

Prevalence of Neurologic Disease Among Those in Same-Sex Relationships

Evidence from the Medical Expenditure Panel Survey

Lennox Byer, MD, Elan L. Guterman, and Nicole Rosendale, MD, MAS

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Correspondence

Dr. Byer
lennox.byer@ucsf.edu

Abstract

Background and Objectives

Prior research has shown several health disparities affecting sexual minority people. Research on the neurologic health of sexual minority people has been limited. Our objective was to characterize the prevalence of neurologic disease and utilization of a neurologist among a population of sexual minority people.

Methods

We conducted a cross-sectional analysis of sexual minority people, using people in same-sex relationships as a proxy for sexual minority status, from the Medical Expenditure Panel Survey (MEPS) from 2016 to 2020. The MEPS is a government-run survey that uses complex sampling to obtain a nationally representative sample. Our primary outcome was a diagnosis of any neurologic disease. We also completed stratified analyses by sex, race, and ethnicity. Our secondary outcome was visit to a neurologist within the past year. Logistic regression was used to compare the odds of both outcomes in those in same-sex relationships and those in different-sex relationships.

Results

Among 153,313 MEPS participants, there were 61,645 (40.2%) participants in relationships who were included in our sample. Of those, 822 (1.33%) participants were in same-sex relationships. Participants were, on average, aged 51 years (median 50 years, IQR 38–63); nearly 50% reported female sex and mostly non-Hispanic White (67.81%). Among those in same-sex relationships, 22.7% reported a neurologic diagnosis compared with 18.1% of those in different-sex relationships (OR 1.33; 95% CI 1.04–1.71). This difference was maintained with adjustment for age, sex, education, and insurance (OR 1.48; 95% CI 1.15–1.91). There was no significant difference in visit to a neurologist (adjusted OR 1.38; 95% CI 0.91–2.10).

Discussion

In this nationally representative sample, neurologic disease was more prevalent among those in same-sex relationships compared with those in different-sex relationships. Limited sample size and absent measurements of minority stress limited the etiologic search for factors driving this disparity. There was no significant difference in visit to a neurologist, and both groups reported their overall health as being similar. There is a need for more routine measurement of sexual orientation in neurologic research. This will allow us to detail differences in neurologic disease risk factors, prevalence, and outcomes. The end goal is the identification of opportunities for intervention and advancement of neurologic health equity.

Department of Neurology (LB, ELG, NR); Weill Institute for Neurosciences (ELG, NR), and Philip R. Lee Institute for Health Policy Studies (ELG), University of California, San Francisco.

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Introduction

Existing research suggests that sexual minority individuals (an umbrella term for any individual whose sexual identity, attraction, or behavior is not heterosexual or straight, such as lesbian, gay, and bisexual people, regardless of gender identity) suffer physical and mental health disparities relative to their heterosexual counterparts. Some examples include higher prevalence and younger age of onset of physical and mental health disability,¹ increased prevalence of cardiovascular risk factors,²⁻⁴ higher number of various chronic conditions,^{4,5} and greater all-cause mortality.⁶ In the context of neurologic illness, some have termed these inequities “neurodisparity.”^{7,8}

Prior research on neurodisparity involving sexual minority populations has been limited. Research is often limited to a few different neurologic diseases. Indeed, a systematic review found that over 70% of studies in this area are focused on HIV, leaving large gaps in our knowledge about sexual and gender neurodisparities. Furthermore, over 50% of identified studies were case reports or case series, resulting in problems of selection bias, problems of external validity, and limitations in our ability to study relevant sociodemographic factors.⁹ Among sexual minority populations, differences in health outcomes have been theorized as partly due to demonstrated structural barriers in health care access.^{10,11} For example, consider that a lack of culturally competent providers may lead to real or perceived stigma and subsequently less health care interaction.¹² This tracks with research involving other minoritized populations that has demonstrated lower likelihood of obtaining care from a neurologist.^{13,14}

This study uses nationally representative data from the Medical Expenditure Panel Survey (MEPS) to examine differences in the prevalence of neurologic disease among people in same-sex as compared with different-sex relationships. People in same-sex relationships were used as a proxy for sexual minority people. Gender minority people (e.g., transgender persons and nonbinary persons) were not explicitly identified in this study. We hypothesize that sexual minority people will be less likely to see a neurologist compared with their heterosexual counterparts.

Methods

Study Design and Data

This study was a cross-sectional analysis of pooled MEPS data from 2016 to 2020. Data for the MEPS are collected annually by the Agency for Healthcare Research and Quality (AHRQ) using complex sampling to acquire a nationally representative sample of noninstitutionalized civilians in the United States. The goal of the survey was to provide information on health care use and expenses, health care insurance, and sociodemographics. Full details of the MEPS design and methods are available elsewhere.¹⁵

We used the MEPS Household Component consolidated data files, Medical Condition files, and Household Component event files to compare neurologic disease and use of specialty neurologic care among those in same-sex relationships compared with those in different-sex relationships.

Standard Protocol Approvals, Registrations, and Patient Consents

The following study is a secondary analysis of unidentifiable information and is not considered human subjects research requiring institutional review board approval at the University of California, San Francisco. The AHRQ obtained informed consent at the time of data collection.

Study Population

Our study population included all participants 18 years and older who reported being in a current relationship. Participants in a relationship were those who reported currently being an “unmarried partner” or “spouse (husband/wife)”. Participants were excluded if they reported being in a relationship, but the data for their partner were not collected (for example, institutionalized persons).

Measurements

The independent variable was type of relationship (same-sex relationship vs different-sex relationship). The type of relationship was not explicitly provided in the data set. We used the relationship between the household members and the household reference person (defined as the household member who owns or rents the home) along with the reported sex of each individual to establish the type of relationship. For example, household members could indicate that, with respect to the household reference person, they were their “unmarried partner” or that they were “married.” If both individuals in that relationship were documented as having the same sex, they were classified as a same-sex relationship for this analysis. If one individual was female and another male, they were classified as a different-sex relationship. This methodology has been used before with government surveys, including the MEPS, as a proxy for studying this sexual minority population.¹⁶⁻¹⁹

The primary dependent variable was neurologic diagnosis. As part of the MEPS data collection process, participants were asked to report the diagnoses associated with every health care encounter or medication purchase within the past year. Participants were also asked to report the presence or absence of every disease included in an a priori list of “priority conditions” that were determined based on their high prevalence and relevance to policy. All reported diagnoses were then converted to ICD-10-CM codes by professional coders. The ICD-10-CM codes were then further converted into Clinical Classification Software Refined (CCSR) codes. The CCSR is a validated system, developed by the Healthcare Cost and Utilization Project and sponsored by the

AHRQ, which was created to aggregate ICD-10-CM codes into clinically meaningful categories.²⁰ We identified the presence of neurologic illness according to a set of pre-specified CCSR categories.

Secondary dependent variables included specific neurologic diseases and visit to a neurologist. For each participant, we created several dichotomous variables specifying whether CCSR categorical diagnoses included stroke, epilepsy, headache, or multiple sclerosis. These diseases were chosen given their relatively common occurrence among neurologic diseases. For each participant, we tallied the number of visits to neurologists at outpatient or hospital outpatient departments using the event files.

Additional variables were routinely collected as part of the MEPS data collection process and used in our analyses, including age, sex (assessed through the question “What is your sex?” and only offered options for “male”, “female”, or nonresponse), race and ethnicity (categorized as Hispanic, non-Hispanic Asian only, non-Hispanic Black only, non-Hispanic White only, or non-Hispanic other or multiple races), highest achieved education, family income level, region that the participant lives (categorized as Northeast, Midwest, South, or West), type of health insurance, usual source of health care (defined as the particular doctor’s office, clinic, health center, or other place that the participant usually goes to if they are sick or need advice about their health), emergency department visit in the past year, inpatient admission in the past year, self-reported overall health, and self-reported mental health.

Statistical Analysis

We compared sociodemographic characteristics according to relationship type (same-sex vs different-sex) using Pearson χ -square tests, except for age where an adjusted Wald test was used.

For our primary analysis, we compared the association between being in a same-sex relationship and having any neurologic diagnosis using 3 separate logistic regression models. First, we fit an unadjusted logistic regression model. Second, we fit a logistic regression model adjusted for age and sex, which were prespecified potential confounders. Third, we fit a logistic regression model adjusted for additional potential confounders. This included sociodemographic characteristics with a statistically significant difference in distribution among those in same-sex relationships compared with those in different-sex relationships. We then repeated our analysis of the primary outcome stratified by sex and race and ethnicity.

For our secondary analyses, we compared the association between being in a same-sex relationship with several specific neurologic diagnoses (cerebrovascular disease, epilepsy, headache, and multiple sclerosis). Like the primary outcome, we examined the association between same-sex relationship

and the specific neurologic disease using logistic regression models with the same independent variables. We compared the association between being in a same-sex relationship and visiting a neurologist in the past year using the same logistic regression models in 2 groups: those without a prior neurologic diagnosis (to account for those who received a diagnosis after that visit) and those with a neurologic diagnosis.

Statistical analyses were conducted using Stata 15.²¹ All analyses were conducted with AHRQ provided survey weights and using the *svy* command to incorporate the complex survey design; this allows for the generation of estimates representative of the noninstitutionalized US population.

Data Availability

The raw data files used in this article are publicly available online through the AHRQ.

Results

From 2016 to 2020, there were 153,313 people sampled as part of the MEPS. Our cohort included 61,546 adults who were currently in a marriage or partnership and had data collected about their partner. There were 1,604 individuals excluded from the sample because data were not collected regarding their partner. Among these participants, 822 (1.34%) were in same-sex relationships and 60,724 (98.66%) in different-sex relationships. Overall, participants were on average aged 51 years (median 50 years, IQR 38–63); nearly 50% reported female sex, majority non-Hispanic White (67.81%), and majority with a college level or higher degree (49.77%). Those in same-sex relationships were younger, more likely to have a college level or higher degree, and more likely to have insurance coverage from a private insurer or Medicare (Table 1). Differences in sex, race, ethnicity, income, and overall reported health did not meet statistical significance (Table 1).

Those in same-sex relationships had a higher prevalence of neurologic disease compared with those in different-sex relationships. Among those in same-sex relationships, the prevalence of neurologic disease was 22.7% compared with 18.1% among those in different-sex relationships (OR 1.33; 95% CI 1.04–1.71; Table 2). This remained the case in a multivariable logistic regression model that was adjusted for age and sex. A second model adjusted for educational attainment and insurance type found that those in same-sex relationships continued to have higher odds of a neurologic diagnosis (OR 1.48; 95% CI 1.15–1.91, Table 2).

Stratifying the primary analysis by sex, we found that, among female participants, people in same-sex relationships had higher odds of a neurologic disease compared with those in different-sex relationships (26.51% vs 19.75%; adjusted OR 1.56; 95% CI 1.13–2.16; Table 3) while the difference did not

Table 1 Descriptive Characteristics of Adults in Same-Sex and Different-Sex Relationships

Demographic	Same-sex relationship N = 822	Different-sex relationship N = 60,724	<i>p</i> Value
Age (mean)	47.48	50.81	0.01
Sex			0.14
Female	55.78	49.87	
Male	44.22	50.13	
Race			0.13
Hispanic	14.45	15.63	
Non-Hispanic Asian	3.09	6.73	
Non-Hispanic Black	7.10	7.65	
Non-Hispanic White	72.01	67.75	
Non-Hispanic other (or multiple races)	3.36	2.25	
Education (highest level degree obtained)			0.00
Doctorate	4.594	3.263	
Master	20.89	11.96	
Bachelor level degree	29.60	23.96	
Other degree	9.87	10.37	
High school or GED	33.40	41.45	
<High school	1.65	9.00	
Family income relative to poverty			0.27
>400%	53.09	53.75	
200%–399%	26.55	27.24	
125%–199%	8.70	9.689	
100%–125%	2.10	2.63	
<100%	9.55	6.681	
Married (in contrast to “partnered”)	68.66	89.62	0.00
Region			0.68
Northeast	16.30	17.09	
Midwest	19.04	21.49	
South	37.12	37.29	
West	27.30	23.53	
Insurance			0.00
Any private	74.01	63.76	
Public only (e.g., Medicaid)	7.67	7.97	
Uninsured	4.04	6.64	
Medicare only (>65yo)	3.31	7.75	

Table 1 Descriptive Characteristics of Adults in Same-Sex and Different-Sex Relationships (*continued*)

Demographic	Same-sex relationship N = 822	Different-sex relationship N = 60,724	<i>p</i> Value
Medicare + private (>65yo)	9.17	12.20	
Medicare + other public option (>65yo)	1.80	1.67	
Usual source of health care	73.60	75.92	0.52
ED visit within the past year	9.72	12.79	0.04
Inpatient admission within the past year	4.15	7.72	0.00
Self-reported overall health			0.2
Excellent	18.56	23.14	
Very good	39.38	36.77	
Good	28.64	29.15	
Fair	11.06	8.68	
Poor	2.365	2.26	
Self-reported mental health			0.05
Excellent	31.08	33.89	
Very good	30.49	34.12	
Good	29.02	25.60	
Fair	7.84	5.32	
Poor	1.57	1.07	

Weighted percentages; Tests of independence using Pearson χ^2 -square tests. “Age” was tested with an adjusted Wald test.

meet statistical significance among male participants (17.88% in same-sex relationships vs 16.40% in different-sex relationships; adjusted OR 1.56; 95% CI 1.13–2.16; Table 3). Stratifying the primary analysis by race and ethnicity, there was a similar increased prevalence of neurologic disease among those in same-sex relationships compared with different-sex relationships; however, these results did not reach statistical significance.

In secondary analyses, there was no statistically significant difference in disease prevalence of specific neurologic diseases (cerebrovascular disease, epilepsy, headache, multiple sclerosis) when those in same-sex relationships were compared with those in different-sex relationships (Table 4). In secondary analyses evaluating visits to a neurologist, there was no significant difference in the proportion of participants who had a visit to a neurologist over the past year. Among those in same-sex relationships, 4.44% had a visit to a neurologist in the past year compared with 3.68% among those in a different-sex relationship (adjusted OR 1.38; 95% CI 0.91–2.10; Table 4). In an analysis limited to those with a

Table 2 Association Between Same-Sex Relationship Type and Having at Least 1 Neurologic Diagnosis

	Weighted proportion as a percentage	OR (95% CI) unadjusted	OR (95% CI) adjusted for sex and age	OR (95% CI) adjusted for age, sex, education, and insurance type
Same-sex relationship (N = 822)	22.69	1.33 (1.04–1.71)	1.47 (1.15–1.89)	1.48 (1.15–1.91)
Different-sex relationship (N = 60,724)	18.07			

OR and CI produced by logistic regression.

reported neurologic diagnosis, there remained no statistically significant difference between the participants (adjusted OR 1.01; 95% CI 0.60–1.72; Table 4).

Discussion

We found that adults in same-sex relationships in the MEPS cohort have a significantly higher prevalence of neurologic disease compared with those in different-sex relationships. Our findings also suggest that the association of neurologic disease with same-sex relationships may be stronger among female participants. Together, these findings reinforce prior research demonstrating neurodisparity based on sexual orientation.^{1–6} Furthermore, this study adds to the limited research focused on sexual minority health within neurology.⁹

This study describes a difference in neurologic disease prevalence across a range of neurologic diseases among a population of sexual minority people. The current findings are consistent with prior research documenting neurodisparity among sexual minority people in particular neurologic diseases. This includes a higher lifetime prevalence of migraine among sexual minority people compared with heterosexual people in a nationally representative sample of US adults and in a cohort of men in Canada.^{22,23} These

findings are similar to our analysis that demonstrated an increased prevalence of headache among sexual minority people; however, this finding only reached statistical significance in unadjusted analyses. In addition, other studies have shown differences in the prevalence of subjective cognitive impairment, dementia, and stroke when sexual minority people are compared with heterosexual people—although these findings have not been consistently repeated.^{24–29} In our study, we were likely underpowered, but did not find any statistically significant differences in cerebrovascular disease prevalence when those in same-sex relationships were compared with those in different-sex relationships. Overall, our study results are consistent with some of the prior research examining the relationship between sexual minority status and specific neurologic diseases; these studies inconsistently reached statistical significance; however, when statistically significant associations were found, effect sizes were similar to those presented in our analysis.

Our demonstrated difference in the prevalence of neurologic disease may be largely driven by social determinants of health associated with the population of individuals in same-sex relationships rather than intrinsic to the individuals. For example, structural barriers, such as historically limited recognition of same-sex marriages, may reduce spousal health

Table 3 Prevalence of Having Any Neurologic Diagnosis Stratified by Sex and Race/Ethnicity

	Same-sex relationship (%)	Different-sex relationship (%)	OR (95% CI) unadjusted	OR (95% CI) adjusted for age ± sex
Stratification by sex				
Female (N = 30,853)	26.51	19.75	1.47 (1.05–2.05)	1.56 (1.13–2.16)
Male (N = 30,653)	17.88	16.40	1.11 (0.74–1.67)	1.36 (0.87–2.11)
Stratification by race/ethnicity				
Asian (non-Hispanic) (N = 4,450)	0	8.61	n/a	n/a
Black (non-Hispanic) (N = 6,251)	18.82	14.74	1.34 (0.56–3.18)	1.19 (0.84–4.39)
Hispanic (N = 14,426)	12.67	10.20	1.28 (0.67–2.45)	1.51 (0.75–3.02)
White (non-Hispanic) (N = 34,945)	25.59	21.07	1.29 (0.98–1.70)	1.36 (1.23–1.44)
Other race or multiple race (non-Hispanic) (N = 1,474)	32.83	22.06	1.73 (0.45–6.68)	2.045 (0.46–9)

Estimates are weighted proportions of the titled column; OR and CI produced by logistic regression.

Table 4 Differences in Secondary Outcomes Between Those in Same-Sex and Those in Different-Sex Relationships

	Same-sex relationship (%)	Different-sex relationship (%)	Unadjusted OR (95% CI)	Adjusted for age and sex OR (95% CI)
Disease type				
Cerebrovascular disease (N = 2,419)	2.54	3.61	0.69 (0.38–1.26)	0.92 (0.48–1.75)
Seizures (N = 1,029)	2.37	1.69	1.41 (0.77–2.58)	1.44 (0.79–2.62)
Headache (N = 2,348)	5.52	3.82	1.47 (1.002–2.17)	1.35 (0.93–1.98)
Multiple sclerosis (N = 117)	0.42	0.22	1.91 (0.46–7.99)	1.94 (0.47–8.01)
Visit to a neurologist				
Among all participants (n = 2,173)	4.44	3.68	1.22 (0.8–1.85)	1.38 (0.91–2.1)
Among participants with neurologic disease (n = 1,585)	14.27	15.12	0.93 (0.54–1.61)	1.01 (0.6–1.72)

Estimates are weighted proportions of the titled column; OR and CI produced by logistic regression.

insurance coverage and have implications for health care quality and the subsequent accumulation of risk factors of neurologic disease.³⁰ In this study, we did find a difference in the distribution of type of insurance when those in same-sex relationships were compared with those in different-sex relationships; however, overall, there was a slightly larger proportion of underinsured people among those in different-sex relationships. Of interest, we found that after adjustment for education and insurance coverage, the difference in prevalence of neurologic disease remained similar, suggesting that there are likely other unincorporated or unmeasured mediators that may explain this difference. Minority stress may also offer a framework and partial explanation for these differences. In the context of sexual minority health, chronic stress related to the direct experience of objective discriminatory events, expectations of rejection, concealment of one's sexual orientation, and internalization of negative societal attitudes results in poorer physical and mental health.^{31–33} Unfortunately, we were unable to incorporate traditional measures of minority stress because those questions (e.g., threats of violence and perceived discrimination) were not available in this survey. Finally, differences in the groups may be mediated through health-related behaviors or modifiable risk factors. In fact, in other non-neurologic diseases such as asthma and cardiovascular disease, researchers have inconsistently found disparities among sexual minorities partially influenced by these differences.^{4,16,34}

Despite the higher prevalence of reported neurologic illness among those in same-sex relationships, there was no significant differences in self-reported overall health when those in same-sex relationships were compared with those in different-sex relationships. This is at odds with prior studies of sexual minority people's health, where self-reported overall health is reported as worse than those who are not sexual minority people.^{35,36} One difference between this study and those prior studies is that our sample includes only those in relationships. There may be protective effect modification related to being in

a relationship. It has certainly been shown in other contexts that relationships may modify health outcomes.^{37–40} In the context of sexual minority health, there has been some evidence of improved subjective health when same-sex relationships were legally recognized.⁴¹

There were several limitations to this study. First, although the MEPS is designed to provide a nationally representative sample through random sampling techniques, smaller subgroups along with sampling and reporting bias, may limit the representativeness of the data for people with neurologic disease, people who are married or partnered, and those who identify as sexual minority people. The surveys were not designed specifically to assess sexual minority people's health. By extension, we were unable to obtain the most accurate assessment of sexual orientation (i.e., one that assesses one's identity or attraction) and instead relied on a component of behavior. Furthermore, there was no mechanism to assess the behavior of single individuals that would serve as a proxy for sexual orientation, so this study was limited to those in relationships. In the grand scheme of the assessment of sexual minority people, the above also contributes to likely misclassification and erasure of bisexual individuals as a sexual minority population. Taken together, these findings limit the representativeness of our estimates and the generalizability of our findings. Indeed, the education and income level of the study population are higher than that of the general US population. Second, because of the above paradigm and the lack of intentional sampling or oversampling of sexual minority people in this survey, the sample sizes are relatively small making it difficult to explore intersectionality and test for effect modification with regard to other variables. Intersectionality is a framework that suggests there is a complex interaction among one's different identities (e.g., socioeconomic class, race, language, and gender) that leads to differing experiences of bias and discrimination.⁴² Third, there was no measurement or mechanism to identify gender minority individuals (for example,

transgender or non-binary people) who often overlap significantly with sexual minority people and contribute to their intersectional outcomes. Finally, the self-report nature of the MEPS may be subject to recall bias; however, it is not immediately clear how there would be a differential bias with respect to relationship status that would over or underestimate the measures of association in a particular direction.

In this cross-sectional analysis of 5 years of MEPS data, we found differences in the overall prevalence of neurologic disease when those in same-sex relationships were compared with those in different-sex relationships. Although we were able to identify a difference between the groups, the rarity of same-sex couples in the general population (and the even rarer identification of this group within the MEPS dataset) leads to less precise measurements (e.g., widened confidence intervals around effect sizes). To improve the precision of estimates when studying this and other sexual and gender minority groups, it would be useful to intentionally identify and sample these groups to develop more precise estimates of health care utilization and a robust sample for multivariate analyses. In the context of MEPS specifically, this strategy has already been used when studying certain racial and ethnic groups which are intentionally oversampled to allow for increased power. Future research should aim to replicate this finding and repeat a similar exploration among sexual minority people more broadly, rather than just among people in a relationship. Future research should explore mediators of this neurodisparity with a particular inclusion of a broad range of additional demographic variables reflecting the intersectionality of respondents and measures assessing the role of minority stress.

The following study adds to our knowledge of the neurologic health of sexual minority people. Sexual and gender minority people are a significant segment of the population who all clinicians and researchers are very likely to encounter. Understanding the disparities in their care is an essential first step to improving health equity and outcomes.

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Appendix Authors

Name	Location	Contribution
Lennox Byer, MD	Department of Neurology, University of California, San Francisco	Drafting/revision of the manuscript for content, including medical writing for content; major role in the acquisition of data; study concept or design; analysis or interpretation of data
Elan L. Guterman, MD, MS	Department of Neurology; Weill Institute for Neurosciences; Philip R. Lee Institute for Health Policy Studies, University of California, San Francisco	Drafting/revision of the manuscript for content, including medical writing for content; analysis or interpretation of data
Nicole Rosendale, MD, MAS	Department of Neurology; Weill Institute for Neurosciences, University of California, San Francisco	Drafting/revision of the manuscript for content, including medical writing for content; major role in the acquisition of data; study concept or design; analysis or interpretation of data

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