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Assistive device use and mobility-related factors among adults aged ≥ 65 years☆

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Abstract

Introduction: Examining how assistive device (cane, walker) use relates to other mobility factors can provide insight into older adults' future mobility needs.

Methods: Data come from the Second Injury Control and Risk Survey, Phase 2 (ICARIS2-P2), conducted from March 2007 to May 2008. Prevalence estimates were calculated for older adults (aged ≥65) and multivariable logistic regression was used to explore associations between assistive device use and mobility-related characteristics.

Result: Compared with non-users, assistive device users were more likely to report a recent fall (AOR 12.0; 95% CI 4.9–29.3), limit walking outside due to concerns about falling (AOR 7.1; 95% CI 2.6–19.1), be unable to walk outside for 10 min without resting (AOR 3.3; 95% CI 1.1–9.3),and be no longer driving (AOR 6.7; 95% CI 2.0–22.3).

Conclusion: Assistive device users have limited mobility and an increased risk for fall injury compared with non-users.

Practical Application: Effective fall prevention interventions, and innovative transportation options, are needed to protect the mobility of this high-risk group.

Keywords

Driving; Falls; Walker; Cane; Independence

1. Introduction

On average, 10,000 adults turn 65 years old each day (Cohn & Taylor, 2010) and a quarter of these adults are expected to live into their 90's (Social Security Administration, 2014). As adults age, they may experience declines in their ability to walk safely. As a result, some use assistive devices such as canes or walkers. In 2013, one in six adults (16.9%) aged 65 years and older reported using an assistive device (unpublished NH1S data). As the population ages, it is likely that the number of older adults who use assistive devices will increase.

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The Journal of Safety Research has partnered with the Office of the Associate Director for Science, Division of Unintentional Injury Prevention in the National Center for Injury Prevention & Control at the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia, USA, to briefly report on some of the latest findings in the research community. This report is the 37th in a series of CDC articles.

However, research on the extent of assistive device use among older adults is both limited and incomplete. Therefore, the purpose of the present study is to provide national prevalence estimates of assistive device use among adults aged 65 and older overall and by demographic and mobility characteristics, and to determine which characteristics are most strongly related to the use of an assistive device.

2. Methods

Data were obtained from the Second Injury Control and Risk Survey, Phase 2 (ICARIS2-P2), a cross-sectional, random-digit dial telephone survey conducted by the Centers for Disease Control and Prevention (CDC) from March 2007 to May 2008. The survey included English- and Spanish-speaking adults at least 18 years of age living in the United States. Specific details of the study methodology have been described previously (Klevens, Simon, & Chen, 2012).

This study was restricted to survey respondents who were aged 65 years or older who answered either ‘yes’ (assistive device users) or ‘no’ (non-users) to the following question (n = 574): “Do you currently use an assistive device like a cane or walker when you go outdoors?” Respondents were also asked the following six mobility-related questions: “About how many minutes do you walk outside the home each week?”; “If you wanted to visit a friend, say no more than 3 or 4 blocks away, would you walk, drive, get a ride, or get there some other way?”; “In the past three months, have you fallen?”; “Do you limit how much you walk outside your home because you are worried about falling?”; “Are you able to walk outside the home for at least 10 min, or a quarter mile without resting?”; “About how many miles did you drive during the past 12 months?”; “At what age do you think you will stop driving?” Respondents who did not answer all six mobility-related questions were excluded from further analyses, resulting in a final study sample of n = 402 (57%).

We calculated nationally weighted estimates and percentages, and 95% confidence intervals (CIs) and reported them by demographic and mobility characteristics. All analyses were performed using SAS, version 9.3 (SAS Institute, Inc.; Cary, NC). Multivariable logistic regression was used to examine the relationships between assistive device use and other mobility-related characteristics. For all analyses, p-values < 0.05 were considered statistically significant.

3. Results

Overall 16.6% (95% CI 12.7%−20.5%) of adults aged 65 and older, or approximately 4.8 million older adults, reported that they used an assistive device when they went outdoors (data not shown). Compared with non-users, more assistive device users were aged 75 + years (Table 1). More assistive device users reported falling in the past 3 months (35.0%; 95% CI 21.4–48.6) and limiting walking outside due to concerns about falling (56.4%; 95% CI 41.2–71.5) compared with non-users (6.8%; 95% CI 3.8–9.9 and 9.8%; 95% CI 6.2–13.3, respectively). A larger proportion of non-users reported being able to walk outside for 10 min without resting compared with assistive device users (91.5%; 95% CI 87.9–95.0 and 50.6%; 95% CI 35.9–65.4, respectively). Assistive device users preferred to get a ride to go

3–4 blocks (40.6%; 95% CI 25.4–55.9), followed by driving (29.9%; 95% CI 16.5–43.2). Non-users preferred walking (61.9%; 95% CI 55.5–68.4), followed by driving (33.1%; 95% CI 26.8–39.5).

Almost half of the device users were non-drivers (47.8%; 95% CI 32.7–62.8), followed by drivers who reported they would stop driving in 0–10 years (27.5%; 95% CI 15.6–39.3). Most non-users were drivers who reported they would stop driving in > 10 years (66.2%; 95% CI 60.3–72.1), followed by drivers who reported they would stop in 0–10 years (24.6%; 95% CI 19.4–29.8) (Table 1).

Several predictors from crude analyses remained significant in the multivariable model. Compared with non-users, assistive device users were more likely to be aged 75 years and older (AOR3.1; 95% CI 1.3–7.5), to report having fallen in the past three months (AOR 12.0; 95% CI 4.9–29.3), and to limit walking outside due to concerns about falling (AOR 7.1; 95% CI 2.6–19.1) (Table 2). Additionally, users were more likely than non-users to report not being able to walk outside for 10 min without resting (AOR 3.3; 95% CI 1.1–9.3) and were more likely to be non-drivers (AOR 6.7; 95% CI 2.0–22.3).

4. Discussion

The current study estimated that 16.6% of older adults use an assistive device outdoors. This is similar to the 2013 National Health Interview Survey estimate that 16.9% of adults aged ≥ 65 used an assistive device. Similarly, the 2011 National Health and Aging T rends Study estimate showed that 13.8% of community-dwelling Medicare beneficiaries used an assistive device for mobility (Clarke, 2014). However, estimates of assistive device use among Medicare beneficiaries living in the community likely are not comparable to that of the overall older adult population possibly because of disparities in benefit coverage for assistive devices by type of insurance provider (Groah, Ljungberg, Lichy, Oyster, & Boninger, 2014). The similarity of the national prevalence estimates of assistive device use among older adults lends support for the validity of the current study results.

Assistive device users in this study were more likely than non-users to report falling in the last 3 months. Using nationally representative data on fall-related injuries among adults aged 65 years and older who were treated in emergency departments, Stevens et al. estimated that more than 47,000 fall-related injuries each year were associated with canes and walkers (Stevens, Thomas, Teh, & Greenspan, 2009). Older adults who use assistive devices generally have balance and/or mobility problems, are frail, and therefore are at increased risk of falling and sustaining an injury in the event of a fall (Andersen, Roos, Stanziano, Gonzalez, & Signorile, 2007; Charron, Kirby, & MacLeod, 1995; Mahoney, Sager, Dunham, & Johnson, 1994; Morse, Tylko, & Dixon, 1987). However, research on whether using an assistive device reduces fall risk has produced equivocal results. Assistive device use may merely identify a group with balance and mobility limitations (Mahoney, Sager, & Jalaluddin, 1999).

Graffmans et al. found that assistive devices can improve balance and mobility and therefore reduce fall risk (Graafmans, Lips, Wijlhuizen, Pluijm, & Bouter, 2003). Others have

reported that these devices can interfere with balance and coordination (Bateni, Heung, Zettel, McLlroy, & Maki, 2004; Mann, Granger, Hurren, Tomita, & Charvat, 1995a; Mann, Granger, Hurren, Tomita, & Charvat, 1995b) and therefore increase the risk of falls and fall-related injuries (Bateni & Maki, 2005; Stevens et al., 2009). The conflicting results may be explained by research that has found increased fall risk results when devices are not professionally prescribed (Chen et al., 2011) or properly fit (Sainsbury & Mulley, 1982). Future research is needed to determine what effect assistive devices have on fall risk; to what extent proper device prescription, fit, and training impacts this risk; and whether assistive devices can be re-designed for increased safety and ease of use.

In addition to being more likely to have experienced a recent fall, our study found that assistive device users were more likely to report limiting walking outside because of concerns about falling. Previous research among community-dwelling older women has found that those who worried about falls and restricted their activities due to these concerns were more likely to suffer fall injuries (Hu, Xia, Jiang, Zhou, & Li, 2015). Our findings, in light of the Hu et al. study, could indicate that assistive device users are at increased risk of both falls and fall injuries.

A number of effective fall prevention programs exist (Gillespie et al., 2003; Gillespie et al., 2012; Stevens & Burns, 2015). However, these programs generally involve exercise that might not be feasible for older adults with limited mobility. As this study showed, assistive device users are more likely to have mobility limitations, including not being able to walk outside the home for 10 min without rest. However, a recent pilot of an exercise intervention for frail older adults (including both assistive device users and non-users) showed that a 12-week exercise intervention was feasible (Clegg, Barber, Young, Iliffe, & Forster, 2014). Future research should explore the feasibility of exercise interventions for assistive device users and the effectiveness of exercise-based fall prevention programs to reduce falls and fall-related injuries among this group.

Our study found that assistive device users were less likely to drive. Older adults who no longer drive have few transportation options (Bailey, 2004), as about 80% live in car-dependent suburban or rural communities (Rosenbloom, 2003) that often lack alternative transportation resources. Not driving limits access to goods, services, and social contacts (Satariano et al., 2012; Spinney, Scott, & Newbold, 2009). Additionally, physical and mental health declines more rapidly among older adults who do not drive than it does among those who do (Edwards, Lunsman, Perkins, Rebok, & Roth, 2009; Ragland, Satariano, & MacLeod, 2005).

Since assistive device users have limited mobility, public transportation options that require walking to bus stops or train stations may not be viable. Alternative transportation options such as Supplemental Transportation Programs (STPs) (Freund & McKnight, 1997; Oxley & Whelan, 2008) that provide a door-to-door or, in some cases, door-through-door transportation service could be better alternatives for assistive device users. Our finding that getting a ride was the preferred method of travel for short trips among assistive device users may indicate that they would be receptive to the STPs' door-to-door approach. Future

research should identify transportation options that are feasible for assistive device users as well as acceptable to older adults in general.

This study has some limitations. The response rate for ICARIS2-P2 was 52%. This rate can be partially explained by changes in the telecommunications environment, which have increased non-contact rates for telephone surveys (Tourangeau, 2004). However, this response rate is higher than other national random digit dial telephone surveys carried out during the same time period (Centers for Disease Control and Prevention, 2011; National Cancer Institute, 2012). Despite the low response rate, older adult ICARIS2-P2 respondents were similar to the older adult U.S. population with respect to gender, race, and ethnicity. These demographic similarities increase our confidence that our study findings are generalizable to the U.S. non-institutionalized older adult population. Finally, our study was not able to examine differences in the mobility-related characteristics by type of assistive device (such as cane or walker).

Our study reports on a nationally representative survey that collected information about mobility-related factors and driving status among the population of older adults that use assistive devices—a population estimated at over 4.8 million. Given our aging society it is likely that the proportion of assistive device users will increase over the next decade; therefore, it is important to explore effective fall prevention interventions, innovative transportation options, and other approaches to extend the mobility of this high-risk group.

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☆ The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Biography

Bethany West, MPH, serves as an epidemiologist on the Transportation Safety Team of the CDC’s Injury Center. She currently conducts several studies in the area of road safety focusing on older adult mobility, child passenger safety, minority groups, and alcohol-impaired driving.

Geeta Bhat, MPH, is a former research fellow for the Transportation Safety Team of the CDC’s Injury Center. Her areas of focus included teen driving, safety belt use, and older adult mobility.

Dr.Judy Stevens received her PhD from Emory University and joined the Injury Center at CDC in 1996 as an epidemiologist in the Division of Unintentional Injury Prevention. She is a national expert and the lead scientist on older adult falls and fall prevention, and conducts epidemiologic research on fatal and nonfatal falls. Dr. Stevens has published over eighty peer-reviewed journal articles and has contributed chapters on older adult falls to five textbooks. She guided the development of STEADI (Stopping Elderly Accidents, Deaths, and Injuries), a fall prevention tool kit that contains an array of healthcare provider resources for assessing and addressing falls risk in clinical settings, as well as educational materials for older adults and their caregivers.

Gwen Bergen received her Ph.D. in health policy and management at the Johns Hopkins Bloomberg School of Public Health and her M.P.H. in social and behavioral sciences from the Emory University Rollins School of Public Health. Since 2009, she has worked as a behavioral scientist at the U.S. Centers for Disease Control and Prevention in Atlanta. Prior to that, she completed a fellowship with the CDC's National Center for Health Statistics. Gwen's work is in the areas of older adult mobility, with past work in alcohol-impaired driving, and data for motor vehicle crash surveillance especially data linkage.

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Table 1

Characteristics of adults aged 65 or older by assistive device use,ICARIS-2, Phase 2,2007–2008.[a]

Characteristics	Use an assistive device (e.g. cane, walker) when outside			Do not use an assistive device when outside		
	n	Annual weighted estimate	Weighted % (95% CI)	*n*	Annual weighted estimate	Weighted % (95% CI)
Gender						
Female	50	2,465,774	60.5 (46.2–74.8)	167	9,783,469	54.4 (48.1–60.7)
Male	25	1,609,082	39.5 (25.2–53.8)	160	8,190,427	45.6 (39.3–51.9)
Age group						
65–74	24	1,450,994	35.6 (21.2–50.0)	201	11,686,674	65.0 (58.9–71.1)
75 +	51	2,623,862	64.4 (50.0–78.8)	126	6,287,221	35.0 (28.9–41.1)
Marital status						
Married or coupled	30	2,345,751	57.6 (43.5–71.6)	172	11,608,784	64.8 (58.9–70.6)
Divorced, separated, Widowed, never married	45	1,729,105	42.4 (28.4–56.5)	154	6,312,687	35.2 (29.4–41.1)
Highest level of education						
< HS grad	*a*			33	1,879,052	10.5 (6.4–14.6)
≥ HS grad, <College grad	36	1,900,378	46.6 (31.9–61.3)	161	8,793,068	49.2 (42.7–55.6)
≥ College grad	26	1,442,569	35.4 (20.7–50.1)	131	7,212,413	40.3 (34.1–46.6)
Employment status						
Employed at least part-time or a student	*a*			67	3,901,642	21.8 (16.3–27.4)
Homemaker, Caregiver, retired, not working	73	3,946,010	96.8 (92.5–100.0)	258	13,982,891	78.2 (72.6–83.7)
Time spent walking outside each week						
<30 min	28	1,422,091	38.0 (23.1–52.8)	71	4,176,997	24.0 (18.2–29.7)
≥ 30 min	37	2,323,647	62.0 (47.2–76.9)	244	13,253,290	76.0 (70.3–81.8)
Mode of travel, if visiting a friend 3–4 blocks away						
Walk	*a*			190	10,451,536	61.9 (55.5–68.4)
Drive	22	998,129	29.9 (16.5–43.2)	104	5,589,586	33.1 (26.8–39.5)
Get ride	27	1,357,627	40.6 (25.4–55.9)	*a*		

Characteristics	Use an assistive device (e.g. cane, walker) when outside			Do not use an assistive device when outside		
	n	Annual weighted estimate	Weighted % (95% CI)	*n*	Annual weighted estimate	Weighted % (95% CI)
Fall in last 3 months						
Yes	24	1,426,470	35.0 (21.4–48.6)	26	1,227,892	6.8 (3.8–9.9)
No	51	2,648,386	65.0 (51.4–78.6)	301	16,746,003	93.2 (90.1–96.2)
Limit walking outside the home because worried about falling						
Yes	43	2,283,412	56.4 (41.2–71.5)	40	1,758,447	9.8 (6.2–13.3)
No	31	1,766,575	43.6 (28.5–58.8)	287	16,215,448	90.2 (86.7–93.8)
Able to walk outside the home for 10 min without resting						
Yes	40	2,062,589	50.6 (35.9–65.4)	296	16,346,536	91.5 (87.9–95.0)
No	35	2,012,267	49.4(34.6–64.1)	30	1,519,512	8.5 (5.0–12.1)
Driving status						
Will stop driving in ≤10 years	24	1,118,705	27.5 (15.6–39.3)	91	4,414,336	24.6 (19.4–29.8)
Will stop driving in > 10 years	20	1,009,985	24.8 (12.9–36.7)	205	11,900,223	66.2 (60.3–72.1)
Non-driver	31	1,946,165	47.8 (32.7–62.8)	31	1,659,336	9.2 (5.5–13.0)

[a]Estimates were suppressed because the unweighted sample size was <20.

Table 2

Crude and adjusted odds ratios (and 95% confidence intervals) for using an assistive device vs. not using an assistive device.

	Odds ratios for using an assistive device vs. not using an assistive device	
	Crude OR (95% CI)	**Adjusted OR (95% CI)[a]**
Age group		
65–74	1.00	1.00
75 +	3.4 (1.7–6.6)	3.1 (1.3–7.5)
Fall in last 3 months		
No	1.00	1.00
Yes	7.3 (3.4–15.8)	12.0 (4.9–29.3)
Limit walking outside the home because worried about falling		
No	1.00	1.00
Yes	11.9 (5.7–24.9)	7.1 (2.6–19.1)
Ability to walk outside the home for 10 min without resting		
Yes, able to	1.00	1.00
No, not able to	10.5 (5.0–22.1)	3.3 (1.1–9.3)
Driving Status		
Driver will stop in > 10 years	1.00	1.00
Driver will stop in 0–10 years	3.0 (1.4–6.4)	1.6 (0.7–3.8)
Non-driver	13.8 (5.9–32.5)	6.7 (2.0–22.3)

[a]The adjusted model controlled for all variables presented in the crude modeling.