

Health Disparities Among Lesbian, Gay, and Bisexual
Service Members and Veterans

Felicia R. Carey, PhD,^{1,2} Cynthia A. LeardMann, MPH,^{1,2} Keren Lehavot, PhD,^{3,4,5}
Isabel G. Jacobson, MPH,^{1,2} Claire A. Kolaja, MPH,^{1,2} Valerie A. Stander, PhD,¹
Rudolph P. Rull, PhD¹, for the Millennium Cohort Study Team

Introduction: This study investigated whether health disparities exist among lesbian, gay, and bisexual individuals serving in the U.S. military by examining the associations of sexual orientation with mental, physical, and behavioral health among a population-based sample of service members and veterans.

Methods: Sexual orientation and health outcomes were self-reported on the 2016 Millennium Cohort Study follow-up questionnaire (N=96,930). Health outcomes were assessed across 3 domains: mental health (post-traumatic stress disorder, depression, anxiety, binge eating, problematic anger), physical health (multiple somatic symptoms, physical functioning, BMI), and behavioral health (smoking, problem and risky drinking, insomnia). Adjusted logistic regression models conducted between 2019 and 2022 estimated the associations between sexual orientation and each health outcome.

Results: Lesbian, gay, and bisexual individuals (3.6% of the sample) were more likely to screen positive for post-traumatic stress disorder, depression, anxiety, binge eating, problematic anger, multiple somatic symptoms, and insomnia than heterosexual individuals. Gay/lesbian and bisexual women reported more adverse health outcomes (overweight and obesity, smoking, problem/risky drinking) than heterosexual women. Gay and bisexual men reported some adverse health outcomes (e.g., smoking and problem drinking) but better physical health (e.g., less overweight/obesity) than heterosexual men.

Conclusions: Lesbian, gay, and bisexual service members reported poorer mental, physical, and behavioral health than heterosexual peers, most notably among gay/lesbian women and bisexual individuals. Findings suggest that lesbian, gay, and bisexual service members experience health disparities, despite many having equal eligibility for health care, highlighting the need for improved equity initiatives that promote cultural responsiveness, acceptance, and approaches to support the healthcare needs of lesbian, gay, and bisexual military members.

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INTRODUCTION

Lesbian, gay, and bisexual (LGB) individuals in civilian populations have higher odds of experiencing depression, anxiety, general psychological distress, chronic physical health conditions, heavy drinking, and smoking than heterosexual adults.^{1–3} Health disparities among LGB individuals can be attributed in part to the effects of *minority stress*, defined as stressors including discrimination and stigma that minority groups face in excess of general stressors, which

From the ¹Deployment Health Research Department, Naval Health Research Center, San Diego, California; ²Leidos, San Diego, California; ³Center of Innovation for Veteran-Centered and Value-Driven Care, Health Services Research & Development (HSR&D), VA Puget Sound Health Care System, Seattle, Washington; ⁴Department of Psychiatry and Behavioral Sciences, University of Washington, Seattle, Washington; and ⁵Department of Health Services, University of Washington, Seattle, Washington

Address correspondence to: Felicia R. Carey, PhD, Deployment Health Research Department, Naval Health Research Center, 140 Sylvester Road, San Diego CA 92106. E-mail: felicia.r.carey.ctr@mail.mil.
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then compound to cause mental and somatic illness.⁴ In the military context, the legacy of Don't ask, don't tell (DADT) and related stigma toward LGB individuals may further contribute to experiences of minority stress and impact the health and readiness of LGB service members.⁵

Much of the previous research on LGB individuals in a military context has focused on veterans, with more LGB veterans reporting depression, post-traumatic stress disorder (PTSD), other psychiatric diagnoses, smoking, and alcohol misuse than heterosexual veterans.^{6–13} However, the majority of this research used small convenience samples or regional surveys, limiting generalizability. Moreover, research examining health outcomes among currently serving LGB military personnel is scarce. One survey of active duty service members found that LGB personnel were more likely to report binge drinking, smoking, risky sexual behavior, depression, and suicidal behaviors than heterosexual personnel but was limited by low response rates.¹⁴ The limited research among actively serving populations prevents any clear assessment of how the health and readiness of active duty, Reserve, and National Guard (NG) service members differ by sexual orientation. The objective of this study was to examine whether differences in mental, physical, and behavioral health exist by sexual orientation among a large sample of active duty and Reserve/NG U.S. service members and veterans.

METHODS

Study Sample

The Millennium Cohort Study is the U.S. Department of Defense's largest longitudinal study investigating the health of service members during and after their military service.¹⁵ Invited participants were randomly selected from U.S. military rosters, representing all service branches and components. Over 200,000 individuals enrolled across 4 separate study panels in 2001–2003 (Panel 1), 2004–2006 (Panel 2), 2007–2008 (Panel 3), and 2011–2013 (Panel 4) (see Ryan et al. and Smith et al. for detailed methodology).^{15,16} For this cross-sectional study, eligible participants completed the full version of the 2014–2016 survey (referred to as the 2016 survey), which first assessed sexual orientation identity. Participants who provided a response other than *prefer not to answer* were included. This study was approved by the Naval Health Research Center IRB. Written or electronic informed consent was obtained for all participants.

Measures

All items were assessed at the 2016 survey unless otherwise noted. Outcomes are briefly described below (Appendix Table 1, available online, provides details).

Sexual orientation identity was assessed by a single question asking participants whether they considered themselves to be heterosexual or straight, gay or lesbian, or bisexual.

A positive screen for PTSD was assessed using the 17-item PTSD Checklist–Civilian Version on the basis of DSM-IV criteria.^{17,18} A positive screen for depression was assessed using the Patient Health Questionnaire (PHQ) 8 depression scale on the basis of DSM-IV criteria.^{18,19} Because PTSD and depression are often comorbid and were strongly correlated in this population ($r=0.86$), these items were combined as neither, depression only, PTSD only, or comorbid PTSD and depression.^{20,21} Additional PHQ subscales were used to screen for panic syndrome (15 items)/other anxiety syndromes (7 items) using standardized scoring algorithms,²² and the first 3 items from the PHQ eating subscale were used to screen for binge eating.²³ Problematic anger was assessed using the 5-item Dimensions of Anger Reactions scale.^{24,25}

Using a validated approach, multiple somatic symptoms were assessed using the PHQ somatic symptom scale (PHQ-15).^{22,26,27} Physical functioning was assessed using the physical component summary score from the Short Form 36-Item Health Survey for Veterans.^{28,29} BMI was assessed using self-reported height and weight.

Smoking status was determined on the basis of ever smoking cigarettes and quit attempts.^{30,31} Problem drinking was assessed using the PHQ alcohol scale.²³ Risky drinking was assessed on the basis of the number of alcoholic drinks consumed per day in the past week and instances of binge drinking in the past year,^{31,32} scored using sex-specific limits.³³ Insomnia symptoms were assessed using the Insomnia Severity Index.³⁴

Marital status and education level were assessed using survey data. Demographics were obtained from the Defense Manpower Data Center at baseline for birthdate, sex (self-reported by the service member with options of male or female), and race/ethnicity or at the 2016 survey date for military characteristics (service status [active duty, Reserve/NG, veteran], service branch, pay grade, military occupation). Deployment experience was categorized as never deployed, deployed with no combat exposure, and deployed with combat exposure on the basis of Defense Manpower Data Center deployment data, which was combined with self-reported combat experiences between baseline and the 2016 survey.³⁵

Statistical Analysis

Descriptive frequencies of the health outcomes were stratified by sex and reported by sexual orientation identity. Associations between sexual orientation identity and each outcome were estimated using logistic regression models, adjusted for covariates and study enrollment panel. The proportion of missing data among covariates in the analytic sample ranged from <0.01% to 2.90%. To reduce bias, missing covariate data were imputed using multiple imputation methods with 10 imputations.³⁶ Interactions between sex and sexual orientation identity were examined for each model to determine whether effect estimates differed by sex. Sex-stratified models are presented where interaction terms were statistically significant ($p<0.05$). Interactions between service status and sexual orientation identity were also examined for all models. All p -values were 2 sided, and values < 0.05 were considered statistically significant. Statistical analyses were performed between 2019 and 2022 using SAS software, version 9.4 (SAS Institute Inc).

RESULTS

Of the eligible study population (N=103,245), participants were excluded owing to missing data ($n=3,644$) or a response of *prefer not to answer* ($n=2,671$) on the sexual orientation identity question, yielding an analytic sample of 96,930 participants.

Of the 96,930 participants, 96.4% identified as heterosexual, 1.9% identified as gay/lesbian, and 1.7% identified as bisexual (Table 1). Most participants were non-Hispanic White, born in 1980 or later, veterans, and in the Army. Most LGB individuals were female (gay/lesbian, 64.0%; bisexual, 59.6%) and unmarried (gay/lesbian, 68.9%; bisexual, 51.2%), whereas most heterosexual individuals were male (72.0%) and married or in a committed relationship (71.5%).

Sex-stratified results revealed that LGB individuals were more likely to report poorer mental, physical, and behavioral health than heterosexual individuals, with bisexual individuals proportionally more likely than gay/lesbian individuals to report poorer health on most outcomes (Table 2). For example, higher proportions of LGB individuals screened positive for depression and/or PTSD than of heterosexual individuals of the same sex (bisexual men, 31.6%; gay men, 20.9%; heterosexual men, 13.8%; bisexual women, 33.2%; gay/lesbian women, 20.6%; heterosexual women, 15.5%). However, this did not hold true for physical functioning (gay men scored highest, gay/lesbian women scored lowest) or BMI (more gay and bisexual men had a BMI <25 kg/m² than heterosexual men, and fewer LGB women had a BMI <25 kg/m² than heterosexual women).

Table 3 lists the effect estimates from adjusted multivariable models where there was significant effect modification by sex. Gay/lesbian and bisexual women were significantly more likely than heterosexual women to experience the following outcomes: overweight (≥ 25 and <30 kg/m²) or obese (≥ 30 kg/m²) BMI, former or current smoking, problem drinking, and risky drinking. Gay/lesbian women reported worse physical functioning than heterosexual women. No significant differences were observed between gay, bisexual, and heterosexual men for risky drinking. Both gay and bisexual men were less likely than heterosexual men to have an overweight BMI, whereas only gay men were significantly less likely to have an obese BMI. Gay men were more likely to report current smoking and problem drinking than heterosexual men but reported better physical functioning. Bisexual men were more likely to report former or current smoking and problem drinking than heterosexual men.

Table 4 lists the effect estimates from multivariable models where there was no significant effect

modification by sex. LGB individuals had higher odds of screening positive for depression, PTSD or comorbid PTSD/depression, panic/anxiety syndrome, binge eating, problematic anger, multiple somatic symptoms, and insomnia symptoms than heterosexual individuals.

With the exception of problem drinking (interaction p -value=0.022), service status did not significantly moderate any of the associations (results not shown). LGB individuals were significantly more likely to report problem drinking than heterosexual peers of the same service status; these associations were stronger among active duty (gay/lesbian, AOR=2.31, 95% CI=1.64, 3.25; bisexual, AOR=1.91, 95% CI=1.32, 2.76) and Reserve/NG (gay/lesbian, AOR=2.33, 95% CI=1.69, 3.21; bisexual, AOR=2.78, 95% CI=1.97, 3.91) personnel than among veterans (gay/lesbian, AOR=1.63, 95% CI=1.39, 1.91; bisexual, AOR=1.76, 95% CI=1.50, 2.06).

DISCUSSION

This is the first and largest study to examine disparities in mental, physical, and behavioral health among LGB individuals compared with those among heterosexual individuals in a representative sample of U.S. service members and veterans. Consistent with previous studies among civilian and veteran populations,^{1–3,6–13} this study observed that LGB individuals reported more adverse health outcomes than heterosexual individuals and that there were notable differences by sex and within LGB groups.

Both LGB men and women were more likely to screen positive for PTSD and depression, panic/anxiety syndrome, binge eating, problematic anger, multiple somatic symptoms, and insomnia symptoms than heterosexual individuals; these observed associations were stronger among bisexual individuals than among gay or lesbian individuals. The increased likelihood of these adverse health outcomes may be directly or indirectly linked to discrimination, stigma, minority stress, or traumatic events experienced by LGB individuals.^{37–39} Previous studies have found that LGB and transgender service members and veterans reported high levels of minority stress, microaggressions, victimization, and institutional discrimination during military service.^{37,40} Evidence-based treatment of mental disorders may need to account for these additional stressors and traumatic events experienced by LGB individuals.³⁷ The presence of worse outcomes among bisexual individuals is consistent with literature in civilian populations^{41–44} as well as with previous findings from this cohort.⁴⁵ Together, this suggests that the effects of dual discrimination from both heterosexual and gay/lesbian communities experienced by bisexual individuals may also be present within

Table 1. Demographic and Military Characteristics by Sexual Orientation, Millennium Cohort Study 2014–2016 (N=96,930)

Variables	Sexual orientation identity, n (column %)		
	Heterosexual (n=93,492; 96.4%)	Gay or lesbian (n=1,824; 1.9%)	Bisexual (n=1,614; 1.7%)
Demographic characteristics			
Sex	***		
Male	67,305 (72.0)	656 (36.0)	652 (40.4)
Female	26,187 (28.0)	1,168 (64.0)	962 (59.6)
Birth year	***		
Pre-1960	12,168 (13.0)	156 (8.6)	60 (3.7)
1960–1969	19,677 (21.1)	353 (19.4)	160 (9.9)
1970–1979	23,275 (24.9)	425 (23.3)	389 (24.1)
1980+	38,372 (41.0)	890 (48.8)	1,005 (62.3)
Race and ethnicity ^a	***		
Black, non-Hispanic	9,316 (10.0)	214 (11.7)	144 (8.9)
Hispanic	6,517 (7.0)	179 (9.8)	145 (9.0)
Other ^b	6,008 (6.4)	160 (8.8)	120 (7.4)
White, non-Hispanic	71,649 (76.6)	1,271 (69.7)	1,205 (74.7)
Marital status	***		
Single or dating casually	11,683 (12.5)	929 (50.9)	379 (23.5)
Married or in a committed relationship	66,796 (71.5)	567 (31.1)	788 (48.8)
Separated, divorced, or widowed	15,013 (16.1)	328 (18.0)	447 (27.7)
Education level	***		
High school or less	5,646 (6.0)	63 (3.5)	89 (5.5)
Some college or associate degree	39,424 (42.2)	778 (42.7)	876 (54.3)
Bachelor's degree	25,083 (26.8)	508 (27.9)	387 (24.0)
Master's degree or higher	23,339 (25.0)	475 (26.0)	262 (16.2)
Military characteristics			
Service status	***		
Active duty	23,498 (25.1)	350 (19.2)	350 (21.7)
Reserve/National Guard	15,526 (16.6)	325 (17.8)	236 (14.6)
Veteran	54,468 (58.3)	1,149 (63.0)	1,028 (63.7)
Service branch	***		
Army	41,648 (44.6)	855 (46.9)	800 (49.6)
Navy/Coast Guard	16,956 (18.1)	407 (22.3)	326 (20.2)
Marine corps	7,036 (7.5)	77 (4.2)	108 (6.7)
Air Force	27,852 (29.8)	485 (26.6)	380 (23.5)
Pay grade ^a	***		
Junior enlisted	5,020 (5.4)	171 (9.4)	207 (12.8)
Senior enlisted	61,574 (65.9)	1,227 (67.3)	1,194 (74.0)
Officer	26,897 (28.8)	426 (23.4)	213 (13.2)
Military occupation ^a	***		
Combat specialist	16,266 (17.4)	142 (7.8)	156 (9.7)
Functional support/administration	17,871 (19.1)	423 (23.2)	326 (20.2)
Health care	11,934 (12.8)	304 (16.7)	246 (15.3)
Other ^c	47,459 (50.8)	955 (52.4)	886 (54.9)
Deployment experience ^a	***		
Never deployed	34,798 (37.2)	740 (40.6)	662 (41.0)
Deployed, no combat	13,586 (14.5)	242 (13.3)	230 (14.3)
Deployed, with combat	45,061 (48.2)	841 (46.1)	722 (44.7)

Note: Asterisks indicate statistical significance of the chi-square test for each variable versus sexual orientation (* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$).

^aThe distribution of the specified covariate is presented before multiple imputation. Sample sizes for these items range from 96,882 to 96,929. Adjusted models utilize the imputed versions of these covariates.

the military.⁴⁶ Bisexual individuals may also experience bisexual erasure, which occurs when bisexual individuals are marginalized by others who refuse to recognize their unique identity, instead assuming that they are confused or presuming that they are heterosexual or gay/lesbian on the basis of the gender of their partner(s).⁴⁷ Bisexual service members may also have worse health outcomes because of different patterns of outness because they are less likely to be out to LGBT friends, medical providers, and counselors than gay and lesbian individuals.⁴⁸

Gay/lesbian and bisexual women reported significantly poorer health than heterosexual women across nearly all outcomes assessed, including BMI, smoking, risky drinking, and problem drinking. Although minority stress is relevant to all LGB individuals in this study, the intersection of gender and sexual orientation identity may pose additional stress among LGB women. Specifically, dual discrimination may be especially challenging for LGB women functioning in a male-dominated work environment, such as the military, because they may feel deprecatd on the basis of their gender and sexual orientation. The observed outcomes may be physiologic or behavioral responses to stress, which may be related to experiences of discrimination, stigma, or traumatic events.³⁷ In previous literature, women veterans have reported higher rates of cumulative trauma experiences than women civilians.⁴⁹ Moreover, lesbian and bisexual veterans may experience more sexual trauma in the military than heterosexual women veterans.¹¹ These traumatic experiences may exceed typical occupational stressors, such as deployment and combat, experienced by service members. Thus, current military programs aimed at preventing and addressing these other traumatic experiences may need additional tailoring for specific subpopulations.

Results were less consistent when comparing gay and bisexual men with heterosexual men. In addition to higher odds for adverse mental-health outcomes and multiple somatic symptoms, gay and bisexual men also had elevated odds for some adverse behavioral health outcomes (e.g., smoking, problem drinking). However, they reported better physical functioning and healthier BMI (<25 kg/m²) than heterosexual men; these differences were more pronounced among gay men than among bisexual men. Lower odds of obese (≥ 30 kg/m²) BMI among gay and bisexual men have been observed in the civilian literature^{50,51}; however, civilian studies have found comparable or poorer general and functional health

among gay and bisexual men than among heterosexual men.^{1,50,52,53} It is possible that needing to maintain higher levels of physical fitness and functioning as part of military duties may potentially ameliorate some of these negative health outcomes among sexual minority service men. Moreover, these findings, among gay men in particular, may be related to socially imposed fitness and appearance standards among gay-identifying men.⁵⁴ Still, gay and bisexual men had increased odds for numerous adverse behavioral health outcomes compared with heterosexual men. For example, gay and bisexual men were more likely to be current smokers and report problem drinking than heterosexual men, which is consistent with findings from other populations.^{55,56} Discrimination due to sexual orientation may contribute to stress-related substance use. Future studies should examine the drivers of positive differences in physical health among gay and bisexual men to determine whether these attributes could be promoted military wide to improve the physical health and readiness of all service members.

Finally, although veterans made up the majority of this study population, the authors observed that the associations between sexual orientation identity and health outcomes were consistent among active duty, Reserve/NG, and veteran individuals. This suggests that the poor health outcomes observed may not be entirely related to the availability of health care and medical services; active duty service members, who have universal healthcare access, reported experiences similar to those of Reservists and veterans, who may not have consistent access to care. In addition to the contributing role of minority stress, trauma, stigma, and discrimination, health disparities may be related to barriers to care, such as limited availability of culturally competent and non-discriminatory healthcare services and scarcity of medical staff trained in LGB health issues. Findings may also suggest that previous results from studies of LGB veterans may be relevant to LGB service members. Future research could identify the factors associated with these health disparities so that steps can be taken to alleviate them.

To the authors' knowledge, this is the largest study assessing sexual orientation identity among U.S. service members and veterans that represents all components, service branches, and ranks, providing the ability to examine underrepresented subgroups, such as bisexual individuals, and differences among LGB individuals by sex. Whereas

^bIncluding American Indian ($n=1,196$), Asian and Pacific Islander ($n=3,896$), and Other racial and ethnic groups (e.g., multiple races and ethnicities, $n=1,196$) as identified within Defense Manpower Data Center personnel records on the basis of self-reported data.

^cIncluding electrical repair, communication/intelligence, other technical and specialty, electrical/mechanical equipment repair, craft workers, service and supply, and nonoccupations.

Table 2. Mental, Physical, and Behavioral Health by Sex and Sexual Orientation, Millennium Cohort Study 2014–2016 (N=96,930)

Outcome variables	Female			Male		
	Sexual orientation identity, n (column %)			Sexual orientation identity, n (column %)		
	Heterosexual (n=26,187; 92.5%)	Gay/lesbian (n=1,168; 4.1%)	Bisexual (n=962; 3.4%)	Heterosexual (n=67,305; 98.1%)	Gay (n=656; 1.0%)	Bisexual (n=652; 1.0%)
Mental health						
PTSD and depression	***			***		
Neither	21,778 (84.5)	911 (79.4)	634 (66.8)	57,274 (86.2)	512 (79.1)	439 (68.4)
Depression only	731 (2.8)	42 (3.7)	54 (5.7)	1,299 (2.0)	26 (4.0)	33 (5.1)
PTSD only	1,508 (5.9)	91 (7.9)	115 (12.1)	3,804 (5.7)	45 (7.0)	81 (12.6)
Comorbid PTSD and depression	1,746 (6.8)	103 (9.0)	146 (15.4)	4,072 (6.1)	64 (9.9)	89 (13.9)
Panic/anxiety syndrome	***			***		
No	22,654 (87.0)	961 (83.1)	690 (72.1)	61,114 (91.2)	560 (85.6)	530 (81.4)
Yes	3,392 (13.0)	196 (16.9)	267 (27.9)	5,922 (8.8)	94 (14.4)	121 (18.6)
Binge eating	***			***		
No	24,564 (93.9)	1,086 (93.0)	855 (89.0)	63,474 (94.4)	592 (90.5)	576 (88.3)
Yes	1,599 (6.1)	82 (7.0)	106 (11.0)	3,772 (5.6)	62 (9.5)	76 (11.7)
Problematic anger	***			***		
No	21,775 (83.3)	884 (76.0)	641 (66.8)	55,380 (82.4)	507 (77.8)	431 (66.3)
Yes	4,372 (16.7)	279 (24.0)	318 (33.2)	11,817 (17.6)	145 (22.2)	219 (33.7)
Physical health						
Multiple somatic symptoms	***			***		
None	10,626 (40.6)	389 (33.4)	238 (24.8)	37,378 (55.6)	338 (51.5)	241 (37.1)
Low	8,399 (32.1)	408 (35.0)	335 (34.9)	18,587 (27.7)	198 (30.2)	222 (34.2)
Medium	4,440 (17.0)	239 (20.5)	231 (24.1)	7,526 (11.2)	79 (12.0)	116 (17.9)
High	2,695 (10.3)	129 (11.1)	156 (16.3)	3,702 (5.5)	41 (6.3)	71 (10.9)
Physical functioning	***			***		
Lowest 15th percentile (lowest health)	3,955 (15.2)	211 (18.2)	154 (16.1)	9,971 (14.9)	55 (8.4)	106 (16.3)
Middle 70th percentile	17,587 (67.5)	777 (66.9)	623 (65.2)	47,567 (71.1)	452 (69.3)	436 (67.1)
Highest 15th percentile (highest health)	4,507 (17.3)	174 (15.0)	178 (18.6)	9,339 (14.0)	145 (22.2)	108 (16.6)
BMI	***			***		
BMI <25 kg/m ²	10,776 (41.3)	421 (36.1)	333 (34.7)	13,429 (20.0)	218 (33.3)	150 (23.0)
Overweight BMI (≥25 and <30 kg/m ²)	9,212 (35.3)	449 (38.5)	333 (34.7)	33,374 (49.7)	285 (43.5)	277 (42.6)
Obese BMI (≥30 kg/m ²)	6,076 (23.3)	295 (25.3)	295 (30.7)	20,348 (30.3)	152 (23.2)	224 (34.4)
Behavioral health						
Smoking status	***			***		
Never smoker	16,829 (66.0)	572 (50.4)	405 (43.5)	37,966 (57.8)	366 (57.4)	300 (47.2)
Former smoker	6,589 (25.8)	401 (35.4)	377 (40.5)	20,982 (31.9)	172 (27.0)	237 (37.3)
Current smoker	2,085 (8.2)	161 (14.2)	150 (16.1)	6,757 (10.3)	100 (15.7)	99 (15.6)
Problem drinking	***			***		
No	23,931 (93.4)	968 (85.3)	761 (81.7)	59,024 (89.6)	508 (79.4)	511 (80.4)
Yes	1,685 (6.6)	167 (14.7)	170 (18.3)	6,863 (10.4)	132 (20.6)	125 (19.7)
Risky drinking	***			***		
No	18,127 (70.9)	605 (53.3)	484 (51.8)	36,992 (56.2)	290 (45.3)	298 (46.9)
Yes	7,441 (29.1)	531 (46.7)	450 (48.1)	28,796 (43.8)	350 (54.7)	338 (53.1)
Insomnia symptoms	***			***		
Not clinically significant symptoms	14,240 (54.5)	523 (44.9)	363 (37.9)	39,382 (58.7)	332 (50.8)	294 (45.2)
Subthreshold symptoms	8,666 (33.2)	444 (38.1)	402 (41.9)	20,820 (31.0)	235 (35.9)	238 (36.6)
Clinical symptoms	3,216 (12.3)	197 (16.9)	194 (20.2)	6,876 (10.3)	87 (13.3)	118 (18.2)

Note: Asterisks indicate the statistical significance of the chi-square test for each variable versus sexual orientation within each category of sex (* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$).

Owing to nonresponse, the number of missing responses on each outcome variable varies. Sample sizes range from 94,534 to 96,884.

PTSD, post-traumatic stress disorder.

Table 3. AORs of Mental, Physical, and Behavioral Health Outcomes by Sex and Sexual Orientation

Outcome variables	Female		Male	
	Sexual orientation identity (ref: heterosexual)		Sexual orientation identity (ref: heterosexual)	
	Gay/lesbian, AOR (95% CI)	Bisexual, AOR (95% CI)	Gay, AOR (95% CI)	Bisexual, AOR (95% CI)
Physical health				
Physical functioning (ref: middle 70th percentile)				
Lowest 15th percentile	1.24 (1.05, 1.45)	1.08 (0.90, 1.30)	0.70 (0.53, 0.93)	1.13 (0.91, 1.41)
Highest 15th percentile	0.86 (0.72, 1.01)	0.98 (0.83, 1.17)	1.23 (1.01, 1.49)	1.13 (0.91, 1.40)
BMI (ref: BMI <25 kg/m ²)				
Overweight BMI (≥25 and <30 kg/m ²)	1.26 (1.10, 1.45)	1.28 (1.10, 1.50)	0.62 (0.52, 0.75)	0.79 (0.64, 0.97)
Obese BMI (≥30 kg/m ²)	1.22 (1.04, 1.43)	1.62 (1.37, 1.91)	0.49 (0.40, 0.61)	0.94 (0.75, 1.16)
Behavioral health				
Smoking status (ref: never smoker)				
Former smoker	1.86 (1.62, 2.13)	2.01 (1.74, 2.34)	1.01 (0.83, 1.22)	1.28 (1.07, 1.53)
Current smoker	2.15 (1.77, 2.60)	2.03 (1.66, 2.49)	1.51 (1.19, 1.92)	1.37 (1.07, 1.74)
Problem drinking (ref: no)	2.07 (1.73, 2.47)	2.29 (1.92, 2.74)	1.55 (1.26, 1.89)	1.52 (1.24, 1.86)
Risky drinking (ref: no)	1.91 (1.68, 2.16)	1.70 (1.48, 1.94)	1.15 (0.98, 1.36)	1.14 (0.97, 1.34)

Note: Boldface indicates statistical significance ($p < 0.05$).

Significant effect modification by sex was observed for these models (interaction $p < 0.05$). All models are adjusted for birth year, race and ethnicity, marital status, education level, service status, service branch, pay grade, military occupation, deployment experience, and study enrollment panel.

Table 4. AORs of Mental, Physical, and Behavioral Health Outcomes by Sexual Orientation

Outcome variables	Sexual orientation identity (Ref: heterosexual)	
	Gay or lesbian, AOR (95% CI)	Bisexual, AOR (95% CI)
Mental health		
PTSD and depression (ref: neither)		
Depression only	1.43 (1.11, 1.84)	2.18 (1.74, 2.74)
PTSD only	1.28 (1.06, 1.54)	2.09 (1.78, 2.46)
Comorbid PTSD and depression	1.31 (1.10, 1.56)	2.09 (1.79, 2.44)
Panic/anxiety syndrome (ref: no)	1.36 (1.18, 1.56)	1.85 (1.63, 2.10)
Binge eating (ref: no)	1.27 (1.06, 1.52)	1.66 (1.41, 1.94)
Problematic anger (ref: no)	1.39 (1.23, 1.57)	1.82 (1.62, 2.03)
Physical health		
Multiple somatic symptoms (ref: none)		
Low	1.25 (1.12, 1.40)	1.62 (1.43, 1.84)
Medium	1.34 (1.16, 1.55)	1.91 (1.65, 2.22)
High	1.24 (1.03, 1.49)	2.13 (1.79, 2.53)
Behavioral health		
Insomnia symptoms (ref: not clinically significant)		
Subthreshold symptoms	1.28 (1.15, 1.42)	1.45 (1.30, 1.63)
Clinical symptoms	1.46 (1.26, 1.69)	1.78 (1.54, 2.05)

Note: Boldface indicates statistical significance ($p < 0.05$).

No significant effect modification by sex was observed for these models (interaction $p > 0.05$). All models are adjusted for sex, birth year, race and ethnicity, marital status, education level, service status, service branch, pay grade, military occupation, deployment experience, and study enrollment panel.

PTSD, post-traumatic stress disorder.

much of the previous research has been conducted among veterans exclusively, all Millennium Cohort Study participants were actively serving at the time of study enrollment, and over 40% of the analytic sample was actively serving at the time of the 2016 survey.

Limitations

However, there are notable limitations. Survey responses may be impacted by the sensitivity of sexual orientation in the military and the legacy of DADT, although potential response bias is minimized through the use of confidential, self-administered surveys that are not available to military leadership or other personnel. Still, concerns about confidentiality or discrimination may have prevented some participants from responding to the sexual orientation identity item.⁵⁷ Although the 2016 survey was collected after the repeal of DADT in 2011, responses may not reflect current experiences in a post-DADT world because all participants served under DADT. Moreover, some participants may have declined to respond or endorsed a sexual orientation identity that did not accurately reflect their true identity because of limited response options (e.g., response options for queer, pansexual, asexual, or questioning individuals were not available). In addition, the exclusion of participants who preferred not to report their sexual orientation identity owing to the nonhomogeneous nature of this group prevents any examination of health outcomes among these individuals. Many within this diverse subgroup may have unique health risk factors and outcomes that are important to explore. Future studies should examine the characteristics, experiences, and challenges of different types of respondents who choose not to answer sexual orientation questions. In addition, this study was not able to assess gender identity, prohibiting investigation of health outcomes experienced by transgender and gender diverse service members. Data on sex are likely reflective of sex assigned at birth, with only options of female or male provided. Although the authors posit that discrimination is likely related to worse health outcomes among LGB individuals, the study did not specifically assess experiences of discrimination. In addition, the authors did not adjust for traumatic experiences and social support because these events may mediate (i.e., be on the causal pathway) between sexual orientation identity and the health outcomes. Finally, BMI was the only available body composition measure and is self-reported, thus not representing medical diagnoses of obesity. Results should be interpreted with caution given that BMI does not account for muscular or athletic builds among those with shorter stature, and this may disproportionately affect certain subgroups (e.g., muscular men and women of color).^{58,59}

CONCLUSIONS

In this large cohort of service members and veterans, LGB individuals reported poorer mental, physical, and behavioral health outcomes than heterosexual individuals, most notably among gay/lesbian women and bisexual individuals. Findings suggest that disparities in health outcomes exist on the basis of sexual orientation identity, despite the availability of medical care and health resources among active-duty personnel. This highlights the need for improved resources and policies within the Department of Defense and Veterans Health Administration aimed at promoting health and resiliency among LGB populations. Current programs and policies to prevent and address discrimination, stigma, and other traumatic experiences within the military should be further evaluated and improved. Specifically, organizational and policy shifts that promote cultural responsiveness and acceptance of LGB individuals need to be bolstered. It is important that future research identify the specific underlying factors that may contribute to these adverse health disparities and outcomes among LGB individuals in the military. Potential mechanisms that may need to be explored include minority stress, traumatic events, discrimination, stigma, and systemic bias. In addition, it is essential that health care and medical treatment options for LGB service members and veterans are evaluated and enhanced, including access to culturally competent and nondiscriminatory healthcare services. Ultimately, identifying and addressing the social and structural mechanisms that impact health among these populations may lead to a reduction in health disparities for LGB individuals in the military.

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CREDIT AUTHOR STATEMENT

Felicia R. Carey: Conceptualization, Data curation, Formal analysis, Methodology, Software, Validation, Visualization, Writing - original draft, Writing - review and editing. Cynthia A. Leard-Mann: Conceptualization, Methodology, Validation, Visualization, Writing - original draft, Writing - review and editing. Keren Lehavot: Conceptualization, Methodology, Validation, Writing - original draft, Writing - review and editing. Isabel G. Jacobson: Conceptualization, Methodology, Validation, Visualization, Writing - original draft, Writing - review and editing. Claire A. Kolaja: Conceptualization, Methodology, Validation, Writing - original draft, Writing - review and editing. Valerie A. Stander: Conceptualization, Methodology, Validation, Writing - review and editing. Rudolph P. Rull: Conceptualization, Methodology, Supervision, Validation, Writing - review and editing.

SUPPLEMENTAL MATERIAL

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