feinstein & Dyar, 2017). Furthermore, previous research has revealed increased risk for poorer physical health among bisexual individuals compared to heterosexual and lesbian/gay individuals (e.g., Conron et al., 2010; Dilley et al., 2010; Fredriksen-Goldsen, Kim, Barkan, Balsam, & Mincer, 2010). Bisexual individuals' increased risk is attributed to unique aspects of anti-bisexual stigma (e.g., Brewster & Moradi, 2010; Kuyper & Fokkema, 2011). For instance, bisexual individuals experience bias from both heterosexual and lesbian/gay populations, whereas lesbian/gay individuals experience bias from heterosexuals (Brewster & Moradi, 2010; Dodge et al., 2016; Mohr & Rochlen, 1999). Additionally, bias against lesbian/gay individuals is generally viewed as having a single dimension—negative attitudes toward lesbian/gay individuals. However, for bisexual individuals, bias includes negative attitudes as well as stereotype-based bias, which portrays bisexuality as an illegitimate and unstable sexual orientation and bisexual individuals as sexually irresponsible and promiscuous (Brewster & Moradi, 2010; Dodge et al., 2016; Mohr & Rochlen, 1999). Given the heterogeneity of experiences and outcomes among sexual minority subgroups, most notably between lesbian/gay and bisexual individuals, it is necessary to examine how physical health disparities may differentially affect subgroups of sexual minorities.

Third, though often overlooked, it is critical to take intersecting minority identities (i.e., sexual minority, gender, race/ethnicity) into account when examining physical health disparities. Growing research indicates poorer physical health among sexual minority individuals of color (Hsieh & Ruther, 2016; Katz-Wise et al., 2014; Martinez et al., 2017), and this increased risk is likely conferred by the synergistic impact of minority stress experiences based on their multiple marginalized identities (Greene, 1996). For instance, sexual minority individuals of color may not be accepted by their racial/ethnic communities because of their sexual identity (Malebranche, Fields, Bryant, & Harper, 2007; Mays, Cochran, & Rhue, 1993) and also experience racism within the sexual minority community (Balsam, Molina, Beadnell, Simoni, & Walters, 2011). However, some research also indicates that sexual minority individuals of color display resilience in the face of stigma (e.g., Moradi et al., 2010). Given the dearth of research using an intersectional perspective to examine physical health disparities as well as evidence suggesting both increased risk and resilience, further examinations of how physical health disparities differ by race/ethnicity are required.

Taken together, these limitations make comparisons of sexual orientation-related physical health disparities across studies difficult at best, which has resulted in piecemeal contributions to the literature (Institute of Medicine, 2011), and prevented our ability to more comprehensively understand these disparities and the pathways through which they may operate. Furthermore, these limitations may have obscured nuanced findings important to public health efforts, including prevention and intervention, for a critically at-risk population. Thus, more nuanced examinations of sexual orientation-related physical health disparities are required to overcome these obstacles by: (1) using multidimensional definitions of sexual orientation, (2) examining sexual minority subgroups, separately, and (3) using intersectional approaches.

The Present Study

The current study aimed to address previous limitations by using data from a large, nationally representative, probability sample of U.S. adults collected between 2004 and 2005 to investigate differences in physical health disparities across three dimensions of sexual orientation (i.e., identity, attraction, behavior). To make comparisons by sex and race/ethnicity, we examined physical health disparities separately for men and women, and for non-Hispanic White, non-Hispanic African American, and Hispanic/Latinx individuals, separately.

We hypothesized that individuals who identify as lesbian, gay, or bisexual report any same-sex attraction, and/or report any same-sex sexual partners (i.e., sexual minority individuals) would be at increased risk for physical health conditions, poorer physical health-related quality of life, and a higher number of physical health conditions compared to individuals who identify as heterosexual with exclusively opposite-sex attractions and

sexual partners. We expect disparities to be most pronounced among individuals who identify as bisexual, report attractions to men and women, or report male and female sexual partners. We hypothesized similar patterns of disparities for men and women based on prior research. Finally, given limited research examining sexual minority physical health disparities by race/ethnicity, we did not offer a priori hypotheses regarding possible differences in patterns by race/ethnicity.

Method

Participants

We used data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) for the current analyses. NESARC is a representative, national probability sample of the adult civilian, non-institutionalized U.S. population. Wave 1 data were fielded from 2001 to 2002 ($N = 43,093$; response rate 81% of eligible individuals), and a Wave 2 follow-up (2004–2005) reassessed Wave 1 participants ($N = 34,653$; 86.7% of eligible original sample; 70.2% cumulative response rate). For more detail about NESARC's design, see Grant and Dawson (2006). Sexual orientation was not assessed at Wave 1; therefore, the current study only used Wave 2 data. To ensure representativeness of the age, race/ethnic, and sex distribution of the U.S., based on the 2000 census, we incorporated survey design variables (e.g., weights). After applying sample weights, the sample ($N = 34,653$) represented a population comprised of 52% women, with a racial/ethnic breakdown of 70.9% non-Hispanic/Latino White, 11.6% Hispanic/Latino, 11.1% non-Hispanic African American, 4.3% non-Hispanic/Latino Asian/Pacific Islander/Hawaiian Native, and 2.2% American Indian/Alaskan Native. Demographic information is presented in Table 1. The NESARC received a full ethical review and was approved by the US Census Bureau and the Office of Management and Budget.

Measures

Sexual Orientation

Three dimensions of sexual orientation were assessed: sexual orientation identity, sexual attractions, and sexual behavior. Descriptive information is presented in Table 2, including response frequencies for each sexual orientation variable, separately, by sex and race/ethnicity.

Identity was assessed with the question, “Which of the categories best describes you?” Responses included “heterosexual (straight),” “gay or lesbian,” “bisexual,” or “not sure.” Variables were dummy coded with heterosexual identity as the reference group.

Table 1 Demographic characteristics: NESARC, Wave 2

Demographic characteristic	Number ^a	% ^b
Sex		
Men	14,564	48.0
Women	20,089	52.0
Race/ethnicity		
Non-Hispanic White	20,161	70.9
Non-Hispanic African American	6587	11.0
Hispanic/Latinx	6359	11.6
Non-Hispanic Asian/Pacific Islander	968	4.2
American Indian/Alaskan native	578	2.2
Age		
20–24	2183	7.6
25–44	1333	38.5
45–64	11,960	34.7
64–90	7177	19.2
Marital status		
Married or cohabitating	18,866	54.4
Widowed, divorced, or separated	9149	26.4
Never married	6638	19.2
Education		
Less than high school	5514	15.9
Completed high school	9452	27.3
More than high school	19,687	56.8
Income		
Less than \$20,000	8031	23.2
\$20,000 to \$34,999	6882	19.9
\$35,000 to \$59,999	8444	24.4
\$60,000 or more	11,296	32.6
Region of US		
Northeast	6091	17.6
Midwest	6558	18.9
South	13,178	38.0
West	8826	25.5

^a *N*s based on unweighted data

^b Percentages based on weighted data

Attractions were assessed with the question, “People are different in their sexual attraction to other people. Which category best describes your feelings?” Responses included “only attracted to females,” “mostly attracted to females,” “equally attracted to females and males,” “mostly attracted to males,” and “only attracted to males.” This variable was coded to reflect same- and/or opposite-sex attractions and was dummy coded with only opposite-sex attractions serving as the reference group.

Behavior was assessed with the question, “In your entire life, have you had sex with only males, only females, both males and females, or have you never had sex?” Responses included “only males,” “only females,” “both males and females,” and “never had sex.” We coded this variable to reflect having same- and/or opposite-sex sexual partners and dummy coded it using individuals with only opposite-sex sexual partners as the reference group.

Physical Health

Several past-year physical health conditions were assessed in NESARC Wave 2.¹ The NESARC examined the following physical health outcomes: (1) high blood pressure (hypertension or arteriosclerosis), (2) cardiovascular disease (angina pectoris [chest pain], tachycardia [rapid heartbeat], myocardial infarction [heart attack], or any other form of heart disease), (3) high cholesterol, (4) gastrointestinal disorder (stomach ulcer, gastritis), (5) hepatic disease (cirrhosis of the liver or any other form of liver disease), (6) arthritis, (7) obesity, (8) diabetes, and (9) stroke. HIV/AIDS and other sexually transmitted infections (STIs) were also assessed but not examined as outcomes in the current study.² For all items except obesity, participants were first asked whether they had each physical condition over the past year. If participants endorsed a condition, they were then asked whether a physician or other health professional had diagnosed them with the condition. We used the latter, stricter criterion for the current analyses, consistent with previous literature (El-Gabalawy, Katz, & Sareen, 2010; Goldstein et al., 2008; Mather, Cox, Enns, & Sareen, 2008). Obesity was calculated using a BMI (body mass index) threshold of greater than 30. BMI was calculated by dividing weight (in pounds) by height² (in inches) and multiplying by 703 (El-Gabalawy et al., 2010). Each physical health condition was dichotomously coded. Additionally, we summed the number of conditions a participant endorsed to create a count variable, which we used to examine individuals’ disease burden (number of physical conditions); higher scores indicate increased risk for more physical health conditions.

Additionally, the NESARC assessed health quality of life (HQoL) using the Physical Component Summary (PCS) from the 12-item Medical Outcomes Study Short Form (SF-12)—a self-report measure of general physical health with high reliability and validity (Gandek et al., 1998; Ware, Kosinski, & Keller, 1996). A sample question includes, “The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?” Responses included “Yes, limited a lot,” “Yes, limited a little,” and “No, not limited at all.” Scores were computed according to standard scoring procedures for this population-normed scale (Gandek et al., 1998; Ware et al., 1996). Higher scores indicate higher physical HQoL.

Statistical Approach

Analyses were conducted using Mplus Version 7.2 (Muthén & Muthén, 2012). We used NESARC’s design variables to

¹ Lifetime physical health was not assessed at Wave 2 and, therefore, is not examined in the current manuscript.

² Sexual orientation differences in risk for HIV/AIDS and other STIs using the NESARC dataset have been presented elsewhere (Oldenburg, Perez-Brumer, & Reiser, 2014; Sweet & Welles, 2012), so we do not examine them here. In the current analyses, we use these variables as covariates in a set of sensitivity analyses (see footnote 3).

Table 2 Sexual orientation by sex and race/ethnicity

Sexual orientation	Sex						Race/ethnicity							
	Men		Women		White		African American		Latinx		Asian/Pacific Islander		Native American	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Identity														
Heterosexual	14,109	96.9	19,489	97.0	19,547	97.0	6410	97.3	6165	96.9	925	95.6	551	95.3
Lesbian/Gay	190	1.3	145	.7	220	1.1	49	.7	49	.8	7	.7	10	1.7
Bisexual	81	.6	161	.8	145	.7	41	.6	44	.7	7	.7	5	.9
Not sure	69	.5	110	.5	79	.4	37	.6	42	.7	6	.6	6	1.0
Sexual attractions														
Opposite sex only	13,704	94.1	18,358	91.4	18,670	92.6	6097	92.6	5909	92.9	865	89.4	521	90.1
Mostly opposite sex	227	1.6	880	4.4	675	3.3	240	3.6	194	3.1	31	3.2	17	2.9
Equally same and opposite sex	130	.9	260	1.3	225	1.1	74	1.1	62	1.0	17	1.8	12	2.1
Mostly same sex	96	.7	87	.4	101	.5	36	.5	38	.6	5	.5	3	.5
Same sex only	229	1.6	275	1.4	295	1.5	81	1.2	90	1.4	23	2.4	15	2.6
Sexual behavior														
Opposite sex only	13,534	92.9	18,904	94.1	18,823	93.4	6246	94.8	5960	93.7	879	90.8	530	91.7
Same sex only	342	2.3	177	.9	293	1.5	96	1.5	99	1.6	21	2.2	10	1.7
Both same and opposite sex	302	2.1	445	2.2	475	2.4	121	1.8	119	1.9	8	.8	24	4.2
Never had sex	249	1.7	334	1.7	370	1.8	61	.9	114	1.8	31	3.2	7	1.2

Categories do not add up to the full sample size due to missing data on sexual identity ($n = 308$), sexual attractions ($n = 357$), and sexual behavior ($n = 366$). Percentages were calculated out of the total number of individuals in each sex or race/ethnic group

accommodate the complex study design. We used Monte Carlo integration and robust maximum likelihood estimation (MLR) to conduct analyses. To examine sexual orientation-related differences in the prevalence of physical health conditions by dimension of sexual orientation (i.e., identity, behavior, attraction), we used logistic (individual physical health conditions), negative binomial (number of conditions), and linear (HQoL) regression. Analyses were stratified by sex (men, $n = 14,564$; women, $n = 20,089$) and then, separately, by race/ethnicity (non-Hispanic White, $n = 20,161$; non-Hispanic Black, $n = 6587$; Hispanic/Latinx, $n = 6359$). Non-Hispanic Asian, Pacific Islander, Native American, and Native Alaskan individuals were included in analyses stratified by sex, but due to the smaller sizes of these racial/ethnic subsamples, we could not conduct analyses stratified by race/ethnicity in these subsamples. All models controlled for sex (in analyses not stratified by sex), age, race/ethnicity (in analyses not stratified by race/ethnicity), income, education, marital status, and region of country.³

³ Given known disparities in HIV/AIDS and other STIs (CDC, 2015; Logie, Navia, & Loutfy, 2015), we conducted analyses with and without controlling for HIV, AIDS, and STI diagnoses. Both sets of results yielded similar results. Thus, for brevity and because sexual orientation differences in risk for HIV/AIDS using the NESARC dataset have been presented elsewhere (Oldenburg et al., 2014; Sweet & Welles, 2012), we present analyses unadjusted for HIV/AIDS and STIs.

Results

Adjusted odds ratios for physical health conditions are presented separately by stratification group (i.e., sex and race/ethnicity) and for each dimension of sexual orientation (i.e., identity, attractions, behavior) in Tables 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12.

Women

Identity

Lesbian- and bisexually identified women had approximately two times higher risk for gastrointestinal conditions compared to heterosexually identified women (see Tables 3, 4). Lesbian-identified women had increased risk for arthritis and obesity compared to heterosexually identified women. Bisexually identified women had significantly poorer HQoL compared to heterosexually identified women.

Attractions

Mostly opposite-sex attracted women had increased risk for gastrointestinal conditions, having more physical health conditions, and poorer HQoL compared to exclusively opposite-sex

Table 3 Adjusted odds ratios for physical health conditions: Women

Sexual orientation	Gastrointestinal conditions	Cardiovascular disease	High blood pressure	High cholesterol	Hepatic disease	Arthritis	Obesity	Diabetes	Stroke
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sexual identity									
Lesbian	1.95 (1.01, 3.77)*	1.22 (.49, 3.04)	1.02 (.61, 1.70)	1.12 (.60, 2.08)	–	1.57 (1.00, 2.48)*	1.58 (1.01, 2.47)*	1.71 (.84, 3.49)	3.61 (.52, 25.27)
Bisexual	2.10 (1.17, 3.76)**	.65 (.31, 1.35)	1.28 (.74, 2.19)	.98 (.56, 1.71)	–	1.38 (.85, 2.23)	1.29 (.83, 2.02)	.92 (.41, 2.05)	3.39 (.73, 15.78)
Not sure	.92 (.30, 2.80)	2.01 (.79, 5.13)	1.84 (.92, 3.62)	1.19 (.58, 2.44)	–	.98 (.47, 2.01)	1.08 (.60, 1.95)	1.36 (.69, 2.66)	3.13 (.39, 24.83)
Heterosexual	Referent	Referent	Referent	Referent	–	Referent	Referent	Referent	Referent
Sexual attractions									
Only SS	1.08 (.61, 1.92)	1.12 (.60, 1.51)	1.09 (.74, 1.60)	1.02 (.70, 1.50)	.30 (.04, 2.18)	.79 (.54, 1.14)	1.32 (.93, 1.87)	1.02 (.60, 1.74)	.93 (.21, 4.16)
Mostly SS	.92 (.33, 2.58)	.99 (.33, 3.04)	1.06 (.61, 1.83)	.79 (.38, 1.66)	1.45 (.20, 10.61)	.76 (.42, 1.34)	.96 (.53, 1.74)	1.11 (.39, 3.15)	–
Equally SS and OS	1.20 (.72, 1.98)	1.00 (.66, 1.48)	1.25 (.89, 1.77)	1.03 (.68, 1.55)	.36 (.05, 2.59)	.93 (.65, 1.32)	.99 (.72, 1.38)	.95 (.57, 1.59)	1.99 (.82, 4.81)
Mostly OS	1.38 (1.05, 1.82)*	.95 (.84, 1.50)	1.13 (.90, 1.41)	1.09 (.87, 1.37)	1.51 (.7, 3.08)	1.03 (.83, 1.28)	1.12 (.93, 1.35)	1.09 (.80, 1.48)	1.83 (.97, 3.48)
Only OS	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Sexual behavior									
Only SS	1.53 (.79, 2.97)	0.84 (.44, 1.59)	1.26 (.81, 1.98)	0.79 (.48, 1.30)	–	.60 (.38, .95)*	1.61 (1.07, 2.40)*	.83 (.45, 1.53)	1.06 (.15, 7.49)
Both SS and OS	1.88 (1.29, 2.74)**	1.50 (.98, 2.30)	1.19 (.86, 1.66)	1.18 (.80, 1.72)	2.86 (1.33, 6.14)**	1.61 (1.18, 2.20)**	1.48 (1.13, 1.94)**	1.51 (.90, 2.54)	1.06 (.28, 4.03)
Never had sex	.75 (.41, 1.37)	1.16 (.68, 2.00)	1.44 (.94, 2.21)	1.28 (.87, 1.89)	1.40 (.40, 4.87)	0.94 (.60, 1.46)	1.63 (1.20, 2.20)**	1.41 (.86, 2.31)	1.77 (.44, 7.13)
Only OS	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent

“–” indicates too little within-group variance to allow for between-group differences to be modeled. Odds ratios were adjusted for: age, race/ethnicity, income, education, marital status, and region of country

SS same-sex; OS opposite-sex

* $p < .05$; ** $p < .01$

Table 4 Disparities in number of conditions and HQoL: Women

Sexual orientation	Number of conditions RR (95% CI)	Health-related quality of life <i>b</i> (95% CI)
Sexual identity		
Lesbian	1.28 (.93, 1.64)	− 2.05 (− 4.20, .09)
Bisexual	1.12 (.88, 1.36)	− 1.96 (− 3.54, − .37)*
Not sure	1.38 (.88, 1.89)	− 3.14 (− 6.96, .67)
Heterosexual	Referent	Referent
Sexual attractions		
Only SS	1.01 (.84, 1.23)	− .32 (− 1.92, 1.28)
Mostly SS	.91 (.64, 1.18)	.91 (− .96, 2.79)
Equally SS and OS	1.05 (.91, 1.18)	.55 (− .86, 1.95)
Mostly OS	1.11 (1.00, 1.23)*	− .86 (− 1.63, − .09)*
Only OS	Referent	Referent
Sexual behavior		
Only SS	0.94 (.74, 1.15)	.17 (− 1.80, 2.13)
Both SS and OS	1.34 (1.12, 1.55)**	− 2.22 (− 3.29, − 1.15)**
Never had sex	1.13 (.86, 1.39)	− 1.13 (− 2.42, .16)
Only OS	Referent	Referent

Estimates were adjusted for: age, sex, income, education, marital status, and region of country

Number of conditions number of conditions reported by an individual (disease burden); *HQoL* health-related quality of life; *SS* same-sex; *OS* opposite-sex

* $p < .05$; ** $p < .01$

attracted women. Women of all other attractions were not at significantly increased risk for any physical health conditions compared to exclusively opposite-sex attracted women.

Behavior

Women with same- and opposite-sex sexual partners had significantly higher risk for the largest number of physical health conditions, including gastrointestinal conditions, hepatic disease, arthritis, obesity, having more physical health conditions, and poorer HQoL compared to women with only opposite-sex sexual partners. In contrast, women with only same-sex sexual partners had decreased risk for arthritis and increased risk for obesity compared to women with only opposite-sex sexual partners. Women who never had sex had increased risk for obesity compared to women with only opposite-sex sexual partners.

Men

Identity

Gay- and bisexually identified men had increased risk for high cholesterol and having more physical health conditions

compared to heterosexually identified men (see Tables 5, 6). Bisexually identified men had higher risk for gastrointestinal conditions and obesity, while gay-identified men had higher risk for hepatic disease compared to heterosexually identified men. Men who reported being unsure about their sexual identities had increased risk for high blood pressure and having more physical health conditions compared to heterosexually identified men.

Attractions

Men attracted to both men and women were at risk for the highest number of conditions—although patterns varied by their specific attractions (i.e., mostly same-sex, mostly opposite-sex, or equally same- and opposite-sex attracted). This group was at increased risk for cardiovascular disease, high cholesterol, hepatic disease, arthritis, and having more physical health conditions compared to exclusively opposite-sex attracted men. Exclusively same-sex attracted men only had increased risk for arthritis compared to exclusively opposite-sex attracted men.

Behavior

Similarly, men with both same- and opposite-sex sexual partners had increased risk for gastrointestinal conditions, high blood pressure, high cholesterol, hepatic disease, and having more physical health conditions compared to men with only opposite-sex sexual partners. Men with only same-sex sexual partners only had increased risk for stroke compared to men with only opposite-sex partners.

Non-Hispanic White

Identity

Non-Hispanic White bisexually identified individuals had higher risk for gastrointestinal conditions, obesity, and having more physical health conditions compared to heterosexually identified individuals (see Tables 7, 8). Lesbian/gay-identified individuals had increased risk for hepatic disease, stroke, and having more physical health conditions. Individuals who were unsure about their sexual identity had increased risk for high blood pressure and having more physical health conditions compared to heterosexually identified individuals.

Attraction

Non-Hispanic White individuals with mostly opposite-sex and equal same-sex and opposite-sex attractions were at increased risk for gastrointestinal conditions and having more physical health conditions compared to exclusively opposite-sex attracted individuals, while mostly same-sex attracted individuals

Table 5 Adjusted odds ratios for physical health conditions: Men

Sexual orientation	Gastrointestinal conditions	Cardiovascular disease	High blood pressure	High cholesterol	Hepatic disease	Arthritis	Obesity	Diabetes	Stroke
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sexual identity									
Gay	1.16 (.48, 2.80)	1.86 (.98, 3.50)	1.23 (.77, 1.96)	1.66 (1.11, 2.48)*	3.27 (1.34, 7.96)**	1.02 (.54, 1.90)	.64 (.39, 1.05)	1.37 (.70, 2.69)	4.13 (.61, 28.16)
Bisexual	3.37 (1.61, 7.03)**	1.39 (.61, 3.14)	1.64 (.87, 3.08)	1.92 (1.06, 3.49)*	2.96 (.52, 16.74)	1.66 (.91, 3.02)	2.37 (1.34, 4.20)**	1.49 (.72, 3.10)	1.46 (.19, 11.05)
Not sure	1.50 (.60, 3.78)	.59 (.24, 1.50)	3.12 (1.60, 6.11)**	1.62 (.78, 3.39)	1.61 (.38, 6.78)	1.66 (.76, 3.62)	.55 (.26, 1.15)	.55 (.59, 4.05)	1.75 (.25, 12.25)
Heterosexual	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Sexual attractions									
Only SS	.79 (.41, 1.53)	1.15 (.70, 1.89)	.95 (.62, 1.45)	1.17 (.81, 1.70)	.93 (.22, 3.97)	1.79 (1.16, 2.74)**	.83 (.56, 1.24)	1.05 (.61, 1.81)	2.58 (.60, 11.05)
Mostly SS	1.81 (.76, 4.29)	2.57 (1.09, 6.03)*	1.80 (.98, 3.31)	2.29 (1.32, 3.97)**	4.62 (1.56, 13.65)**	1.67 (.80, 3.47)	.69 (.35, 1.39)	1.44 (.53, 3.91)	1.71 (.22, 13.20)
Equally SS and OS	1.88 (.97, 3.66)	1.18 (.55, 2.53)	1.44 (.86, 2.42)	1.51 (.89, 2.57)	2.36 (.68, 8.25)	1.58 (.93, 2.69)	1.35 (.82, 2.22)	.95 (.51, 1.75)	2.62 (.59, 1.62)
Mostly OS	.94 (.55, 1.61)	.59 (.37, .94)*	1.11 (.82, 1.51)	1.04 (.75, 1.45)	1.18 (.33, 4.15)	1.45 (1.02, 2.07)*	.97 (.72, 1.32)	1.19 (.77, 1.85)	.93 (.29, 2.98)
Only OS	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Sexual behavior									
Only SS	.83 (.44, 1.55)	1.04 (.66, 1.63)	.90 (.65, 1.24)	1.07 (.74, 1.55)	.85 (.36, 2.00)	1.32 (.93, 1.89)	1.05 (.78, 1.43)	1.03 (.65, 1.65)	2.96 (1.06, 8.24)*
Both SS and OS	2.45 (1.55, 3.83)**	1.38 (.87, 2.18)	1.40 (1.01, 1.94)*	1.72 (1.28, 2.32)**	2.39 (1.05, 5.43)*	1.45 (.98, 2.16)	1.07 (.77, 1.47)	1.35 (.87, 2.11)	-
Never had sex	.84 (.35, 2.04)	.63 (.27, 1.45)	1.46 (.93, 2.29)	1.14 (.75, 1.73)	1.32 (.26, 6.65)	.86 (.49, 1.53)	1.25 (.85, 1.82)	1.48 (.78, 2.79)	.57 (.08, 4.34)
Only OS	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent

“-” indicates too little within-group variance to allow for between-group differences to be modeled. Odds ratios were adjusted for: age, race/ethnicity, income, education, marital status, and region of country

SS same-sex; OS opposite-sex

* $p < .05$; ** $p < .01$

Table 6 Disparities in number of conditions and HQoL: Men

Sexual orientation	Number of conditions RR (95% CI)	Health-related quality of life <i>b</i> (95% CI)
Sexual identity		
Gay	1.46 (1.03, 1.89)*	− 1.26 (− 3.54, 1.01)
Bisexual	1.59 (1.19, 1.99)**	0.39 (− 2.86, 3.64)
Not sure	1.70 (1.12, 2.28)**	0.85 (− 1.17, 2.88)
Heterosexual	Referent	Referent
Sexual attractions		
Only SS	1.15 (.92, 1.37)	− 1.06 (− 2.77, .64)
Mostly SS	1.83 (1.16, 2.51)**	− 1.36 (− 4.35, 1.62)
Equally SS and OS	1.40 (1.08, 1.73)**	− .003 (− 2.25, 2.24)
Mostly OS	1.05 (.89, 1.21)	.89 (− 2.12, .34)
Only OS	Referent	Referent
Sexual behavior		
Only SS	1.03 (.86, 1.21)	.72 (− .22, 1.67)
Both SS and OS	1.54 (1.30, 1.78)**	− 1.15 (− 2.91, .61)
Never had sex	1.09 (.72, 1.46)	− 1.05 (− 2.53, .43)
Only OS	Referent	Referent

Estimates were adjusted for: age, sex, income, education, marital status, and region of country

Number of conditions number of conditions reported by an individual (disease burden); *HQoL* health-related quality of life; *SS* same-sex; *OS* opposite-sex

* $p < .05$; ** $p < .01$

had increased risk for hepatic disease. Exclusively same-sex attracted individuals were not at increased risk for any physical health conditions.

Behavior

Non-Hispanic White individuals with same- and opposite-sex sexual partners had increased risk for gastrointestinal conditions, cardiovascular disease, high cholesterol, having more physical health conditions, and poorer HQoL compared to individuals with only opposite-sex partners. Individuals with only same-sex sexual partners only had increased risk for stroke. Individuals who never had sex had increased risk for high blood pressure, obesity, and poorer HQoL compared to individuals with only opposite-sex partners.

Non-Hispanic Black

Identity

Non-Hispanic Black lesbian/gay and bisexually identified individuals were not at increased risk for any physical health conditions (see Tables 9, 10). Individuals unsure about their sexual

identity had increased risk for cardiovascular disease, high blood pressure, high cholesterol, and having more physical health conditions compared to heterosexually identified individuals.

Attraction

Non-Hispanic Black mostly same-sex attracted individuals had decreased risk for obesity compared to exclusively opposite-sex attracted individuals. No other significant findings emerged.

Behavior

Compared to sexual identity and attraction, sexual behavior was more strongly associated with higher risk for poorer physical health among non-Hispanic Black individuals. Those with same- and opposite-sex sexual partners had higher risk for gastrointestinal conditions, hepatic disease, arthritis, and having more physical health conditions compared to individuals with only opposite-sex partners. Individuals with only same-sex sexual partners had increased risk for high cholesterol and obesity, whereas individuals who never had sex had increased risk for high blood pressure and decreased risk for arthritis compared to individuals with only opposite-sex partners.

Hispanic/Latino

Identity

Bisexually identified Hispanic/Latino individuals had heightened risk for high blood pressure and having more physical health conditions compared to heterosexually identified Hispanic/Latino individuals (see Tables 11, 12). Lesbian/gay-identified individuals had decreased risk for gastrointestinal conditions. Individuals unsure about their sexual identity had increased risk for high blood pressure compared to heterosexual individuals.

Attraction

Hispanic/Latino individuals with equal same- and opposite-sex attractions had increased risk for high blood pressure and having more physical health conditions, and mostly same-sex attracted individuals had decreased risk for gastrointestinal conditions. Exclusively same-sex attracted individuals were not at increased risk for any physical health conditions.

Behavior

Hispanic/Latino individuals with same- and opposite-sex sexual partners had increased risk for hepatic disease and having more physical health conditions compared to Hispanic/Latino individuals with only opposite-sex sexual partners. No other significant findings emerged.

Table 7 Adjusted odds ratios for physical health conditions: Non-Hispanic Whites

Sexual orientation	Gastrointestinal disorder	Cardiovascular disease	High blood pressure	High cholesterol	Hepatic disease	Arthritis	Obesity	Diabetes	Stroke
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sexual identity									
Lesbian/Gay	1.61 (.86, 3.00)	1.45 (.82, 2.56)	1.25 (.83, 1.87)	1.22 (.81, 1.83)	2.78 (1.14, 6.79)*	1.20 (.80, 1.80)	.87 (.56, 1.36)	1.19 (.67, 2.11)	5.73 (1.40, 23.43)*
Bisexual	3.01 (1.75, 5.20)**	.91 (.45, 1.83)	1.41 (.85, 2.34)	1.44 (.93, 2.24)	1.47 (.21, 10.13)	1.17 (.75, 1.83)	1.69 (1.16, 2.45)**	1.19 (.60, 2.34)	3.41 (.95, 12.18)
Not Sure	1.00 (.33, 2.97)	1.33 (.46, 3.84)	2.11 (1.10, 4.05)*	1.24 (.64, 2.43)	.66 (.09, 4.79)	1.12 (.56, 2.23)	1.11 (.59, 2.06)	1.83 (.91, 3.71)	3.92 (.70, 21.82)
Heterosexual	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Sexual attractions									
Only SS	1.07 (.62, 1.84)	1.05 (.69, 1.59)	1.00 (.69, 1.47)	1.23 (.90, 1.69)	.57 (.14, 2.25)	1.27 (.87, 1.85)	1.04 (.73, 1.47)	1.06 (.62, 1.82)	2.01 (.53, 7.54)
Mostly SS	1.59 (.76, 3.31)	1.67 (.72, 3.87)	1.30 (.82, 2.07)	1.01 (.62, 1.66)	4.14 (1.39, 12.32)*	.95 (.55, 1.63)	.71 (.41, 1.21)	.63 (.28, 1.42)	1.27 (.16, 9.73)
Equally SS and OS	1.67 (1.03, 2.70)*	1.03 (.65, 1.62)	1.33 (.95, 1.86)	1.23 (.88, 1.73)	1.34 (.40, 4.52)	1.07 (.75, 1.51)	1.21 (.88, 1.66)	1.03 (.63, 1.70)	1.01 (.38, 2.64)
Mostly OS	1.38 (1.03, 1.85)*	1.00 (.75, 1.33)	1.10 (.90, 1.35)	1.20 (.98, 1.47)	1.44 (.67, 3.10)	1.14 (.93, 1.39)	1.16 (.97, 1.39)	1.19 (.90, 1.58)	1.57 (.83, 2.99)
Only OS	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Sexual Behavior									
Only SS	1.32 (.77, 2.25)	.92 (.57, 1.46)	.93 (.67, 1.30)	.96 (.67, 1.37)	.20 (.03, 1.41)	1.09 (.77, 1.55)	1.19 (.86, 1.64)	.99 (.62, 1.57)	3.92 (1.65, 9.31)**
Both SS OS	2.27 (1.64, 3.14)**	1.47 (1.01, 2.12)*	1.18 (.89, 1.56)	1.28 (1.01, 1.62)*	2.05 (.98, 4.29)	1.27 (.96, 1.70)	1.19 (.94, 1.51)	1.36 (.90, 2.06)	–
Never had sex	.66 (.34, 1.28)	1.01 (.60, 1.71)	1.44 (1.01, 2.07)*	1.35 (.97, 1.87)	1.49 (.48, 4.59)	1.00 (.67, 1.50)	1.55 (1.17, 2.04)**	1.44 (.88, 2.36)	1.50 (.38, 5.87)
Only OS	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent

“–” indicates too little within-group variance to allow for between-group differences to be modeled. Odds ratios were adjusted for: age, sex, income, education, marital status, and region of country

SS same-sex; OS opposite-sex

* $p < .05$; ** $p < .01$

Table 8 Disparities in number of conditions and HQoL: Non-Hispanic Whites

Sexual orientation	Number of conditions RR (95% CI)	Health-related quality of life b (95% CI)
Sexual identity		
Lesbian/Gay	1.32 (1.02, 1.63)*	− 1.08 (− 2.82, .65)
Bisexual	1.31 (1.06, 1.56)**	− 1.24 (− 2.98, .51)
Not sure	1.41 (.92, 1.89)*	− 1.27 (− 4.68, 2.15)
Heterosexual	Referent	Referent
Sexual attractions		
Only SS	1.11 (.91, 1.30)	− .52 (− 1.94, .91)
Mostly SS	1.17 (.83, 1.50)	− .13 (− 2.59, 2.33)
Equally SS and OS	1.14 (1.00, 1.28)*	.45 (− 1.11, 2.01)
Mostly OS	1.12 (1.01, 1.23)*	− .89 (− 1.72, − .07)
Only OS	Referent	Referent
Sexual behavior		
Only SS	1.00 (.84, 1.17)	.36 (− .87, 1.60)
Both SS OS	1.35 (1.17, 1.52)**	− 1.36 (− 2.29, − .44)**
Never had sex	1.17 (.90, 1.45)	− 1.19 (− 2.39, − .01)*
Only OS	Referent	Referent

Estimates were adjusted for: age, sex, income, education, marital status, and region of country

Number of conditions number of conditions reported by an individual (disease burden); *HQoL* health-related quality of life; *SS* same-sex; *OS* opposite-sex

* $p < .05$; ** $p < .01$

Discussion

The current study used a large population prevalence sample to examine physical health disparities for sexual minority individuals. To our knowledge, this is the first study to date to examine physical health disparities across dimensions of sexual orientation (i.e., sexual identity, attractions, and behaviors) by sex and by race/ethnicity, separately. Corroborating previous research (Bränström et al., 2016; Cochran & Mays, 2007; Conron et al., 2010), we found that sexual minority individuals had increased risk for various physical health conditions compared to heterosexuals. Several novel findings emerged: (1) bisexual individuals, regardless of the sexual orientation dimension examined, were at highest risk for physical health conditions; (2) health disparities varied by dimensions of sexual orientation; and (3) health disparities differed by sex and race/ethnicity. Of note, individuals with same- and opposite-sex sexual partners faced the most consistent physical health disparities across sex and race/ethnicity.

Bisexual-Specific Physical Health Disparities

Across all groups (i.e., men, women, non-Hispanic White, non-Hispanic African American, and Hispanic/Latinx individuals), bisexuality—by any definition—conferred increased risk for physical health conditions compared to heterosexual individuals. Lesbian and gay individuals were also at increased risk for physical health conditions compared to heterosexual individuals, but they were at elevated risk for fewer conditions compared to bisexual individuals. This indicates that bisexual individuals—irrespective of sexual orientation dimension—are at highest risk for physical health conditions.

Why do bisexual identity, attractions, and behavior confer increased risk for physical health conditions? Bisexuality is highly stigmatized, and this stigma is qualitatively distinct from the stigmatization of lesbian and gay individuals (Bostwick & Hequembourg, 2014; Bränström et al., 2016; Brewster & Moradi, 2010; Mohr & Rochlen, 1999). For example, bisexual individuals experience bias based on stereotypes that portray them as uncertain about their sexual orientation and sexually irresponsible (Bostwick & Hequembourg, 2014; Brewster & Moradi, 2010; Mohr & Rochlen, 1999). Both heterosexual and lesbian/gay populations perpetrate anti-bisexual bias (Brewster & Moradi, 2010; Mohr & Rochlen, 1999), such that lesbian and gay individuals exclude bisexuals from lesbian and gay communities and perpetrate bisexual-specific discrimination (Hayfield, Clarke, & Halliwell, 2014; Kertzner, Meyer, Frost, & Stirratt, 2009). This, coupled with difficulty accessing bisexual-specific communities (Hayfield et al., 2014; Hequembourg & Brallier, 2009), leaves bisexual individuals with little or no access to supportive communities of similarly stigmatized others or to the group-level coping mechanisms such communities can provide (Cox, Vanden Berghe, Dewaele, & Vincke, 2010; Hayfield et al., 2014; Kertzner et al., 2009).

Together, their distinct stigmatization coupled with bisexual individuals' reduced access to protective factors is theorized to contribute to their increased risk for mental health problems (Bostwick, Boyd, Hughes, & McCabe, 2010; Kertzner et al., 2009) and likely also compounds the effects of stigma on other domains of bisexual health, including physical health (Feinstein & Dyar, 2017). In fact, a recent study indicates that bisexual-specific minority stress predicts poorer physical health above and beyond general sexual minority stress (Katz-Wise, Mereish, & Woulfe, 2016). Further research is needed to clearly characterize mechanisms through which experiences of bisexual stigma and the social implications of bisexual stigma (e.g., exclusion from the lesbian/gay community, decreased access to communities of similar others) directly and indirectly impact physical health among bisexual individuals.

Table 9 Adjusted odds ratios for physical health conditions: Non-Hispanic African Americans

Sexual orientation	Gastrointestinal condition	Cardiovascular disease	High blood pressure	High cholesterol	Hepatic disease	Arthritis	Obesity	Diabetes	Stroke
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sexual identity									
Lesbian/Gay	2.60 (.93, 7.28)	1.21 (.36, 4.08)	.50 (.22, 1.12)	1.71 (.81, 3.57)	2.83 (.70, 11.49)	1.04 (.42, 2.56)	.70 (.37, 1.33)	.99 (.39, 2.54)	–
Bisexual	.15 (.02, 1.12)	1.13 (.35, 3.62)	.56 (.27, 1.16)	.34 (.09, 1.20)	–	2.45 (.77, 7.81)	.97 (.44, 2.12)	.75 (.30, 1.88)	–
Not sure	.74 (.20, 2.79)	2.87 (1.05, 7.84)*	4.08 (1.65, 10.12)**	3.08 (1.09, 8.72)*	–	2.69 (.91, 7.92)	.73 (.29, 1.82)	1.23 (.35, 4.25)	–
Heterosexual	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Sexual attractions									
Only SS	.92 (.38, 2.24)	.76 (.35, 1.66)	.96 (.40, 2.32)	1.41 (.69, 2.87)	1.04 (.14, 7.61)	1.05 (.46, 2.38)	1.48 (.76, 2.88)	1.71 (.82, 3.55)	1.79 (.37, 8.55)
Mostly SS	2.22 (.62, 9.75)	1.86 (.58, 5.97)	1.21 (.40, 3.66)	2.15 (.58, 8.01)	3.40 (.75, 15.39)	1.83 (.47, 7.07)	.33 (.16, .67)*	.84 (.19, 3.63)	–
Equally SS and OS	.56 (.21, 1.48)	.81 (.43, 1.53)	1.31 (.67, 2.57)	1.12 (.43, 2.98)	1.13 (.13, 10.14)	1.02 (.36, 2.87)	1.23 (.66, 2.27)	1.17 (.45, 3.03)	.75 (.10, 5.38)
Mostly OS	.84 (.45, 1.56)	1.32 (.92, 1.90)	1.09 (.64, 1.88)	1.06 (.69, 1.62)	1.30 (.43, 3.93)	.90 (.60, 1.35)	.87 (.66, 1.14)	1.05 (.67, 1.66)	1.74 (.44, 6.90)
Only OS	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Sexual behavior									
Only SS	.75 (.25, 2.25)	1.66 (.85, 3.23)	1.21 (.63, 2.35)	1.83 (1.00, 3.37)*	1.03 (.90, 8.69)	.91 (.37, 2.21)	1.92 (1.07, 3.44)*	1.25 (.63, 2.44)	–
Both SS and OS	2.99 (1.42, 6.28)**	1.62 (.86, 3.06)	1.26 (.73, 2.19)	1.25 (.67, 2.33)	1.73 (2.16, 14.63)**	2.15 (1.15, 4.02)*	1.13 (.68, 1.88)	.85 (.42, 1.71)	1.33 (.33, 5.35)
Never had sex	.62 (.08, 4.68)	.34 (.05, 2.46)	2.43 (1.20, 4.91)*	1.20 (.44, 3.28)	–	.34 (.12, .94)*	1.39 (.72, 2.70)	1.47 (.59, 3.66)	–
Only OS	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent

“–” indicates too little within-group variance to allow for between-group differences to be modeled. Odds ratios were adjusted for: age, sex, income, education, marital status, and region of country

SS same-sex; OS opposite-sex

* $p < .05$; ** $p < .01$

Table 10 Disparities in number of conditions and HQoL: Non-Hispanic African Americans

Sexual orientation	Number of conditions RR (95% CI)	Health-related quality of life <i>b</i> (95% CI)
Sexual identity		
Lesbian/Gay	1.10 (.74, 1.46)	− 1.84 (− 4.32, .63)
Bisexual	.93 (.43, 1.43)	− .46 (− 4.48, 3.56)
Not sure	2.19 (1.57, 2.82)**	− 1.88 (− 5.07, 1.31)
Heterosexual	Referent	Referent
Sexual attractions		
Only SS	1.14 (.75, 1.53)	.51 (− 2.36, 3.39)
Mostly SS	1.56 (.71, 2.41)	− 2.04 (− 5.87, 1.80)
Equally SS and OS	1.07 (.74, 1.39)	.34 (− 2.11, 2.80)
Mostly OS	1.14 (.91, 1.37)	− .99 (− 2.54, .55)
Only OS	Referent	Referent
Sexual behavior		
Only SS	1.22 (.87, 1.56)	1.32 (− .90, 3.55)
Both SS and OS	1.51 (1.15, 1.87)**	− .77 (− 2.59, 1.03)
Never had sex	1.10 (.60, 1.61)	− 1.63 (− 3.65, .38)
Only OS	Referent	Referent

Estimates were adjusted for: age, sex, income, education, marital status, and region of country

Number of conditions number of conditions reported by an individual (disease burden); *HQoL* health-related quality of life; *SS* same-sex; *OS* opposite-sex

* $p < .05$; ** $p < .01$

Physical Health and Stigmatized Identities: Intersectional Findings

Overall, physical health disparities varied across sexual orientation dimensions, sex, and race/ethnicity. Bisexual men, women, and White individuals, across sexual orientation dimensions, were at increased risk for physical health conditions. Identifying as lesbian or gay was associated with increased risk; however, having exclusively same-sex attractions or sexual partners conferred little to no increased risk for physical health conditions in analyses of men, women, and White individuals. Among Black individuals, those with same- or both same- and opposite-sex sexual partners were at highest risk, whereas other dimensions of sexual orientation were not associated with increased risk. Hispanic/Latinx sexual minority individuals (across dimensions) were at increased risk for the fewest number of physical health conditions.

Notably, Black and Hispanic/Latinx sexual minority individuals (across dimensions) were at increased risk for fewer physical health conditions compared to their heterosexual counterparts than were White sexual minority individuals (except for Black individuals with both same- and opposite-sex partners). To understand and explain this discrepancy, we can use the multiple minority resilience theory, which posits that

racial/ethnic minority lesbian, gay, and bisexual individuals possess unique resources and strengths that provide resilience and empowerment in the face of minority stress (Della, Wilson, & Miller, 2002; Meyer, Ouellette, Haile, & McFarlane, 2011; Moradi et al., 2010). One such pathway is believed to operate via one's shared stigmatized identity (i.e., race/ethnicity) with similar others, which may provide sexual minority individuals of color with protective early learning environments that offer stigma-related coping skills and supportive community resources (Greene, 1994; Saleebey, 1996; Shih, 2004). Subsequently, sexual minority individuals of color may adapt and use these skills to cope with sexual orientation-based minority stress (e.g., Bowleg, Huang, Brooks, Black, & Burkholder, 2003; Meyer, 2015; Moore, 2010), resulting in fewer adverse health outcomes for sexual minority individuals of color, like those observed in the present study.

However, this explanation fails to elucidate why sexual behavior predicted poorer physical health among Black individuals, whereas identity and attraction did not. First, our Black and Latinx samples were approximately 30% the size of the White sample, which likely reduced power and limited our ability to detect sexual orientation differences of modest magnitude within these groups. Second, perhaps in response to decreased sexual minority support among Black communities, Black individuals who have same-sex sexual partners may experience conflict between their stigmatized racial/ethnic and sexual minority identities, leading to the use of maladaptive coping strategies, decreased access to resources, and poorer health outcomes (Bridges, Selvidge, & Matthews, 2003; Malebranche et al., 2007; Mays et al., 1993). It is imperative that future research continue examinations of sexual orientation physical health disparities among Black and Latinx populations and factors that may explain such nuanced differences.

Health Disparities for Individuals Identifying as “Not Sure” and Individuals Who Have Never Had Sex

While not the focus of the current study, unique patterns of physical health risk emerged for other sexual minority individuals, including those who are unsure about their sexual identity and those who report never having had sex. We briefly discuss these findings. Research on individuals who are unsure about their sexual identity is rare. In the current study, results indicate that these individuals experience increased risk for a specific subset of physical health conditions compared to heterosexually identified individuals. Individuals who were unsure of their sexual identity were at increased risk for high blood pressure and having more physical health conditions across racial/ethnic groups and among men, but not among women. Notably, individuals who were unsure of their sexual identity were the only sexual identity group at increased risk for any physical health disorders in the Black sample and were at risk for more physical health

Table 11 Adjusted odds ratios for physical health conditions: Hispanic/Latinx

Sexual orientation	Gastrointestinal condition	Cardiovascular disease	High blood pressure	High cholesterol	Hepatic disease	Arthritis	Obesity	Diabetes	Stroke
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sexual identity									
Lesbian/Gay	.09 (.01, .63)*	1.57 (.22, 10.92)	.57 (.19, 1.70)	2.52 (.89, 7.10)	–	1.10 (.36, 3.37)	1.15 (.47, 2.82)	.81 (.14, 4.49)	–
Bisexual	1.08 (.38, 2.09)	1.40 (.29, 3.98)	2.51 (1.13, 5.56)*	1.27 (.52, 3.12)	2.86 (.32, 25.67)	2.05 (.78, 5.35)	.82 (.40, 1.68)	1.45 (.49, 4.27)	–
Not sure	2.21 (.63, 7.79)	.81 (.19, 3.50)	2.94 (1.19, 7.24)*	2.00 (.81, 4.94)	3.19 (.39, 26.15)	.45 (.13, 1.60)	.48 (.19, 1.19)	.40 (.14, 1.19)	–
Heterosexual	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Sexual attractions									
Only SS	.44 (.18, 1.06)	1.09 (.38, 3.07)	1.10 (.39, 3.07)	1.10 (.50, 2.42)	1.60 (.22, 11.80)	.85 (.29, 2.48)	1.14 (.66, 1.98)	.38 (.14, 1.05)	–
Mostly SS	.12 (.02, .88)*	1.00 (.35, 2.87)	1.15 (.24, 5.44)	.50 (.29, .87)	–	1.19 (.46, 3.04)	1.34 (.56, 3.17)	1.60 (.43, 5.98)	–
Equally SS and OS	1.05 (.39, 2.78)	1.16 (.45, 3.02)	2.90 (1.28, 6.56)*	1.64 (.62, 4.37)	1.52 (.19, 12.41)	1.69 (.63, 4.55)	.53 (.22, 1.27)	.86 (.34, 2.19)	–
Mostly OS	1.21 (.65, 2.25)	.85 (.36, 1.98)	1.25 (.78, 2.02)	2.97 (.86, 10.24)	2.11 (.32, 13.86)	1.43 (.87, 2.35)	1.10 (.75, 1.64)	1.29 (.73, 2.27)	1.08 (.13, 8.93)
Only OS	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Sexual behavior									
Only SS	.64 (– 1.23, .33)	.83 (.26, 2.61)	1.17 (.45, 3.10)	1.04 (.51, 2.14)	1.28 (.18, 9.09)	.80 (.28, 2.29)	1.31 (.76, 2.25)	1.00 (.30, 3.30)	–
Both SS and OS	.68 (– 1.19, .42)	.77 (.33, 1.82)	1.72 (.90, 3.29)	1.75 (.90, 3.38)	7.62 (2.20, 26.33)**	1.49 (.81, 2.72)	1.23 (.73, 2.09)	1.53 (.64, 3.65)	–
Never had sex	1.33 (– .64, 1.22)	.83 (.30, 2.31)	.86 (.34, 2.12)	.91 (.43, 1.94)	–	.59 (.26, 1.35)	1.26 (.74, 2.14)	1.26 (.60, 2.62)	–
Only OS	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent

“–” indicates too little within-group variance to allow for between-group differences to be modeled. Odds ratios were adjusted for: age, sex, income, education, marital status, and region of country

SS same-sex; OS opposite-sex

* $p < .05$; ** $p < .01$

Table 12 Disparities in number of conditions and HQoL: Hispanic/Latinx

Sexual orientation	Number of conditions RR (95% CI)	Health-related quality of life <i>b</i> (95% CI)
Sexual identity		
Lesbian/Gay	1.09 (.64, 1.84)	-.48 (-2.71, 1.75)
Bisexual	1.77 (1.00, 3.09)*	.73 (-.80, 2.27)
Not sure	1.74 (.96, 3.15)	-.51 (-6.23, 5.22)
Heterosexual	Referent	Referent
Sexual attractions		
Only SS	.90 (.64, 1.15)	-.06 (-2.09, 1.98)
Mostly SS	1.35 (.77, 1.93)	.84 (-1.06, 2.73)
Equally SS and OS	1.61 (1.01, 2.32)*	.42 (-2.63, 3.48)
Mostly OS	1.02 (.79, 1.26)	-.74 (-2.17, .68)
Only OS	Referent	Referent
Sexual behavior		
Only SS	.97 (.68, 1.26)	.79 (-.81, 2.40)
Both SS and OS	1.47 (1.02, 1.99)*	-.91 (-2.61, .78)
Never had sex	.91 (.54, 1.29)	.19 (-2.01, 2.39)
Only OS	Referent	Referent

Estimates were adjusted for: age, sex, income, education, marital status, and region of country

Number of conditions number of conditions reported by an individual (disease burden); *HQoL* health-related quality of life; *SS* same-sex; *OS* opposite-sex

* $p < .05$; ** $p < .01$

disorders in this subsample than other racial/ethnic subsamples. Further research is needed to determine why Black individuals who are unsure of their sexual identity face heightened risk. It is important to note that research suggests that while some individuals who choose “not sure” in response to sexual identity items are questioning their identity, others are unsure what the question is asking (Sell, Wells, & Wypij, 1995). In the current sample, 21.7% of men and 29.7% of women who selected “not sure” for their sexual identity reported exclusive opposite-sex attractions and sexual partners. While these individuals may genuinely be questioning their sexual identity, this pattern suggests that a sizeable minority of these participants may have been confused by the question. Combining questioning individuals with those perhaps confused by the question limits our ability to interpret findings for this group. Further research is needed to examine physical health disparities for individuals who are unsure of or questioning their sexual identity.

Results also indicate that individuals who never had sex were affected by physical health disparities. Among women and White groups, individuals who never had sex were at increased risk for obesity, and White and Black individuals who never had sex also experienced increased risk for high blood pressure. Of note, the majority of individuals who reported never having sex were identified as heterosexual and had exclusively opposite-sex

attractions (83.9% of men; 81.7% of women). Weight stigma in the context of dating and romantic relationship may underlie the association between never having had sex and obesity. Experimental evidence indicates that overweight individuals, especially overweight women, are perceived to be undesirable intimate partners (Chen & Brown, 2005; Smith, Schmoll, Konik, & Oberlander, 2007). This may lead to reduced dating opportunities for overweight individuals, particularly for overweight women. Further research is needed to examine mechanisms underlying the association between never having had sex and obesity.

Strengths and Limitations

The current study had several notable strengths. First, we used data from a national U.S. probability sample with relatively large sexual and racial/ethnic minority subsamples. This allowed us to examine sexual orientation differences in health disparities by sex and race/ethnicity. Second, using multiple dimensions of sexual orientation, we empirically examined differences in physical health disparities across dimensions. Third, we utilized a wide range of physical health conditions, allowing for the direct investigation of physical health disparities across a number of conditions.

Findings should be considered in light of study limitations. First, although NESARC included two waves of data, sexual orientation was only assessed at Wave 2, and therefore, current analyses are cross-sectional. Second, due to small Black and Hispanic/Latinx sexual minority sample sizes, we did not have large enough numbers of male and female Black and Latinx individuals in each category of sexual identity, attractions, and behavior to produce reliable estimates in analyses simultaneously stratified by sex and race/ethnicity. Therefore, we were only able to examine differences in risk for physical health conditions by sexual orientation within sex and separately within racial/ethnic groups. Future research with larger samples of Black and Latinx sexual minorities should conduct fully intersectional analyses which examine differences in risk for poor physical health by sexual orientation, race/ethnicity, and sex simultaneously. Third, only information about participants' sex, not gender, was assessed. Therefore, we were unable to examine physical health disparities for gender minority individuals (e.g., transgender, genderqueer, non-binary individuals). It is vital that future research examine physical health disparities associated with gender identity to investigate how those disparities may also vary as a function of sexual orientation and race/ethnicity.

Conclusion

The current study indicated that sexual minority individuals were at increased risk for a wide range of physical health conditions. These disparities are particularly pronounced for

individuals who identify as bisexual, report same- and opposite-sex attractions, and/or same- and opposite-sex sexual partners. Although health disparities, and the specific conditions for which they are at increased risk, vary by sexual orientation dimension, sex, and race/ethnicity, the general pattern of increased risk for physical health conditions among sexual minority, and particularly bisexual, individuals is largely consistent across dimensions. Future research is needed to assess the association between minority stress and physical health, as well as underlying mechanisms through which minority stress may lead to poorer physical health, as such mechanisms may be targeted by future interventions aimed at reducing minority stress' impact on physical health.

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