

RESEARCH LETTERS

Beyond the Norm: Epidemiology of Irritable Bowel Syndrome and Mental Health Among Sexual and Gender-Diverse Young Adults in a Large Representative Cohort



Irritable bowel syndrome (IBS) is a common chronic disorder of gut–brain interactions associated with substantial disease burden and reduced quality of life.¹ Gender-associated differences in IBS have been reported in several studies, with IBS more prevalent among young people and female gender.² However, the association between IBS and sexual and gender-diverse minority (SGM) people (eg, gay or lesbian, bisexual, and gender-diverse) has not yet been described.³ SGM people are more likely than heterosexual and cisgender people (whose sex recorded at birth aligns with their current gender identity) to experience adverse health outcomes in both physical and mental health and health care discrimination because of their sexual orientation or gender identity.^{4,5} According to the 2023 Ipsos LGBT+ Pride Study Global Survey, the prevalence of lesbian, gay, bisexual, transgender, and other people outside traditional sexuality and gender categories (LGBT+) identification continues to grow worldwide.⁶ On average, across the 30 countries surveyed, the proportion of the LGBT+ population nets to 9%, ranging from 18% among “Gen Zers” (those born in 1997–2012) to 4% among “Baby Boomers” (those born in 1946–1964).⁶ One of the most pervasive barriers SGM people face is when seeking and accessing culturally competent medical care.^{7,8} Evidence indicates that many who identify as SGM avoid seeking medical treatment out of fear of discrimination or because their providers lack culturally competent knowledge.^{4,7}

Young people face unique personal, relational, academic, and societal challenges, recognized as key contributors to psychosocial stress and mental health issues, which have risen sharply in the past decade, even before COVID-19.^{9,10} The development of their sexual orientation, gender identity, and expression adds to the challenges they already encounter. In the present large-scale study, we examined, for the first time worldwide, the associations between IBS and sex recorded at birth; gender identity; and sexual orientation, attraction, and behavior, along with their interplay with mental health factors among young adults. We used the Flemish College Surveys (FLECS), part of the World Health Organization World Mental Health International College Student Initiative, composed of representative samples (representativity indicator = 94%) of college students across all 18 colleges and universities in Flanders, Belgium.⁹ Between October and December 2022, all 268,104 students enrolled in any of the higher education institutions in Flanders were invited via e-mail (ie, census sampling). IBS status was assessed using the Adult Rome-IV Diagnostic Questionnaire, World Health Organization Composite International Diagnostic Interview Screening Scales, version 3.0 (updated for the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition), for common 12-month mental disorders (eg, mood, anxiety, and substance use

disorders), Composite International Diagnostic Interview Sheehan Disability Scale for role impairment, Midlife in the United States National Survey (MIDUS) Self-Report Scale for severe perceived stress (eg, financial concerns, relationship issues, experiences of harassment, and health problems), and Composite International Diagnostic Interview Screening Scales childhood section for childhood adversities (eg, parental psychopathology and physical, emotional, and sexual abuse).^{1,9} Our study adopted a layered multidimensional approach to the construct of SGM, which is composed of sex assigned at birth (SAAB), gender identity, sexual orientation, attraction, and behavior ([Supplementary Methods](#)).

In total, 21,313 students (71.0% female SAAB; mean [SD] age, 22.5 [4.8] years) completed all relevant sections. Approximately 1 in 4 respondents (25.8%) identified as SGM. The overall prevalence of IBS was 10.8% ([Table 1](#)) and was higher among cisgender women (13.2%; odds ratio [OR], 3.1; 95% CI, 2.7–3.5; adjusted P [P_{adj}] < .001), nonbinary respondents (15.9%; OR, 3.9; 95% CI, 2.9–5.2; P_{adj} < .001), and transgender men (12.4%; OR, 2.9; 95% CI, 1.5–5.1; P_{adj} < .001) compared with cisgender men (4.6%, reference) and with no significant difference observed among transgender women (3.0%; OR, 0.6; 95% CI, 0.1–2.1; NS) ([Supplementary Figure 1](#)). In addition, IBS prevalence varied significantly by reported sexual orientation ($\chi^2_6 = 126.3$; [Supplementary Table 1](#)) and was more common among sexual minority respondents: 8.8% among heterosexual or straight respondents without same-gender attraction (reference); 13.2% among heterosexual or straight respondents with same-gender attraction (OR, 1.6; 95% CI, 1.4–1.8; P_{adj} < .001); 11.8% among those identifying as gay or lesbian (OR, 1.4; 95% CI, 1.1–1.7; P_{adj} < .01); 15.2% among bisexuals (OR, 1.8; 95% CI, 1.6–2.1; P_{adj} < .001); with no significant difference observed among asexuals (8.7%; OR, 1.0; 95% CI, 0.6–1.4; NS); 13.1% among those unsure (OR, 1.6; 95% CI, 1.3–1.8; P_{adj} < .001); and 14.3% for those who reported other (eg, queer or pansexual; adjusted OR [aOR], 1.7; 95% CI, 1.3–2.2; P_{adj} < .001) ([Supplementary Figure 1](#)).

Although the COVID-19 pandemic likely contributed to this trend, our results showed that the prevalence of IBS and

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Abbreviations used in this paper: aOR, adjusted odds ratio; IBS, irritable bowel syndrome; LGBT+, lesbian, gay, bisexual, transgender, and other people outside traditional sexuality and gender categories; OR, odds ratio; P_{adj} , adjusted P value; SAAB, sex assigned at birth; SGM, sexual and gender-diverse minority.

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0016-5085/\$36.00

<https://doi.org/10.1053/j.gastro.2024.06.017>

Table 1. Sociodemographic Correlates as Predictors for Irritable Bowel Syndrome

Variable	Prevalence of row predictor in total cohort		Prevalence of IBS in row predictor, % (SE)	IBS, OR (95% CI)
	n	% (SE)		
All respondents	21,313	—	10.76 (10.34–11.17)	—
Sex assigned at birth				
Male	6166	28.96 (28.35–29.57)	4.75 (4.22–5.29)	Reference
Female	15,127	71.04 (70.43–71.65)	13.21 (12.67–13.75)	3.05 (2.69–3.47)^a
Gender identity				
Cisgender male	6007	28.21 (27.61–28.81)	4.63 (4.1–5.16)	Reference
Cisgender female	14,700	69.03 (68.41–69.65)	13.15 (12.6–13.69)	3.12 (2.74–3.56)^a
Nonbinary	423	1.99 (1.8–2.17)	15.88 (12.39–19.37)	3.89 (2.9–5.15)^a
Transgender man (female to male)	98	0.47 (0.37–0.56)	12.24 (5.72–18.77)	2.87 (1.48–5.12)^a
Transgender woman (male to female)	66	0.31 (0.24–0.38)	3.03 (0.01–7.2)	0.64 (0.11–2.07)
Sexual orientation				
Heterosexual or straight without SGA	11,480	54.81 (54.13–55.48)	8.83 (8.57–9.1)	Reference
Heterosexual or straight with SGA	4027	19.23 (18.7–19.77)	13.21 (12.68–13.74)	1.57 (1.4–1.76)^a
Gay or lesbian	822	3.92 (3.66–4.18)	11.8 (9.59–14.01)	1.38 (1.1–1.71)^b
Bisexual	2160	10.3 (9.88–10.71)	15.15 (13.63–16.66)	1.84 (1.61–2.1)^a
Asexual	313	1.49 (1.33–1.66)	8.65 (5.53–11.78)	0.98 (0.64–1.43)
Unsure	1635	7.79 (7.43–8.16)	13.05 (11.42–14.69)	1.55 (1.32–1.81)^a
Other (eg, queer, pansexual)	516	2.46 (2.25–2.67)	14.34 (11.31–17.37)	1.73 (1.33–2.21)^a
Sexual partners				
Opposite sex only	12,602	60.22 (59.56–60.88)	11.91 (11.34–12.47)	Reference
Same sex only	711	3.4 (3.15–3.64)	9.72 (7.54–11.9)	0.8 (0.61–1.02)
Both men and women	1003	4.79 (4.5–5.08)	15.75 (13.5–18.01)	1.38 (1.15–1.65)^a
Did not have had sexual partners	6611	31.59 (30.96–32.22)	8.44 (7.77–9.11)	0.68 (0.62–0.75)^a
Sexual orientation and gender identity group				
Cisgender heterosexual man with no SGA	4155	19.8 (19.26–20.34)	4.05 (3.45–4.64)	Reference
Cisgender heterosexual woman with no SGA	7312	34.85 (34.21–35.5)	11.55 (10.82–12.29)	3.1 (2.62–3.68)^a
Cisgender heterosexual man with SGA	709	3.38 (3.13–3.62)	6.35 (4.55–8.14)	1.61 (1.13–2.24)^b
Cisgender heterosexual woman with SGA	3296	15.71 (15.22–16.2)	14.63 (13.42–15.84)	4.06 (3.4–4.89)^a
Cisgender sexual minority man	1026	4.89 (4.6–5.18)	6.34 (4.84–7.83)	1.6 (1.19–2.14)^b
Cisgender sexual minority woman	3897	18.57 (18.05–19.1)	15.46 (14.33–16.6)	4.34 (3.64–5.19)^a
Gender diverse person assigned male at birth	93	0.44 (0.35–0.53)	14.13 (6.97–21.29)	3.9 (2.04–6.92)^a
Gender diverse person assigned female at birth	329	1.57 (1.4–1.74)	16.41 (12.4–20.42)	4.66 (3.32–6.44)^a
Transgender man (female to male)	98	0.47 (0.37–0.56)	12.24 (5.72–18.77)	3.31 (1.69–5.94)^a
Transgender woman (male to female)	66	0.31 (0.24–0.39)	3.03 (0.01–7.2)	0.74 (0.12–2.39)
Sexual orientation and gender identity aggregate				
Cisgender heterosexual individuals	15,804	74.20 (73.56–74.74)	9.77 (9.3–10.23)	Reference
Sexual and gender minority individuals	5509	25.80 (25.26–26.44)	13.59 (12.68–14.5)	1.45 (1.32–1.59)^a

NOTE. Significant ORs are in bold ($\alpha = .05$; multiple testing corrections were done using the Benjamini–Hochberg method). ORs are based on logistic regression models with a separate model for each category (in bold); with the category variable as the only predictor in the model. Logistic regression coefficients and their SEs were exponentiated to generate ORs and associated 95% CI.

SGA, same gender attraction.

^a $P_{\text{adj}} < .001$.

^b $P_{\text{adj}} < .01$.

related mental health issues, which exacerbate disease burden, are considerably more common in SGM respondents.¹⁰ Among respondents with IBS, approximately two-thirds met the criteria for any *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition disorder (64.4%), ranging from 5.9% (for drug use disorder) to 52.9% (for major depressive episode). Any *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition disorder was

associated with higher rates of IBS (14.9%; aOR, 2.2; 95% CI, 2.0–2.4; $P_{\text{adj}} < .001$, adjusted for SAAB and age). Mental disorders were considerably more common among SGM groups ($\chi^2_9 = 724.4$; $P_{\text{adj}} < .001$; [Supplementary Table 1](#)). Furthermore, severe perceived stress was significantly associated with increased IBS rates (12.8%; aOR, 2.7; 95% CI, 2.4–3.1; $P_{\text{adj}} < .001$, adjusted for SAAB and age). Severe perceived stress was much higher in SGM groups ($\chi^2_9 =$

481.4; $P_{\text{adj}} < .001$; [Supplementary Table 1](#)). Lastly, early childhood adversities were significantly associated with higher IBS rates (11.4%; aOR, 1.8; 95% CI, 1.6–2.2; $P_{\text{adj}} < .001$, adjusted for SAAB and age). Early childhood adversities were substantially more common in SGM groups ($\chi^2_9 = 258.2$; $P_{\text{adj}} < .001$; [Supplementary Table 1](#)).

These results align with the minority stress model, which hypothesizes that chronic stress stemming from experiences of rejection, discrimination, stigma, and prejudice adversely affects SGM groups.⁵ Existing research confirms that SGM people experience higher rates of health problems compared with their heterosexual and/or cisgender counterparts.^{3,4,7} However, an important limitation is that we do not know whether any of the transgender respondents were receiving hormone therapy or other gender-affirming medical interventions, and whether these influenced the rates of IBS. The finding that female SAAB is associated with an increased IBS risk may result from hormonal influences, altered gastrointestinal motility, heightened visceral sensitivity, and higher rates of comorbid mental disorders, such as anxiety, depression, and stress-related conditions.^{1,2,9}

In conclusion, we report that SGM people have a higher prevalence and an amplified clinical severity of IBS, attributed to higher rates of mental health issues (concurrent and past), compared with their cisgender and heterosexual counterparts. This contributes to a significantly higher burden of disease within the SGM population. Health care providers should be aware of the unique challenges faced by SGM patients, who are more likely to encounter adverse health outcomes and experience discrimination in health care settings.^{3,7} SGM people may have specific health care needs that necessitate tailored approaches.⁸ Further research is needed to improve care for SGM populations and to address presumed disparities in health outcomes.

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Supplementary Material

Note: To access the supplementary material accompanying this article, visit the online version of *Gastroenterology* at www.gastrojournal.org, and at <http://doi.org/10.1053/j.gastro.2024.06.017>.

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Received March 15, 2024. Accepted June 20, 2024.

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Acknowledgments

The Gut-Brain Interactions – WHO – World Mental Health International College Student Initiative Working Group includes Wouter Voorspoels,¹ Sebastian Proost,^{2,3} Philippe Mortier,^{4,5} Glenn Kiekens,^{6,7} Jordi Alonso,^{4,5,8} Jeroen Raes,^{2,3} Gwen Falony,^{2,3,9,10} Sara Vieira-Silva,^{2,3,9,10} Lukas van Oudenhove,¹¹ Pim Cuijpers,¹² and Randy P. Auerbach^{13,14}; from the ¹Center for Public Health Psychiatry, KU Leuven, Leuven, Belgium; ²Laboratory of Molecular Bacteriology, Department of Microbiology, Immunology and Transplantation, Rega Institute, KU Leuven, Leuven, Belgium; ³Vlaams Instituut voor Biotechnologie Center for Microbiology, Vlaams Instituut voor Biotechnologie, Leuven, Belgium; ⁴Health Services Research Unit, Institut Hospital del Mar d'Investigacions Mèdiques Medical Research Institute, Barcelona, Spain; ⁵Centro de Investigación Biomédica en Red en Epidemiología y Salud Pública, Madrid, Spain; ⁶Faculty of Psychology and Educational Sciences, Clinical Psychology, KU Leuven, Leuven, Belgium; ⁷Department of Neurosciences, Center for Contextual Psychiatry, KU Leuven, Leuven, Belgium; ⁸Universitat Pompeu Fabra, Barcelona, Spain; ⁹Institute of Medical Microbiology and Hygiene and Research Center for Immunotherapy, University Medical Center of the Johannes Gutenberg-University Mainz, Mainz, Germany; ¹⁰Institute of Molecular Biology, Mainz, Germany; ¹¹Translational Research Center for Gastrointestinal Disorders, University of Leuven, Leuven, Belgium; ¹²Department of Clinical, Neuro and Developmental Psychology, Amsterdam Public Health Research Institute, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands; ¹³Department of Psychiatry, Columbia University, New York, New York; and ¹⁴Division of Clinical Developmental Neuroscience, Sackler Institute, New York, New York.

The Monitor/Flemish College Surveys (FLECS) is an initiative of Flemish Education Minister Ben Weyts. The authors wish to thank the administration and student services of the Flemish Higher Education Institutes (Antwerp Maritime Academy, Arteveldehogeschool, Artesis Plantijn Hogeschool Antwerpen, Erasmushogeschool Brussel, Hogeschool Gent, Hogeschool PXL, Hogeschool UCLL, Hogeschool VIVES, Hogeschool West-Vlaanderen, KU Leuven, Karel de Grote Hogeschool, LUCA School of Arts, Odisee, Thomas More, Universiteit Antwerpen, Universiteit Gent, Universiteit Hasselt, and Vrije Universiteit Brussel), the Flemish Government, the Flemish Interuniversity Council, the Flemish Council of Universities of Applied Sciences, the Support Centre Inclusive Higher Education, and the Flemish

Association of Students for their assistance in data collection. The authors also wish to thank all of the student volunteers who participated in this project. The Monitor was carried out in conjunction with the World Health Organization World Mental Health Survey Initiative and is a part of the World Mental Health International College Student Initiative. The authors thank the staff of the World Mental Health Data Collection and Data Analysis Coordination Centers for assistance with instrumentation, fieldwork, and consultation on data analysis.

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Conflicts of interest

This author discloses the following: In the past 3 years, Ronald C. Kessler was a consultant for Cambridge Health Alliance, Canandaigua Veterans Affairs Medical Center, Child Mind Institute, Holmusk, Massachusetts General Hospital, Partners Healthcare, Inc, RallyPoint Networks, Inc, Sage Therapeutics, and University of North Carolina. He has stock options in Cerebral Inc, Mirah, PYM (Prepare Your Mind), Roga Sciences, and Verisense Health. The remaining authors disclose no conflicts.

Funding

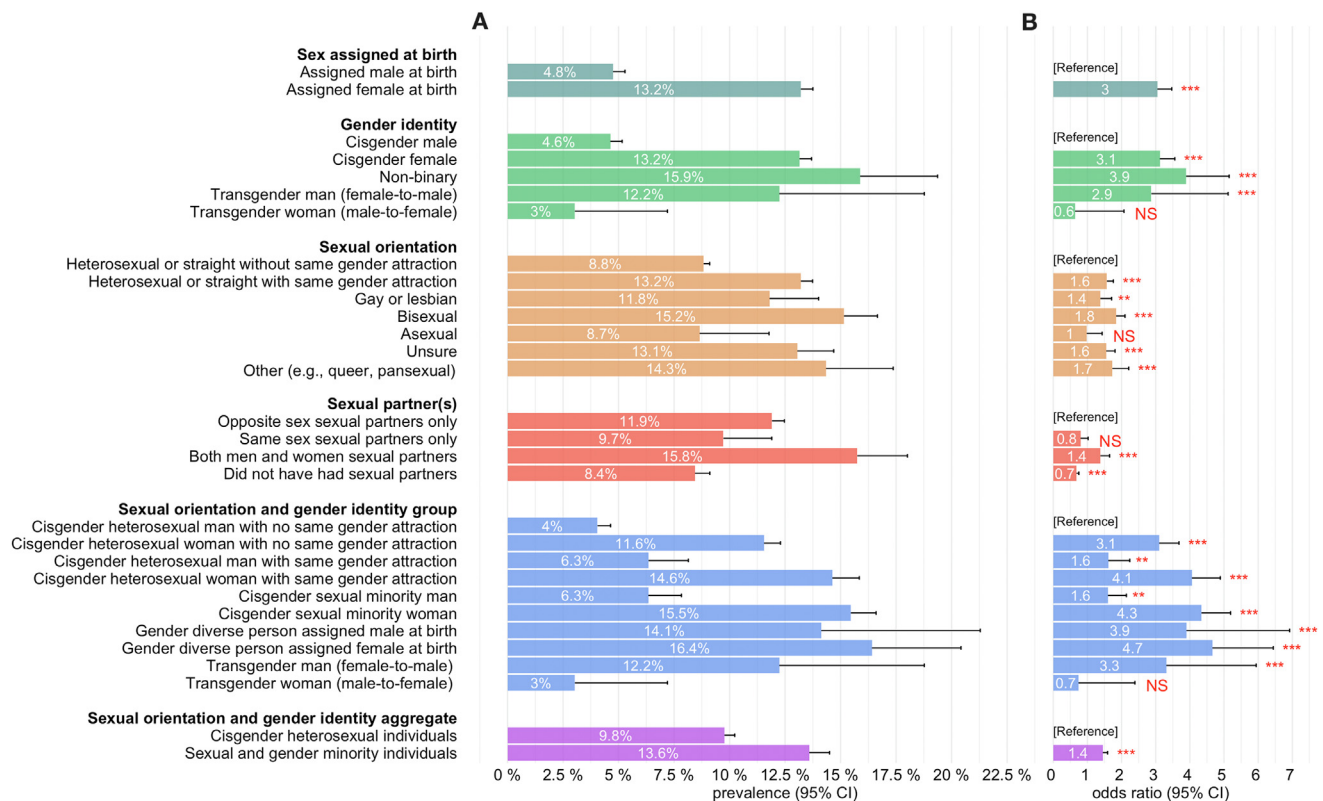
This research was supported in part by grants from the Metaforum Special Research Fund KU Leuven (EDC-D9624-DOA/2020/007 to Ronny Bruffaerts); the Flemish Ministry of Education (EDC-E2095 to Ronny Bruffaerts); and Flemish Ministry of Education, Sport, the Vlaamse Rand, and Animal Welfare (FB0-1FGD2GE-WT to Ronny Bruffaerts).

Supplementary Methods

Respondents were asked what their sex was at birth (as appeared on their birth certificate [male or female]). Gender was assessed by asking respondents to identify themselves as male, female, or nonbinary. To assess sexual orientation, participants were first asked about their sexual identity based on the following options: “heterosexual or straight,” “gay or lesbian,” “bisexual,” “asexual,” “not sure,” and “other.” They further rated their attraction to men and to women and reported sexual partners in the past 5 years as “women only,” “men only,” “both men and women,” or “I have not had sex.”

Sex and gender are distinct concepts. Sex (male, female, or intersex) is assigned at birth based on genitalia. In contrast, gender refers to a person’s internal sense of self, which may include identities such as woman, man, gender nonbinary, gender nonconforming, or gender androgynous. For many, sex assigned at birth aligns with their gender identity (cisgender). Conversely, transgender individuals have a gender identity different from their sex assigned at birth. Sexual orientation has been conceptualized as a multidimensional construct consisting of sexual identity,

attractions, and behaviors. Sexual identity refers to one’s self-identification within a group (eg, heterosexual, gay/lesbian), and sexual attraction refers to the “direction” toward the gender to which someone experiences sexual arousal (eg, women, men, nonbinary, or neither). Notably, individuals who identify as heterosexual and report same-gender attraction or identify as “mostly heterosexual” are also at greater risk for negative mental health symptoms and substance use problems compared with heterosexual individuals with no same-gender attraction. Each individual develops their gender identity, sexual orientation, and expression of both—a process not limited to LGBT+ individuals. However, heteronormativity (ie, the concept that heterosexuality is the preferred or normal sexual orientation) often exacerbates challenges for those outside these normative categories. Our study adopted a layered, multidimensional approach to the construct of sexual orientation, which is composed of gender identity, sexual orientation, attraction, and behavior. This comprehensive approach allows for a much more nuanced understanding of how these factors intersect with IBS and its associated mental health issues among same-gender attraction individuals.



Supplementary Figure 1. Comparative analysis of IBS across the following: sex assigned at birth, gender identity, sexual orientation, and sexual partners. (A) Prevalence estimates of IBS across sexual orientation and gender identity groups. (B) ORs are based on logistic regression models with a separate model for each category (in bold); with the category variable as the only predictor in the model. Logistic regression coefficients and their SEs were exponentiated to generate ORs and associated 95% CIs. Error bars: 95% CIs. Multiple testing corrections were done using the Benjamini–Hochberg method. NS, $P_{\text{adj}} > .05$; * $P_{\text{adj}} < .05$; ** $P_{\text{adj}} < .01$; *** $P_{\text{adj}} < .001$.

Supplementary Table 1. Comparative Analysis of Psychosocial Variables and Irritable Bowel Syndrome Prevalence Across Sex Assigned at Birth, Gender Identity, Sexual Orientation, and Sexual Partner

Variable	IBS	Childhood adversity	12-mo DSM-5 mental disorder	12-mo severe perceived stress	12-mo severe mental role impairment
Sex assigned at birth					
Male, OR (95% CI)	Reference	Reference	Reference	Reference	Reference
Female, OR (95% CI)	3.05 (2.69–3.47)^a	1.37 (1.26–1.49)^a	1.28 (1.21–1.36)^a	1.71 (1.6–1.83)^a	1.3 (1.22–1.39)^a
χ^2_1 , <i>P</i> value	374.87^a	51.46^a	69.34^a	250.79^a	73.36^a
Gender identity					
Cisgender male, OR (95% CI)	Reference	Reference	Reference	Reference	Reference
Cisgender female, OR (95% CI)	3.12 (2.74–3.56)^a	1.37 (1.26–1.49)^a	1.28 (1.21–1.36)^a	1.71 (1.6–1.83)^a	1.3 (1.22–1.39)^a
Nonbinary, OR (95% CI)	3.89 (2.9–5.15)^a	6.03 (3.61–11.08)^a	3.25 (2.63–4.03)^a	2.89 (2.21–3.83)^a	3.18 (2.6–3.9)^a
Transgender man (female to male), OR (95% CI)	2.87 (1.48–5.12)^a	2.93 (1.39–7.54)^b	2.78 (1.83–4.28)^a	2.36 (1.43–4.13)^c	3.35 (2.23–5.1)^a
Transgender woman (male to female), OR (95% CI)	0.64 (0.11–2.07)	4.01 (1.49–16.45)^b	3.02 (1.82–5.18)^a	2.78 (1.48–5.79)^c	2.3 (1.41–3.75)^c
χ^2_4 , <i>P</i> value	390.01^a	115.41^a	189.41^a	284.94^a	193.89^a
Sexual orientation					
Heterosexual or straight without SGA, OR (95% CI)	Reference	Reference	Reference	Reference	Reference
Heterosexual or straight with SGA, OR (95% CI)	1.57 (1.4–1.76)^a	1.42 (1.27–1.59)^a	1.45 (1.34–1.55)^a	1.58 (1.45–1.72)^a	1.34 (1.25–1.45)^a
Gay or lesbian, OR (95% CI)	1.38 (1.1–1.71)^c	2.2 (1.7–2.9)^a	1.76 (1.52–2.02)^a	1.71 (1.43–2.05)^a	1.99 (1.72–2.29)^a
Bisexual, OR (95% CI)	1.84 (1.61–2.1)^a	2.76 (2.3–3.33)^a	3.25 (2.95–3.58)^a	2.32 (2.05–2.63)^a	2.38 (2.17–2.62)^a
Asexual, OR (95% CI)	0.98 (0.64–1.43)	1.8 (1.24–2.72)^c	1.86 (1.48–2.33)^a	1.28 (0.99–1.67)	1.8 (1.44–2.26)^a
Unsure, OR (95% CI)	1.55 (1.32–1.81)^a	1.65 (1.39–1.97)^a	1.6 (1.44–1.78)^a	1.77 (1.55–2.01)^a	1.7 (1.53–1.89)^a
Other (eg, queer, pansexual)	1.73 (1.33–2.21)^a	3.47 (2.36–5.33)^a	3.16 (2.62–3.82)^a	2.17 (1.72–2.77)^a	2.87 (2.4–3.44)^a
χ^2_6 , <i>P</i> value	126.33^a	243.61^a	768.47^a	341.82^a	529.48^a
Sexual partners					
Opposite sex only, OR (95% CI)	Reference	Reference	Reference	Reference	Reference
Same sex only, OR (95% CI)	0.8 (0.61–1.02)	1.63 (1.24–2.17)^a	1.12 (0.97–1.31)	1.26 (1.04–1.52)^b	1.5 (1.29–1.74)^a
Both men and women, OR (95% CI)	1.38 (1.15–1.65)^a	3.26 (2.41–4.55)^a	2.81 (2.44–3.24)^a	1.89 (1.58–2.27)^a	2.09 (1.83–2.38)^a
Did not have had sexual partners, OR (95% CI)	0.68 (0.62–0.75)^a	0.86 (0.78–0.94)^a	0.71 (0.66–0.75)^a	0.88 (0.82–0.94)^a	0.87 (0.82–0.93)^a
χ^2_3 , <i>P</i> value	79.87^a	112.73^a	421.79^a	85.76^a	190.89^a
Sexual orientation and gender identity group					
Cisgender heterosexual man with no SGA, OR (95% CI)	Reference	Reference	Reference	Reference	Reference
Cisgender heterosexual woman with no SGA, OR (95% CI)	3.1 (2.62–3.68)^a	1.21 (1.09–1.34)^a	1.01 (0.93–1.09)	1.57 (1.45–1.7)^a	1.16 (1.07–1.26)^a
Cisgender heterosexual man with SGA, OR (95% CI)	1.61 (1.13–2.24)^c	1.29 (1.03–1.63)^b	1.3 (1.1–1.52)^c	1.63 (1.36–1.96)^a	1.34 (1.14–1.59)^a
Cisgender heterosexual woman with SGA, OR (95% CI)	4.06 (3.4–4.89)^a	1.69 (1.48–1.94)^a	1.48 (1.35–1.63)^a	2.2 (1.98–2.45)^a	1.51 (1.37–1.66)^a
Cisgender sexual minority man, OR (95% CI)	1.6 (1.19–2.14)^c	2.07 (1.65–2.62)^a	1.4 (1.22–1.61)^a	1.71 (1.46–2)^a	1.75 (1.52–2.02)^a
Cisgender sexual minority woman, OR (95% CI)	4.34 (3.64–5.19)^a	2.43 (2.11–2.81)^a	2.47 (2.26–2.7)^a	2.83 (2.55–3.15)^a	2.33 (2.13–2.56)^a
Gender diverse person assigned male at birth, OR (95% CI)	3.9 (2.04–6.92)^a	9.06 (2.86–55.08)^c	2.03 (1.34–3.09)^c	1.98 (1.23–3.34)^c	2.71 (1.8–4.12)^a
Gender diverse person assigned female at birth	4.66 (3.32–6.44)^a	5.76 (3.3–11.23)^a	4.19 (3.27–5.42)^a	3.7 (2.69–5.22)^a	3.96 (3.14–5.01)^a
Transgender man (female to male), OR (95% CI)	3.31 (1.69–5.94)^a	3.05 (1.45–7.86)^c	3.01 (1.99–4.65)^a	2.58 (1.56–4.52)^a	3.85 (2.56–5.87)^a
Transgender woman (male to female), OR (95% CI)	0.74 (0.12–2.39)	4.18 (1.55–17.15)^b	3.28 (1.97–5.63)^a	3.03 (1.61–6.33)^c	2.64 (1.62–4.31)^a
χ^2_9 , <i>P</i> value	437.75^a	258.19^a	724.43^a	481.42^a	554.84^a

Supplementary Table 1.Continued

Variable	IBS	Childhood adversity	12-mo DSM-5 mental disorder	12-mo severe perceived stress	12-mo severe mental role impairment
Sexual orientation and gender identity aggregate					
Cisgender heterosexual individuals	Reference	Reference	Reference	Reference	Reference
Sexual and gender minority individuals, OR (95% CI)	1.45 (1.32–1.59)^a	2.24 (2.01–2.5)^a	2.08 (1.96–2.22)^a	1.84 (1.71–1.99)^a	1.94 (1.82–2.07)^a
χ^2_1 , <i>P</i> value	59.47^a	238.52^a	541.40^a	256.10^a	434.88^a

NOTE. Significant ORs and χ^2 are values are shown in bold ($\alpha = .05$; multiple testing corrections were done using the Benjamini–Hochberg method). ORs are based on logistic regression models with a separate model for each category variable (in bold); with the category variable as the only predictor in the model. Logistic regression coefficients and their SEs were exponentiated to generate ORs and associated 95% CIs. The χ^2 values are based on likelihood ratio test to evaluate joint significance of categorical variable levels.

DSM-5, *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition; SGA, same gender attraction.

^a*P*_{adj} < .001.

^b*P*_{adj} < .05.

^c*P*_{adj} < .01.