



Aging in isolation: Sexual orientation differences in navigating cognitive decline

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ARTICLE INFO

Keywords:

Sexual orientation
Subjective cognitive decline
Aging
Long term supports and services

ABSTRACT

Introduction: Subjective cognitive decline is a self-reported measure of worsening memory and day-to-day decision making. Cognitive decline may impair an individual's ability to complete instrumental activities of daily living (IADL) such as preparing meals or taking medication, ultimately limiting one's ability to live independently. People with IADL impairments typically rely on informal care from spouses or children. Interpersonal and structural discrimination towards sexual minority (SM, including lesbian, gay, bisexual, and other queer identified) populations may contribute to disparities in cognitive decline and informal care outcomes.

Objective: Estimate differences in prevalence, severity, and receipt of social support for subjective cognitive decline stratified by sex and SM status.

Methods: Cross-sectional study design using a probability sample (n = 172,047) from the Behavioral Risk Factor Surveillance System 2015–2019. Prevalence estimates and multivariable Poisson regression models were used to compare outcomes by sex and sexual identity.

Results: Compared to heterosexual peers, SM men and women were more likely to experience cognitive decline (15% of SM men, 11% of heterosexual men, 17% of SM women, 11% of heterosexual women). In adjusted models, SM women were 22% more likely (95%CI:3%–44%, p < .05) to report IADL impairments due to cognitive decline but were 17% less likely (95%CI:1%–31%, p < .05) to receive any social support with IADL impairments compared to heterosexual women. In adjusted models, SM men were 25% more likely (95%CI: 0%–56%, p < .05) to report IADL impairments due to cognitive decline but reported no significant difference in receiving social support with IADL impairments compared to heterosexual men.

Discussion: We identified significant unmet need for social supports for IADL impairments, with highest unmet need among SM women. Comprehensive strategies such as LGBTQ + affirming assisted living and home and community-based services are needed to ensure equity in receipt of long-term supports and services for SM populations.

1. Introduction

1.1. Subjective cognitive decline and population health

As people age, they may experience cognitive decline marked by reductions in cognitive function. This includes impairments in language, thought, memory, and executive function, among other outcomes. Some levels of cognitive decline are expected with age, while others may

indicate clinical diagnosis.(Centers for Disease Control and Prevention & Alzheimer's Association, 2007). Clinical diagnoses exist along a continuum from mild cognitive impairment, which may not progress to more serious states, to diagnoses with acute impairments, such as Alzheimer's Disease and related dementias (ADRD).

Developed through the Healthy Brain initiative, subjective cognitive decline (SCD) is a self-reported measure of worsening memory and capacity for day-to-day decision making.(Centers for Disease Control and

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<https://doi.org/10.1016/j.ssmph.2024.101699>

Received 17 November 2023; Received in revised form 30 May 2024; Accepted 10 July 2024

Available online 14 July 2024

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Prevention, 2019) SCD may become severe enough to impair an individual's ability to complete instrumental activities of daily living (IADL), which includes essential tasks for living independently such as taking medications, paying bills, preparing meals, or driving. While this measure of SCD is not a clinical screening or diagnostic tool, self-reported measures of SCD in federal surveillance datasets provide a population-level estimate of people at risk for ADRD (Rajan et al., 2019; Steenland et al., 2016; Weuve et al., 2018). Social scientists have previously examined the relationship between socioeconomic status, social factors, and cognitive decline. For example, higher levels of educational attainment and household income are protective against earlier and faster cognitive decline (Teri et al., 1995). Similarly, social relationships such as legal marriage, (Liu et al., 2021) and parenthood (Zhang & Fletcher, 2021) are moderators of declines in cognitive function.

A broader body of evidence has examined the associations between minority stressors and biological embodiments of these stressors in minoritized populations at the intersections of race (and implicitly, of racism), gender, and immigration status (Forde et al., 2019; Geronimus, 1992; Wildsmith, 2002). Specific to cognitive function, using data from the Health and Retirement Study, researchers identified significant racial/ethnic and educational patterning of earlier onset, higher lifetime risk, and greater total number of years of cognitive impairment compared to White and higher-educated populations (Hale et al., 2020). This research suggests that individual-level responses to chronic and cumulative experiences of minority stress increase inflammatory responses throughout the body, ultimately contributing to worse cognition, sleep, cardiovascular disease, and metabolic disorders (Hotamisligil, 2006; Motivala, 2011; Ranjbaran et al., 2007; Tangestani Fard & Stough, 2019). Taken together, bio-psycho-social science suggests that multi-system inflammation and chronic neurohormonal responses to stress likely contribute to elevated prevalence of cognitive decline in minoritized populations.

1.2. Subjective cognitive decline among sexual minority populations

There is limited evidence on SCD among sexual minority populations – particularly when disaggregating effects by sex assigned at birth. Existing literature suggests a higher prevalence of SCD among sexual minority populations relative to heterosexual populations. (Brown & Patterson, 2020; Flatt et al., 2021; Fredriksen-Goldsen et al., 2021; Taylor et al., 2018). To date, no studies have examined IADL impairments as a measure of SCD severity or receipt of social support for severe SCD among sexual minority populations.

In the absence of informal social support, individuals may seek formal long-term services and supports (LTSS) to receive assistance with IADL impairments by paying out of pocket (Caldwell, 2022) or qualifying for LTSS benefits provided by state Medicaid programs. Given the significant costs of LTSS, it is possible that a significant proportion of the adult population with IADL impairments due to SCD forego accessing LTSS altogether.

Research using 2013 NHIS data demonstrates that sexual minority older adults are more likely to rely on formal long-term services and supports (LTSS) and less likely to rely on informal social supports from family, as compared to their heterosexual counterparts (Henning-Smith et al., 2015). There are several reasons why sexual minority adults may experience unique barriers in receipt of social support and informal care for IADLs. First, sexual minority populations may be much less likely to have a spouse or child who can provide informal long-term support, in part due to historic bans on same-sex marriage and adoption. Even when legal same-sex marriage is available, sexual minority adults enter marriages at substantially lower rates than their heterosexual adult counterparts (Carpenter, 2020). Prior research suggests that sexual minority women enter legal marriages at higher rates than sexual minority men (Carpenter & Gates, 2008); thus, sexual minority women may be more likely to receive informal social support for IADL impairments due to SCD compared to sexual minority men.

Sexual minority populations also experience significant structural and financial barriers to family formation. As of April 2023, ten states permit state-licensed child welfare agencies to decline to place children or to provide services due to religious conscientious objection, including to sexual and gender minority populations, even if such state-licensed agencies receive public funding. While sexual minority populations may seek to become parents through medical assisted reproductive technologies, gaps in health insurance coverage of such services mean sexual minority populations may face the full cost of in vitro fertilization and other assisted reproductive technologies. Parenthood is both a strong protective factor against SCD (Zhang & Fletcher, 2021) and provides an additional avenue for receiving social support for SCD-related impairments. Taken together, state-level and national policies that regulate household structure and family formation remain important determinants of aging outcomes for older, sexual minority adults.

Drawing on the literature of protective and risk factors for cognitive decline in the general population, we developed a conceptual model of sexual orientation disparities in subjective cognitive decline. We then adapted this model with insight from the sexual and gender minority social safety theoretical model (Diamond & Alley, 2022) and synthesized these findings into Fig. 1. Protective and risk factors that are observable in BRFSS are separated into domains of individual characteristics and then socioeconomic and household structure characteristics. Additional unobservable factors in BRFSS might include social network data, such as the number and strength of additional social ties who help buffer effects of negative acute events or amplify protective factors such as an increased sense of community.

1.3. Research objective

The objective of this study is to estimate the prevalence of SCD, the severity of SCD using both an SCD-specific and general measure of IADL impairment, and the receipt of social support for impairment of IADL due to SCD, stratified by sex and sexual minority status using a multi-state probability-based sample of adults aged 45 years and older.

2. Materials and methods

2.1. Data

Data were from the 2015–2019 Behavioral Risk Factor Surveillance System (BRFSS), a probability sample of non-institutionalized U.S. adults over the age of 18 years. In addition to core questions asked to all respondents, states may adopt optional modules. This study used data from 27 states (Connecticut, Delaware, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kentucky, Louisiana, Massachusetts, Minnesota, Mississippi, Missouri, Nevada, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Vermont, Virginia, Washington, West Virginia, and Wisconsin) that used both the optional sexual orientation and gender identity (SOGI) module and the optional cognitive decline module for adults aged 45 years and older at least once during the study period.

2.2. Sexual orientation measures

Our analysis first examined differences in SCD outcomes by sexual orientation. Respondents were asked “Which of the following best represents how you think of yourself?” Response options for men were “gay”; “straight, that is, not gay”; “bisexual”; and “something else.” Response options for women were “lesbian or gay”; “straight, that is, not gay”; “bisexual”; and “something else.” Respondents who identified as gay/lesbian, bisexual, or something else were classified as sexual minority compared to those who identified as “straight, that is, not gay” (hereafter referred to as heterosexual). Additional analyses stratified respondents by binary sex and sexual minority status.



Fig. 1. Conceptual model of sexual orientation disparities in subjective cognitive decline.

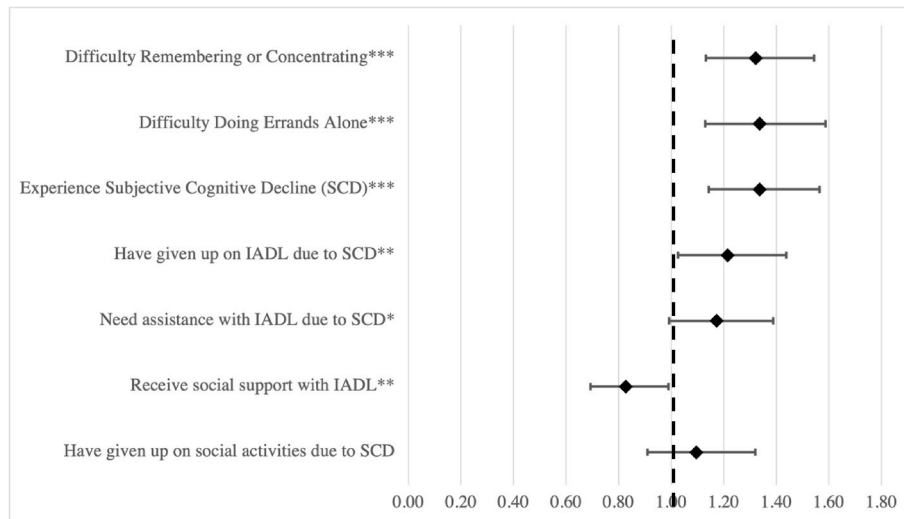


Fig. 2. Adjusted Prevalence Ratio of Subjective Cognitive Decline Outcomes among Sexual Minority Women)

Fig. 2 Author's calculations of 2015–2019 BRFSS data from 27 overlapping states with overlapping sexual orientation and cognitive decline optional modules. Reference group is heterosexual women. Estimates come from Model 2 adjusting for individual sociodemographic characteristics (e.g., age and race and ethnicity, which serves as a proxy for experiences of racial discrimination), state of residency, socioeconomic status (educational attainment, employment status, and household income) and household structure factors (marital/relationship status and number of children under 18 in the household).

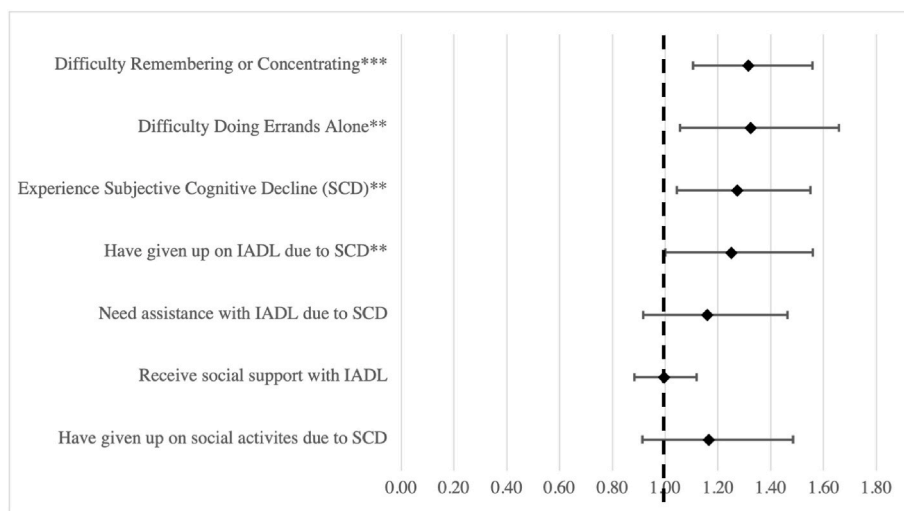


Fig. 3. Adjusted Prevalence Ratio of Subjective Cognitive Decline Outcomes among Sexual Minority Men

Fig. 3 Author's calculations of 2015–2019 BRFSS data from 27 overlapping states with overlapping sexual orientation and cognitive decline optional modules. Reference group is heterosexual men. Estimates come from Model 2 adjusting for individual sociodemographic characteristics (e.g., age and race and ethnicity, which serves as a proxy for experiences of racial discrimination), state of residency, socioeconomic status (educational attainment, employment status, and household income) and household structure factors (marital/relationship status and number of children under 18 in the household).

2.3. Subjective cognitive decline measures

In the cognitive decline module, respondents are first asked “During the past 12 months, have you experienced confusion or memory loss that is happening more often or is getting worse?” with respondents indicating “yes” coded as experiencing SCD or “no” coded as not experiencing SCD, following CDC guidance ([Centers for Disease Control and Prevention, n. d.](#)). Among those who responded Yes or Don’t Know/Not Sure respondents were asked the following.

- [Have given up on IADL] As a result of confusion or memory loss, how often have you given up day-to-day household activities or chores you used to do, such as cooking, cleaning, taking medications, driving, or paying bills?
- [Need assistance with IADL] As a result of confusion or memory loss, how often do you need assistance with these day-to-day activities?
- [Receive social support with IADL] When you need help with these day-to-day activities, how often are you able to get the help that you need?
- [Have given up social activities] During the past 12 months, how often has confusion or memory loss interfered with your ability to work, volunteer, or engage in social activities outside the home? Response options were “Always”, “Usually”, “Sometimes”, “Rarely”, or “Never.” Following CDC guidance for the BRFSS SCD module, respondents reporting Always, Usually, and Sometimes were categorized as “Yes” for endorsing the item and responses Rarely and Never were coded as “No” for endorsing the item.

To improve internal validity, we used two items from the BRFSS core questionnaire to assess IADL impairment. Responses to the state-optional SCD module were compared to responses to the BRFSS core questionnaire items on IADL impairment. Respondents were asked the following.

- [Difficulty remembering or concentrating] Because of a physical, mental, or emotional condition, do you have serious difficulty concentrating, remembering, or making decisions?
- [Difficulty doing errands alone] Because of a physical, mental, or emotional condition, do you have difficulty doing errands alone such as visiting a doctor’s office or shopping?”

Response options were “Yes”, “No”, “Don’t Know/Not Sure” or “Refused.” Responses categorized as Yes or No, other responses were excluded.

3. Calculations

3.1. Calculations

All analyses used survey weights to reflect the BRFSS stratified and clustered probability sampling design ([Centers for Disease Control and Prevention, 2021](#)). Differences in demographic characteristics and unadjusted outcomes were tested using chi-square tests. Modified Poisson regression models were used to estimate the association between sexual minority status and SCD outcomes as adjusted prevalence rates ([Zou, 2004](#)). This study follows STROBE reporting guidelines ([von Elm et al., 2007](#)) and was deemed exempt human subjects research by the [BLIND] Institutional Review Board.

We first calculated unadjusted estimates for all sexual minority adults compared to heterosexual adults, strengthening previous findings on sexual identity and SCD outcomes. We then estimated sex-stratified estimates of sexual minority women compared to heterosexual women and sexual minority men compared to heterosexual men. Next, we calculated regression-adjusted estimates. Model 1 included individual sociodemographic characteristics (e.g., age and race and ethnicity, which serves as a proxy for experiences of racial discrimination) and

state of residency. Model 2 incorporates measures of socioeconomic status (educational attainment, employment status, and household income) and household structure factors (marital/relationship status and number of children under 18 in the household). All adjusted analyses are presented as sex-stratified estimates of sexual minority women compared to heterosexual women and sexual minority men compared to heterosexual men.

Covariates were coded as: Age (18–24, 25–34, 35–44, 45–54, 55–64, >65, or Missing), race and ethnicity (White Non-Hispanic, Black Non-Hispanic, Hispanic, Other/Multi Non-Hispanic, or Missing), educational attainment (Less than High School, High School Graduate, Some College, College or Technical School Graduate, or Missing), employment status (Employed, Not Employed, Not in Labor Force, or Missing), household income (\$0–15,000, \$15–35,000, \$35–50,000, \$50–75,000, greater than \$75,000, or Missing), partnership and marital status (Married or Living with a Cohabiting Partner, Formerly Married, Never Married, or Missing), and number of children in the household (None, At least 1 child, or Missing).

4. Results

4.1. Demographic characteristics

The study sample included 172,047 respondents; 5002 (3%) identified as sexual minority. Compared to heterosexual respondents, sexual minority respondents were more likely to be male (52% vs 47%, $p < 0.01$) and younger (30% over 65 years of age vs. 39%, $p < 0.01$), identify as a minoritized racial or ethnic group (30% vs 24%, $p < 0.01$), have a household income below \$35,000 (42% vs 30%, $p < 0.01$), and have never married (25% vs 7%, $p < 0.01$). Sexual minority women were similarly likely to have a child under the age of 18 in the household (20% vs 17%, $p = .529$) compared to heterosexual women, but sexual minority men were much less likely to have a child under the age of 18 in the household (11% vs 19%, $p < 0.01$). [Table 1](#) presents complete demographic characteristics for the full sample by sexual minority status, [Table 2](#) presents estimates comparing sexual minority women to heterosexual women, and sexual minority men to heterosexual men.

4.2. Unadjusted results

4.2.1. Unadjusted sexual minority vs heterosexual adults

[Table 3](#) reports unadjusted SCD outcomes among all participants. Sexual minority adults were more likely to report difficulty remembering or concentrating (17% vs 10%, $p < 0.01$) and more likely to report difficulty with doing errands alone (14% vs 9%, $p < 0.01$) due to a physical, mental, or emotional condition compared to heterosexual adults. Sexual minority adults were more likely to report experiencing SCD (16% vs 11%, $p < 0.01$) compared to heterosexual adults. Among those experiencing SCD, sexual minority adults were more likely to have given up on IADL due to SCD (51% vs 39%, $p < 0.01$); more likely to need assistance with IADL impairments (41% vs 34%, $p = .04$); and less likely to receive social support with IADL impairments (78% vs 87%, $p = .01$). Sexual minority adults were also more likely to have given up on social activities such as working or volunteering (44% vs 36%, $p = .03$) compared to heterosexual adults.

4.2.2. Unadjusted sex stratified estimates

[Table 4](#) reports unadjusted SCD outcomes comparing sexual minority women to heterosexual women, and sexual minority men to heterosexual men. Compared to heterosexual women, sexual minority women were more likely to report difficulty remembering or concentrating (20% vs 12%, $p < 0.01$) and more likely to report difficulty with doing errands alone (16% vs 10%, $p < 0.01$) due to a physical, mental, or emotional condition. Examining outcomes from the cognitive decline module, sexual minority women were more likely to report experiencing SCD (17% vs 11%, $p < 0.01$) than heterosexual women. Among women

Table 1
Sample demographic characteristics by sexual orientation.

	Sexual Orientation				p-value
	Heterosexual		Sexual Minority		
	No.	%	No.	%	
Total Sample Size	167,045		5002		
Sex					
Male	70,520	47	2462	52	<0.0001
Female	96,525	54	2540	48	
Age					
45–54	33,910	29	1342	37	<0.0001
55–64	49,201	31	1601	31	
>65	81,772	39	2015	30	
Missing	2162	2	44	1	
Race and Ethnicity					
American Indian/Alaska Native, non-Hispanic	1286	1	45	1	
Asian, non-Hispanic	3839	2	89	2	
Black, non-Hispanic	13,351	12	400	13	
Hispanic	4798	6	288	13	
Pacific Islander, non-Hispanic	309	0	20	0	
White, non-Hispanic	136,486	75	3873	68	<0.0001
Other/Multiracial, non-Hispanic	4612	1	192	2	
Missing	2364	1	95	2	
Educational Attainment					<0.0001
Less than High School	62,092	27	2125	28	
High School Graduate	11,497	12	465	18	
Some College	47,201	30	1180	24	
College/Technical School Graduate	45,874	30	1217	29	
Missing	381	0	15	0	
Employment Status					
Employed	67,427	46	2077	45	0.019
Unemployed	5003	4	212	5	
Not in labor force	93,865	50	2675	48	
Missing	750	1	38	1	
Household Income					<0.0001
0-15,000	13,233	8	619	13	
15-35,000	37,557	22	1342	29	
35-50,000	20,391	11	599	11	
50-75,000	23,246	14	612	11	
>75,000	46,421	30	1258	24	
Missing	26,197	15	572	12	
Marital Status					
Married/Partnered	95,077	63	0	45	<0.0001
Formerly Married	58,806	29	0	29	
Never Married	12,357	7	0	25	
Missing	805	0	0	1	
Children in Household					
None	143,239	81	4425	84	0.05
At least 1 child	22,824	18	546	15	
Missing	982	1	31	1	

Author’s calculations of 2015–2019 BRFSS data from 27 overlapping states with overlapping sexual orientation and cognitive decline optional modules. Number reflects crude count while percentage reflects survey weighted prevalence. p-values from chi-squared tests differences in survey weighted prevalence between sexual identity.

experiencing SCD, sexual minority women were less likely to receive social support (72% vs 88%, $p = 0.04$) than heterosexual women.

Compared to heterosexual men, sexual minority men were more likely to report difficulty remembering or concentrating (14% vs 9%, $p < 0.01$) and more likely to report difficulty with doing errands alone (11% vs 6%, $p < 0.01$) due to a physical, mental, or emotional condition. Examining outcomes from the cognitive decline module, sexual minority men were more likely to report experiencing SCD (15% vs 11%, $p < 0.01$) than heterosexual men. Among men experiencing SCD, sexual minority men were more likely to have given up on one or more IADL due to SCD (50% vs 35%, $p = 0.001$) than heterosexual men.

4.3. Adjusted regression results

4.3.1. Adjusted sexual minority women vs heterosexual women

Given clear sex-specific disparities that are hidden without stratification, in [Table 5](#), we present adjusted prevalence ratios (aPR) from modified Poisson regression models stratified by sexual orientation and sex. In Model 1, sexual minority women were more likely to report having trouble remembering or concentrating; more likely to report difficulty doing errands alone; more likely to experience SCD; and less likely to receive social support with IADL impairments compared to heterosexual women. In Model 2, sexual minority women were 32% (95% Confidence Interval [CI]: 13%–54%, $p < 0.01$) more likely to have trouble remembering or concentrating due to a physical, mental, or emotional condition; 34% (95% CI: 13%–59%, $p < 0.01$) more likely to report difficulty doing errands due to a physical, mental, or emotional condition; and 34% (95% CI: 14%–56%, $p < 0.01$) more likely to experience SCD compared to heterosexual women.

Among women experiencing SCD, sexual minority women were 22% (95% CI: 3%–44%, $p < 0.05$) more likely to have given up on IADL due to SCD and 17% (95% CI: 1%–39%, $p < 0.10$) more likely to need help with IADL due to SCD, but 17% less likely (95% CI: 1%–31%, $p < 0.05$) to get social support with IADL impairments. There were no differences in having given up on social activities due to SCD observed.

4.3.2. Adjusted sexual minority men vs heterosexual men

[Table 5](#) presents adjusted prevalence ratios of SCD outcomes for sexual minority men compared to heterosexual men. In Model 1, compared to heterosexual men, sexual minority men were more likely to have trouble remembering or concentrating; more likely to report difficulty doing errands alone; more likely to experience SCD; and more likely to give up on IADL due to SCD. In Model 2, sexual minority men remained 31% (95% Confidence Interval [CI]: 11%–56%, $p < 0.01$) more likely to have trouble remembering or concentrating due to a physical, mental, or emotional condition; 32% (95% CI: 6%–66%, $p < 0.05$) more likely to report difficulty doing errands due to a physical, mental, or emotional condition; and 27% (95% CI: 4%–54%, $p < 0.05$) more likely to experience SCD compared to heterosexual men.

Among men experiencing SCD, sexual minority men were 25% (95% CI: 9%–65%, $p < 0.05$) more likely to have given up on IADL due to SCD. There were no differences in need for help with IADL impairments, receipt of social support for IADL impairments, or given up on social activities due to SCD observed.

5. Discussion

Using a large, multi-state probability sample of U.S. adults, we find that sexual minority adults reported SCD at higher levels compared to their heterosexual peers and that their SCD was more severe using a SCD-specific and two general measures of IADL impairment. Despite higher prevalence of SCD and IADL impairments, sexual minority adults were significantly less likely to receive the necessary social support that would allow them to live independently in the community.

We extend findings from prior studies by examining sex and sexual orientation differences in prevalence of SCD, SCD severity, and receipt of social support for IADL impairments due to SCD. Among women, the association between sexual orientation and SCD outcomes is only partially attenuated by observable characteristics. In adjusted analyses that include measures of individual characteristics, socioeconomic status, and household structure, (i.e., Model 2), sexual minority women reported higher rates and severity of SCD outcomes, but lower receipt of social support for IADL impairments due to SCD compared to heterosexual women. Similarly, sexual minority men reported higher rates and severity of SCD compared to their heterosexual peers. However, there were no observed differences in need for assistance with IADL and receipt of social support for IADL impairments between these two groups after accounting for observable characteristics.

Table 2
Sample demographic characteristics among women and men by sexual orientation.

N _{total} = 172,047	Women		p-value	Men		p-value
	Heterosexual	Sexual Minority		Heterosexual	Sexual Minority	
	N = 96,525 (%)	N = 2540 (%)		N = 70,520 (%)	N = 2462 (%)	
Age			<0.0001			0.001
45–54	28%	39%		30%	36%	
55–64	30%	29%		32%	34%	
>65	40%	31%		37%	29%	
Missing	2%	1%		1%	1%	
Race and Ethnicity			<0.0001			<0.0001
American Indian/Alaska Native, non-Hispanic	1%	1%		1%	1%	
Asian, non-Hispanic	2%	2%		2%	2%	
Black, non-Hispanic	13%	12%		12%	14%	
Hispanic	6%	12%		7%	14%	
Pacific Islander, non-Hispanic	0%	0%		0%	0%	
White, non-Hispanic	76%	69%		75%	66%	
Other/Multiracial, non-Hispanic	1%	2%		2%	1%	
Missing	1%	2%		2%	3%	
Educational Attainment			<0.0001			<0.0001
Less than High School	11%	17%		13%	20%	
High School Graduate	30%	25%		30%	23%	
Some College	32%	30%		28%	29%	
College/Technical School Graduate	27%	28%		28%	29%	
Missing	0%	0%		0%	0%	
Employment Status			0.048			0.035
Employed	41%	42%		52%	49%	
Unemployed	4%	5%		4%	5%	
Not in labor force	55%	52%		43%	45%	
Missing	1%	1%		1%	1%	
Household Income			<0.0001			<0.0001
0-15,000	9%	13%		35%	25%	
15-35,000	24%	29%		7%	14%	
35-50,000	11%	11%		20%	29%	
50-75,000	13%	11%		12%	11%	
>75,000	26%	23%		15%	11%	
Missing	18%	14%		12%	10%	
Marital Status			<0.0001			<0.0001
Married/Partnered	58%	44%		69%	45%	
Formerly Married	35%	36%		23%	23%	
Never Married	6%	19%		8%	31%	
Missing	1%	1%		0%	1%	
Children in Household			0.529			<0.0001
None	82%	80%		80%	88%	
At least 1 child	17%	20%		19%	11%	
Missing	1%	1%		1%	1%	

Author’s calculations of 2015–2019 BRFSS data from 27 overlapping states with overlapping sexual orientation and cognitive decline optional modules. Percentage reflects survey weighted prevalence. p-values from chi-squared tests differences in survey weighted prevalence between sexual identity within sex.

Table 3
Unadjusted subjective cognitive decline outcomes by sexual orientation.

	Sexual Orientation				p-value
	Heterosexual		Sexual Minority		
	No.	%	No.	%	
Difficulty Remembering or Concentrating	16,399	10%	776	17%	<0.0001
Difficulty Doing Errands Alone	14,448	9%	592	14%	<0.0001
Experience Subjective Cognitive Decline (SCD)	17,552	11%	792	16%	<0.0001
Have given up on IADL due to SCD	6207	39%	331	51%	<0.0001
Need assistance with IADL due to SCD	5261	34%	297	41%	0.04
Receive social support with IADL	4472	87%	231	78%	0.01
Have given up on social activities due to SCD	5646	36%	300	44%	0.03

Author’s calculations of 2015–2019 BRFSS data from 27 overlapping states with overlapping sexual orientation and cognitive decline optional modules. Number reflects crude count while percentage reflects survey weighted prevalence. p-values from chi-squared tests differences in survey weighted prevalence between sexual identity.

A key finding from this study is that despite experiencing more severe IADL impairments, sexual minority women are much less likely to receive social support to navigate IADL impairments than heterosexual women. This extends previous research suggesting that, in the absence of spouses or kin caregivers, sexual minority adults are more likely to need formal LTSS in later life than their heterosexual peers (Henning-Smith et al., 2015). One reason for observing differences between sexual minority and heterosexual women, but not men, may be the unique stressors (e.g., sexism) and life course pathways of sexual minority women. A mixed body of evidence finds that women may have higher cognitive reserves but that their cognition declines more rapidly than male counterparts. Differences in cognitive reserve may also be attributed to longer life expectancy in women compared to men. This study does not exhaustively assess the association between known protective characteristics (e.g., gainful employment, academic opportunity, financial assets across the life course). We also do not measure unique social stressors, particularly for sexual minority women, such as bisexual erasure or biphobia (Colledge et al., 2015; Friedman et al., 2014), or lower social safety resources. Instead, we identify high rates of unmet need for social supports for IADL impairments due to SCD among sexual minority women.

The present study builds on prior research and advances ADRD

Table 4
Unadjusted subjective cognitive decline outcomes among women and men by sexual orientation.

	Women			Men		p-value
	Heterosexual	Sexual Minority		Heterosexual	Sexual Minority	
	N = 96,525 (%)	N = 2540 (%)		N = 70,520 (%)	N = 2462 (%)	
Difficulty Remembering or Concentrating	12%	20%	<0.0001	9%	15%	<0.0001
Difficulty Doing Errands Alone	10%	16%	<0.0001	6%	11%	<0.0001
Experience Subjective Cognitive Decline (SCD)	11%	17%	<0.0001	11%	15%	<0.0001
Have given up on IADL due to SCD	43%	52%	0.067	35%	50%	0.001
Need assistance with IADL due to SCD	37%	42%	0.204	31%	39%	0.088
Receive social support with IADL	88%	72%	0.004	86%	84%	0.063
Have given up on social activities due to SCD	38%	45%	0.149	9%	42%	0.073

Author’s calculations of 2015–2019 BRFSS data from 27 overlapping states with overlapping sexual orientation and cognitive decline optional modules. Percentage reflects survey weighted prevalence. p-values from chi-squared tests differences in survey weighted prevalence between sexual identity within sex.

Table 5
Adjusted prevalence ratios of subjective cognitive decline outcomes among sexual minority women and sexual minority men.

	Women				Men			
	Model 1 aPR	95% CI	Model 2 aPR	95% CI	Model 1 aPR	95% CI	Model 2 aPR	95% CI
Difficulty Remembering or Concentrating	1.59***	[1.36,1.87]	1.32***	[1.13,1.54]	1.62***	[1.35,1.95]	1.31***	[1.11,1.56]
Difficulty Doing Errands Alone	1.62***	[1.34,1.96]	1.34***	[1.13,1.59]	1.71***	[1.36,2.15]	1.32**	[1.06,1.66]
Experience SCD	1.54***	[1.32,1.80]	1.34***	[1.14,1.56]	1.49***	[1.20,1.82]	1.27**	[1.04,1.55]
Have given up on IADL due to SCD	1.16	[0.95,1.42]	1.22**	[1.03,1.44]	1.30***	[1.08,1.58]	1.25**	[1.00,1.56]
Need assistance with IADL due to SCD	1.09	[0.90,1.31]	1.17*	[0.99,1.39]	1.16	[0.93,1.45]	1.16	[0.92,1.46]
Receive social support with IADL	0.82**	[0.68,1.00]	0.83**	[0.69,0.99]	0.96	[0.85,1.09]	0.99	[0.88,1.12]
Have given up on social activities due to SCD	1.05	[0.87,1.27]	1.10	[0.91,1.32]	1.20	[0.96,1.50]	1.16	[0.91,1.49]

Author’s calculations of 2015–2019 BRFSS data from 27 overlapping states with overlapping sexual orientation and cognitive decline optional modules. Model 1 included individual sociodemographic characteristics (e.g., age and race and ethnicity, which serves as a proxy for experiences of racial discrimination) and state of residency. Model 2 incorporates measures of socioeconomic status (educational attainment, employment status, and household income) and household structure factors (marital/relationship status and number of children under 18 in the household).

scholarship in several important ways. First, this study is the largest population-based study with data from over 172,000 respondents, including more than 5000 sexual minority adults aged 45 years and older between 2015 and 2019 to disaggregate experiences of SCD by sex and sexual identity. Secondly, we assessed severity of SCD using multiple measures of disability. Specifically, we incorporated measures of IADL impairment that ask specifically about SCD severity and two other CDC-based measures of IADL impairment that relate to cognition and independent living (Stevens, 2016). This study also expands current understandings of sexual orientation and sex-based patterns in aging, such as differences in severity of SCD and quality of life among adults with SCD.

An additional contribution of this study is that we estimated whether sexual minority adults receive social support (e.g., informal assistance from a family member or friend) to navigate IADL impairments due to SCD differential to their heterosexual peers. People experiencing IADL impairments often rely on informal care from a spouse, child, or other kin (Broese van Groenou & De Boer, 2016; National Research Council (US) Committee on the Role of Human Factors in Home Health Care, 2010; Noelker & Bass, 1989; Tennstedt et al., 1993), but sexual minorities may be less likely to have kin to provide social supports than heterosexual counterparts. This is the first study that quantifies receipt of formal and informal LTSS for adults with SCD by sexual minority status.

This is the largest study to date on cognitive decline by sexual orientation, and our results are representative of over 15 million adults aged 45 years and older across 27 states. Our sample size allowed for stratification by sex and sexual minority status to identify disparities in SCD. We build on previous studies by assessing IADL impairment with an objective measure of SCD severity. An additional advantage of using BRFSS data is the ability to examine informal social support for individuals with IADL impairments due to SCD, which is not available in similar data sources like the National Health Interview Survey.

Prevalence of SCD and receipt of social support may change over long periods of time with changing legal and policy environments. For

example, access to legal same-sex marriage and the adoption of comprehensive workplace, education, and public accommodation non-discrimination protections, such as The Equality Act (Gonzales & Gavalic, 2020), are policy interventions that may both improve social attitudes towards sexual minority populations and reduce exposure to stressors such as physical assault and verbal harassment. The status of structural protections at the time of this writing remains tenuous. For example, court cases at the health system (*Franciscan Alliance v. Burwell*) and state-levels (*Barber v. Bryant*) permit legal denial of healthcare to LGBTQ + patients, despite federal rules against discrimination based on sex (interpreted by the current presidential administration to include sex, sexual orientation, and gender identity) among health care providers receiving federal funding.

Drawing on our conceptual model of sexual orientation disparities in SCD and empirical findings, we identified multiple opportunities to intervene on the SCD continuum to improve population health outcomes. Wealth is a key protective factor for ADRD and we observed that sexual minority populations had lower household incomes than their heterosexual peers. We expect that reducing wage and wealth disparities among sexual minority populations will likely improve long-term cognitive health. Targeted policies that improve socioeconomic standing of sexual minority populations such as employment non-discrimination (such as *Bostock v. Clayton County*) may improve employment, earnings, and mental wellbeing with indirect effects on SCD outcomes among sexual minority populations.

Our findings also underscore the importance of policies that regulate family formation and household structure on unmet need for social supports for IADL impairments. Legalizing same-sex marriage and adoption may directly improve quality of life among sexual minority populations, which may, in turn, reduce prevalence and severity of SCD outcomes in the long run. Alternatively, access to these kinship structures may improve access to social supports for IADL impairments due to SCD. However, focusing solely on heteronormative family structures such as marriage and parenthood obscures broader questions—Who

should bear financial and emotional costs of care work? And importantly, who can afford or has access to formal and informal long-term supports and services under current arrangements? Sexual minority adults want to grow older in settings where they feel dignified and respected and in a community with whom they share life experiences (Willis et al., 2023). Our research sheds light on the untapped potential of developing LGBTQ + affirming assisted living facilities, home and community based services, and retirement communities which could address unmet needs for social support with impairments to IADL.

Another opportunity to address LTSS needs of sexual minority adults is to improve the capacity of the healthcare workforce — including primary care providers, social workers, psychiatrists, and other mental health professionals — to provide LGBTQ + affirming care which may prevent or improve the management of chronic health conditions (McKay et al., 2023) engender trust with providers to improve advanced LTSS planning for populations at high risk for ADRD.

Current LTSS interventions may be key to promoting healthier aging outcomes for older sexual minority adults. For example, home-delivered meal services (such as *Meals on Wheels*) may address IADL impairments related to ability to prepare food independently but have also been key in reducing social isolation and may help keep older adults out of more intensive care settings such as nursing homes (Thomas & Mor, 2013). Despite the impact of community-based interventions, coverage and provision of LTSS is often limited to Medicaid beneficiaries (Allen et al., 2014); therefore, people with LTSS needs who do not qualify for Medicaid will be responsible for the cost of these services (Caldwell, 2022).

Our findings echo a national trend — that as people live longer lives on average, a growing number of people will need formal and informal LTSS to live independently in the community. The needs for populations who have experienced pervasive, chronic discrimination because of their minoritized identities are even greater than the general population. While effective interventions exist to meet LTSS needs, many people who need LTSS do not access them. The Congressional Budget Office estimates that LTSS expenditures are expected to increase the national budget deficit by at least \$150 million by 2031 (Congressional Budget Office, 2021), suggesting a growing demand for LTSS with likely high levels of unmet need among socially marginalized populations. Ongoing research should focus on addressing the unmet health and social needs of marginalized populations experiencing SCD or living with ADRD.

5.1. Limitations

While findings from this study are representative of populations from the 27 states sampled, future research with nationally representative samples would allow for national estimates of SCD prevalence and LTSS needs by sexual orientation. Such estimates are necessary to understand need and access among the intersections of historically marginalized populations who may face more social barriers to community-based care. By 2021, 42 states have collected at least one round of sexual orientation and gender identity information using the optional, standardized BRFSS module, increasing the sample of states with which estimates of SCD and IADL impairments by sexual minority status could be obtained.

One tradeoff of using BRFSS data is that parenthood is assessed as having any child under the age of 18 years in the household rather than a more robust measure of parenthood, such as ever being a birthing parent or legal guardian, currently cohabitating with a child over the age of 18, or having a grandchild in the household. Another limitation is that it is a household survey, which precludes analyses by housing status. Sexual minority adults experience temporary and chronic homelessness at higher rates than heterosexual peers, which likely results in an underestimate of differences in adverse aging outcomes by sexual minority status (Cochran et al., 2002). Furthermore, adults living with SCD may no longer be living at home and residing in long-term group settings (e.g., nursing homes) or assisted living facilities for their ADRD-related

care and treatment.

This study focused on the needs of sexual minority adults. Additional analysis among gender minority adults is warranted, and authors should adopt analytical best practices associated with analysis of gender identity data in BRFSS (Lett & Everhart, 2021). Our findings are specific to cohorts of sexual minority adults over the age of 45 years between 2015 and 2019 (e.g., earliest respondents were born in 1974 or earlier). Most respondents came of age during the height of the HIV/AIDS epidemic without educational and workplace legal protections. Additionally, most respondents likely experienced categorical denial of access to same-sex marriage and adoption, which are common sources of informal LTSS among heterosexual households. Prior research has shown that the denial of these institutions partially explains adverse mental health outcomes in sexual minority populations (Hatzenbuehler et al., 2010; Raifman et al., 2018).

6. Conclusion

A high proportions of adults over the age of 45 experience cognitive decline that impairs their ability to complete IADL. An alarming proportion receive no support for such impairments related to self-reported declines in cognitive function, with greatest unmet needs for sexual minority women. Rethinking how we develop, finance, and provide LTSS will be essential for meeting the needs of an aging national population. In part, formal LTSS provided by the public and private sectors may improve wellbeing for those who need help with tasks such as cooking, cleaning, taking medications, driving, or paying bills. Many adults often rely on unpaid informal LTSS providers, such as spouses, children, and other kin. Sexual minorities are at greater risk for unmet LTSS needs compared to their heterosexual peers. Future research should evaluate and identify best practices for achieving equity in health, health care, and receipt of social services for aging sexual minorities experiencing SCD and/or ADRD.

Funding

This work was supported by the National Institute on Aging (R01AG063771, R01AG063771-04-S2, R36AG083386-01).

Conflict of interest

The authors have no conflict of interest to report. Tran is a consultant at NORC at the University of Chicago and Evaluation, Management, and Training (EMT) Associates. These funding sources had no role in the design of this study and did not have any role during its execution, analyses, interpretation of the data, or decision to submit results.

CRedit authorship contribution statement

Nathaniel M. Tran: Writing – review & editing, Writing – original draft, Visualization, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Tara McKay:** Writing – review & editing, Visualization, Supervision, Methodology, Conceptualization. **Gilbert Gonzales:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Stacie B. Dusetzina:** Writing – review & editing, Supervision, Investigation, Conceptualization. **Carrie Fry:** Writing – review & editing, Supervision, Methodology, Formal analysis, Conceptualization.

Data availability

Data are publicly available from CDC. Citation for access is included in the manuscript.

Acknowledgement

The authors thank audience members at the American Public Health Association section on Aging and Public Health, the Interdisciplinary Association for Population Health Sciences, the Association for Public Policy Analysis and Management, and the Vanderbilt LGBTQ + Policy Lab seminar series for their comments.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ssmph.2024.101699>.

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