

RESEARCH LETTER

Arthritis and Functional Limitations Among Home Healthcare Aides: 2021–2023, Behavioral Risk Factor Surveillance System

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Received: 22 May 2025 | **Revised:** 7 July 2025 | **Accepted:** 1 August 2025

Funding: This work was supported by the National Institute on Aging (K99 AG086523) to S.G.T., the American Heart Association (AHA #23SCISA1142170) to M.R.S., and the Doris Duke Charitable Foundation Clinical Scientist Development Award (DDCF 2022053) to M.R.S.

Keywords: arthritis | functional disabilities | home healthcare | pain

1 | Introduction

As the population ages, many families turn to home healthcare aides for help at home [1]. Caregiving in the home is physically demanding and has implications for physical health. Arthritis, for example, is prevalent (35%–40%) among family caregivers and is associated with poor outcomes, including worse physical functioning and low-quality care [2–4]. We hypothesized that home healthcare aides may be at increased risk of arthritis and functional disability given the job's physical demands (e.g., lifting patients at home without standardized equipment) and economic challenges (e.g., low wages and inadequate health insurance which can prevent home healthcare aides from seeking care).

2 | Methods

We conducted a secondary analysis of the 2021–2023 Centers for Disease Control and Prevention's (CDC's) Behavioral Risk Factor Surveillance System (BRFSS) to identify the prevalence of arthritis and functional disability among home healthcare

aides (including nursing, psychiatric, and home health aides, and personal care aides working in homecare settings; henceforth, HCAs-home) compared to similar healthcare aides providing care in settings other than the home, such as hospitals and long-term care (henceforth, HCAs-other).

The BRFSS is a probability-based telephone survey of noninstitutionalized US adults and collects data about employment status, demographics, health status, health behaviors, and use of preventive services. In addition to a core national survey, BRFSS offers an optional module eliciting industry and occupation for respondents who indicate that they are currently employed for wages or self-employed [5]. Forty-two states and territories administered this module at least once during 2021–2023 (Table 1). The CDC's Human Research Protection office reviewed the project and determined BRFSS to be exempt research.

We calculated unadjusted prevalences and adjusted prevalence ratios (aPRs) of self-reported doctor-diagnosed arthritis and six functional disabilities (hearing, seeing, concentrating or remembering, walking or climbing stairs, dressing or bathing, doing errands alone) among HCAs-home versus HCAs-other,

The findings and conclusions presented in this article are those of the authors and do not necessarily represent the views of the National Institute for Occupational Safety and Health and the Centers for Disease Control and Prevention.

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TABLE 1 | Sample characteristics of healthcare aides working in the home (HCAs-home)* and healthcare aides working in other settings (HCAs-other)**, Behavioral Risk Factor Surveillance System 2021–2023^a.

	Unadjusted weighted prevalence percentage (95% CI)**	
	HCAs-home <i>n</i> = 2821	HCAs-other <i>n</i> = 4512
Total sample caregiver characteristics		
Sex		
Male	17.4 (14.0, 21.2)	14.5 (12.4, 16.8)
Female	82.6 (78.8, 86.0)	85.5 (83.2, 87.6)
Age		
18–24	8.1 (5.9, 10.7)	21.0 (16.7, 25.7)
25–29	6.1 (4.5, 8.2)	9.3 (7.6, 11.2)
30–34	13.1 (10.0, 16.8)	11.8 (9.8, 14.1)
35–39	11.1 (8.6, 13.9)	9.7 (7.9, 11.8)
40–44	11.3 (8.3, 15.0)	9.1 (7.3, 11.2)
45–49	8.5 (6.7, 10.6)	6.8 (5.6, 8.3)
50–54	10.9 (8.3, 14.0)	11.5 (8.9, 14.7)
55–59	10.9 (8.5, 13.6)	7.4 (6.0, 9.0)
60–64	10.4 (8.1, 13.0)	7.5 (6.1, 9.0)
65+	9.6 (7.4, 12.3)	5.9 (4.9, 7.1)
Race/Hispanic ethnicity		
Non-Hispanic White	38.5 (34.5, 42.7)	43.9 (40.2, 47.6)
Non-Hispanic Black	28.4 (24.5, 32.7)	26.3 (22.6, 30.2)
Non-Hispanic Asian	4.8 (3.2, 6.9)	4.9 (3.2, 7.0)
Hispanic	23.4 (19.6, 27.5)	18.9 (15.5, 22.7)
Non-Hispanic other	4.8 (3.5, 6.5)	6.0 (4.2, 8.3)
Education		
Did not graduate high school	20.2 (16.6, 24.2)	11.4 (8.8, 14.4)
Graduated high school	36.3 (32.3, 40.5)	39.4 (35.5, 43.4)
Attended college or technical school	33.7 (29.5, 38.0)	37.7 (33.9, 41.5)
Graduated from college or technical school	9.8 (8.0, 11.8)	11.5 (9.9, 13.4)
Computed body mass index categories		
Underweight	****	2.1 (1.1, 3.6)
Normal weight	20.6 (16.9, 24.7)	25.0 (21.9, 28.3)
Overweight	30.3 (25.8, 34.9)	30.4 (26.7, 34.4)
Obese	47.8 (43.2, 52.5)	42.5 (38.8, 46.2)

Abbreviation: CI, confidence interval.

^a42 states and territories administered the industry and occupation module, and are included in this study: Arizona, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Dakota, Tennessee, Texas, Utah, Vermont, Washington, West Virginia, Wisconsin, Wyoming, Guam, Virgin Islands.

*HHW defined as 2012/2017 U.S. Census industry code equal to 8170 and 2010 Census occupation codes in (3600, 4610) or 2018 U.S. Census occupation codes in (3601, 3602, 3603, 3605).

**HCA defined as 2012/2017 U.S. Census industry codes not equal to 8170 and 2010 Census occupation codes in (3600, 4610) or 2018 U.S. Census occupation codes in (3601, 3602, 3603, 3605).

***SAS SURVEYFREQ procedure was used to estimate the unadjusted and weighted prevalences and 95% CIs.

****Suppressed, Relative Standard Error > 30%.

adjusting for age, sex, race/ethnicity, education, and body mass index. We calculated 95% CIs and considered aPRs with CIs not including the null (1.0) to be statistically significant.

To incorporate sampling weights and account for the complex survey design, we used SAS version 9.4 (SAS Institute Inc.) and SAS-callable SUDAAN version 11.0.1 (RTI International, Research Triangle Park) for data analysis. The BRFSS program provides imputed values for missing age and race/ethnicity. We used the pairwise deletion method (available-case analysis) to handle missing data in all other variables, where only

respondents' missing values on involved variables were removed from each pertinent analysis.

3 | Results

About 28.5% of HCAs-home and 19.5% of HCAs-other had arthritis; after adjustment, HCAs-home were significantly more likely than HCAs-other to have arthritis (aPR = 1.20 [1.02, 1.41]; Table 2). About 33.1% of HCAs-home had a functional disability versus 27.4% of HCAs-other; after adjustment, HCAs-home were

TABLE 2 | Prevalence of arthritis and functional disabilities among healthcare aides working in the home (HCAs-home)* compared with healthcare aides working in other Settings (HCAs-other)**; Behavioral Risk Factor Surveillance System 2021–2023^a.

	Unadjusted weighted prevalence percentage (95% CI)		Adjusted prevalence ratio (95% CI) ^{***}
	HCAs-home <i>n</i> = 2821	HCAs-other <i>n</i> = 4512 (reference group)	
Arthritis	28.5 (24.8, 32.4)	19.5 (17.1, 22.0)	1.20 (1.02, 1.41)
Functional disabilities			
Deaf or serious difficulty hearing	5.0 (3.3, 7.1)	3.3 (2.2, 4.7)	1.27 (0.80, 2.03)
Blind or difficulty seeing	6.8 (5.0, 9.0)	4.3 (3.4, 5.4)	1.45 (0.99, 2.12)
Difficulty concentrating or remembering	17.7 (14.4, 21.4)	15.3 (11.9, 19.3)	1.43 (1.13, 1.81)
Difficulty walking or climbing stairs	15.4 (12.4, 18.9)	9.4 (7.4, 11.7)	1.28 (0.98, 1.66)
Difficulty dressing or bathing	2.9 (1.5, 5.1)	1.3 (0.8, 1.9)	1.78 (0.97, 3.26)
Difficulty doing errands alone	6.8 (4.3, 10.3)	6.1 (4.5, 8.2)	1.03 (0.65, 1.65)
Any functional disability ^{****}	33.1 (29.0, 37.4)	27.4 (23.7, 31.4)	1.23 (1.05, 1.46)
Functional disabilities among participants with arthritis			
Deaf or serious difficulty hearing	11.6 (6.8, 18.0)	7.5 (5.0, 10.8)	1.44 (0.86, 2.40)
Blind or difficulty seeing	14.2 (8.9, 21.1)	8.9 (6.2, 12.3)	1.39 (0.83, 2.31)
Difficulty concentrating or remembering	27.6 (20.7, 35.3)	19.2 (14.6, 24.5)	1.45 (1.04, 2.02)
Difficulty walking or climbing stairs	37.2 (29.3, 45.5)	28.0 (21.7, 35.0)	1.15 (0.88, 1.51)
Difficulty dressing or bathing	*****	4.2 (2.3, 7.0)	1.62 (0.76, 3.47)
Difficulty doing errands alone	10.7 (5.4, 18.4)	8.7 (5.2, 13.4)	1.08 (0.56, 2.09)
Any functional disability	59.0 (51.5, 66.3)	47.5 (41.1, 54.0)	1.18 (0.99, 1.41)

Note: Bolding indicates statistically significant aPR elevation (HHWs comparing to HCAs).

Abbreviation: CI, confidence interval.

^a42 states and territories administered the Behavioral Risk Factor Surveillance System industry and occupation module in at least one year 2021–2023, and are included in this study: Arizona, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Dakota, Tennessee, Texas, Utah, Vermont, Washington, West Virginia, Wisconsin, Wyoming, Guam, Virgin Islands.

*HHW defined as 2012/2017 U.S. Census industry code equal to 8170 and 2010 Census occupation codes in (3600, 4610) or 2018 U.S. Census occupation codes in (3601, 3602, 3603, 3605).

**HCA defined as 2012/2017 U.S. Census industry codes not equal to 8170 and 2010 Census occupation codes in (3600, 4610) or 2018 U.S. Census occupation codes in (3601, 3602, 3603, 3605).

***Logistic regression of each functional disability on healthcare worker (HHW vs. HCA), adjusting for age, sex, race/ethnicity, education, and body mass index, using SUDAAN RLOGIST procedure.

****At least one of the six specified functional disabilities.

*****Suppressed, Relative Standard Error > 30%.

significantly more likely than HCAs-other to report a functional disability (aPR = 1.23 [1.05, 1.46]; Table 2).

Among HCAs-home and HCAs-other with arthritis, difficulty walking or climbing stairs was the most common functional disability. Although functional disabilities were more common among HCAs-home, after adjustment, only difficulty concentrating or remembering was statistically significant (aPR = 1.45 [1.04, 2.02]; Table 2).

4 | Discussion

HCAs in both groups reported a high prevalence of arthritis and functional disabilities, suggesting that, regardless of setting, HCAs frequently experience physical challenges which could impact the quality of care they can provide. However, more than a quarter of HCAs-home had arthritis and over 30% had a functional disability, both prevalences exceeding those observed among HCAs-other and the US adult population at large [6, 7]. These findings suggest that providing care in the home may present a heightened risk for joint and musculoskeletal issues and ultimately, arthritis, which is particularly concerning, given that caring for older adults requires home healthcare workers to perform manual tasks (i.e., bathing, transferring).

Limitations include that the data are self-reported, not nationally representative, and cross-sectional in nature. The cross-sectional design of the data obscures the temporality of arthritis diagnosis and employment as an HCA. As such, future studies examining longitudinal associations between working as an HCA and arthritis and functional disabilities would be useful and could add context to whether home care work itself puts a person at risk for developing or exacerbating arthritis and/or functional disabilities over time. Future studies could also elucidate the consequences of arthritis and functional disability for worker outcomes (i.e., absenteeism, high turnover rates) and care quality. Additionally, better supports for home healthcare workers, including training to mitigate pain and injury, ergonomic assistive devices, and access to treatment, may be warranted to increase the sustainability of this essential workforce.

Author Contributions

Everyone who contributed significantly to the work is included as an author on this manuscript. S.G.T. and M.R.S. conceptualized the study and took the lead on preparing the manuscript. J.L., S.R.S., and M.D. supported study conceptualization. J.L. and S.S. provided guidance about the analysis of BRFSS data, and J.L. performed the analyses. A.S. and M.D. supported manuscript preparation and offered feedback on the study design.

Conflicts of Interest

The authors declare no conflicts of interest.

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