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Falls and fear of falling: burden, beliefs and behaviours

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Abstract

Objectives: this study estimated the frequency of recent falls and prevalence of fear of falling among adults aged 65 and older.
Design: a cross-sectional, list-assisted random digit dialling telephone survey of US adults from 2001 to 2003.
Subjects: 1,709 adults aged 65 or older who spoke either English or Spanish.
Methods: prevalence estimates were calculated for recent falls, fall injuries, fear of falling and fall prevention beliefs and behaviours.
Results: an estimated 3.5 million, or 9.6%, of older adults reported falling at least once in the past 3 months. About 36.2% of all older adults said that they were moderately or very afraid of falling. Few older adults who fell in the past 3 months reported making any changes to prevent future falls.
Conclusions: the high prevalence of falls and fear of falling among US older adults is of concern. Both can result in adverse health outcomes including decreased quality of life, functional limitations, restricted activity and depression. Older adults' fear of falling and their reluctance to adopt behaviours that could prevent future falls should be considered when designing fall prevention programmes.

Keywords: *falls, fear of falling, injury, elderly*

Introduction

Falls are the leading cause of unintentional injuries and deaths among adults aged 65 and older [1]. In 2005, among older adults, there were nearly 16,000 fall-related deaths in the United States, and more than 1.8 million non-fatal fall injuries were treated in emergency departments [1]. The number of fall injuries treated in outpatient settings or that do not receive medical treatment is undetermined. Because falls are a risk factor for future falls and are associated with other adverse health outcomes such as fear of falling, it is important to know the extent of falls among older adults [2–5].

Falls and fear of falling are interrelated problems; each is a risk factor for the other [2–4]. Many older adults who fall, whether or not they sustain an injury, develop a fear of falling that may lead to restricted activity, a decline in social interactions, depression and an increased risk of falling [2–6]. The purpose of this study was to estimate both the frequency of recent falls and the prevalence of fear of falling among a nationally representative sample of non-institutionalised US adults aged 65 and older.

Methods

Data were obtained from the second Injury Control and Risk Survey (ICARIS-2), a cross-sectional, list-assisted, random-digit dialled telephone survey. It was conducted by the

Centers for Disease Control and Prevention (CDC) from July 2001 through February 2003 and included English- or Spanish-speaking adults aged 18 and older living in the United States.

The ICARIS-2 sampling frame included ~96% of US households with working landline telephones [7]. An eligible household was defined as a private residence that did not meet the US Census Bureau's definition of a group quarter [8]. Data were weighted to adjust for the complex sample design, non-response and non-coverage. Study methodologies have been previously published [9, 10]. All survey questions, materials and interview protocols were approved by CDC's institutional review board.

Respondents in this study, adults aged 65 and older, were asked, 'In the past 3 months, that is since (Month and Date), have you fallen?' Those who answered 'yes' were asked if they were injured in their most recent fall, and if so, whether they received medical treatment. The survey did not define a fall or an injury.

Respondents also were asked, 'On a scale of 1 to 5, how would you rate your fear of falling? One is not at all afraid and 5 is extremely afraid'. Responses were dichotomised into 'not or slightly afraid' (1 or 2) and 'moderately or very afraid' (3, 4 or 5) categories. Several questions were asked about beliefs and behaviours for preventing falls. Respondents were asked, 'On a scale from 1 to 5, how important do you believe it is to be physically active in order to keep from falling? One is not at all important and 5 is extremely important'. Responses were heavily skewed and were dichotomised into 'not or somewhat important' (1, 2, 3 or 4) and 'extremely important' (5) categories. Respondents also were asked, 'In the past 12 months has your doctor or pharmacist actually reviewed with you each bottle or jar of medication you are on?' Respondents who reported a recent fall were asked about changes they had made in their physical activity, medications and home environment to keep from falling again.

Data analyses

The survey response rate was calculated using a standard definition from the American Association of Public Opinion Research (AAPOR) [11]. Data analyses were performed using SAS, version 9.1 (SAS Institute, Inc., Cary, NC, USA) and SUDAAN, Release 9 (Research Triangle Institute, Research Triangle Park, NC, USA).

Demographic characteristics and fear of falling for all respondents and specifically for those who reported recent falls and fall-related injuries were examined using bivariable analyses. Associations were examined using Wald chi-square tests, and *P*-values <0.05 were considered statistically significant.

Results

A total of 1,709 older adults were interviewed (Table 1); the response rate was 48%. More than half were women (58.4%), 46.4% had annual incomes of at least $35,000 and 81.1% had completed high school. The majority (61.2%) were married or coupled. About 12.9 million or 36.2% (95% CI 33.2–39.3) of respondents said that they were moderately or very afraid of falling. About 71.7% (95% CI 68.7–74.5) said that they believed that physical activity was extremely important for preventing falls, and 58.1% (95% CI 54.9–61.1) reported that a doctor or pharmacist had reviewed their medications with them in the past year.

Gender, age group, income and marital status differed by self-reported fear of falling (Table 2). A greater proportion of women were moderately or very afraid of falling [43.2% (95% CI 38.9–47.5)] than men [26.4% (95% CI 22.5–30.3)], and 41.3% (95% CI 36.5–46.1) of people aged 75 and older

Table 1. Characteristics of adults aged 65 and older, Injury Control and Risk Survey-2, 2001–2003

Characteristic	Count	Weighted estimate	Per cent (95% CI[a])
Overall	1,709	36,107,094	100.0
Gender			
Men	742	15,035,360	41.6 (38.6–44.7)
Women	967	21,071,734	58.4 (55.3–61.4)
Age group			
65–69	484	11,688,000	32.8 (29.8–35.9)
70–74	466	10,578,727	29.7 (26.8–32.6)
75–79	371	7,343,184	20.6 (18.1–23.1)
80+	357	5,992,008	16.8 (14.7–19.0)
Income			
≤$19,999	463	8,705,980	31.1 (27.9–34.2)
$20,000–34,999	305	6,322,728	22.6 (19.6–25.5)
≥$35,000	570	13,010,420	46.4 (42.8–50.0)
Education			
<High school	306	6,778,004	18.9 (16.4–21.4)
≥High school	1,389	29,154,941	81.1 (78.7–83.6)
Marital status			
Single[b]	970	13,928,250	38.8 (35.9–41.6)
Married or coupled	725	22,009,709	61.2 (58.4–64.1)
Census region			
Northeast	392	7,853,926	21.8 (19.3–24.2)
North Central	316	7,922,999	21.9 (19.5–24.4)
South	704	12,575,770	34.8 (32.0–37.7)
West	297	7,753,399	21.5 (18.8–24.1)
Fear of falling			
Not or slightly afraid	1,069	22,693,352	63.8 (60.7–66.8)
Moderately or very afraid	619	12,871,889	36.2 (33.2–39.3)
Is physical activity important for fall prevention?			
Not important or slightly important	445	9,909,902	28.3 (25.5–31.3)
Extremely important	1,220	25,057,484	71.7 (68.7–74.5)
Were medications reviewed in past year?			
Yes	970	20,862,118	58.1 (54.9–61.1)
No	554	11,570,774	32.2 (29.3–35.2)
No medications	176	3,504,769	9.8 (8.0–11.8)

[a]CI = confidence interval.
[b]Includes divorced, widowed, separated and never married.
Note: 31 respondents were missing age, 371 did not provide their income, 14 responses were missing education, 14 were missing marital status, 21 were missing fear of falling score, 44 did not rate importance of physical activity and 9 were missing for whether a doctor or pharmacist had recently reviewed their medications.

Table 2. Characteristics of adults aged 65 or older by self-reported fear of falling, Injury Control and Risk Survey-2, 2001–2003

	Self-reported 'moderately or very afraid of falling'			Self-reported 'not or slightly afraid of falling'			
Characteristic	Count	Weighted estimate	Per cent (95% CI[a])	Count	Weighted estimate	Per cent (95% CI[a])	*P*-value[b]
Gender							
Men	186	3,921,882	26.4 (22.5–30.3)	548	10,925,837	73.6 (69.7–77.5)	<0.001
Women	433	8,950,008	43.2 (38.9–47.5)	521	11,767,516	56.8 (52.5–61.1)	
Age group							
65–74	319	7,328,698	33.3 (29.4–37.2)	622	14,677,954	66.7 (62.8–70.6)	0.011
75+	287	5,429,048	41.3 (36.5–46.1)	431	7,719,725	58.7 (53.9–63.5)	
Income							
≤$19,999	196	3,863,535	45.6 (39.6–51.5)	257	4,618,875	54.5 (48.5–60.4)	<0.001
$20,000–34,999	126	2,511,286	40.2 (33.1–47.4)	176	3,728,832	59.8 (52.6–66.9)	
≥$35,000	169	3,751,536	28.8 (23.9–33.8)	401	9,258,885	71.2 (66.2–76.1)	
Education							
<High school	119	2,619,714	41.0 (33.8–48.3)	175	3,769,394	59.0 (51.7–66.3)	0.142
≥High school	495	10,192,571	35.1 (31.8–38.5)	885	18,815,415	64.9 (61.5–68.2)	
Marital status							
Single[c]	409	5,874,095	42.7 (38.9–46.6)	548	7,883,503	57.3 (53.5–61.2)	<0.001
Married or coupled	203	6,926,710	32.0 (27.7–36.3)	514	14,711,800	68.0 (63.7–72.3)	

[a]CI = confidence interval.
[b]*P*-value for the Wald chi-square test.
[c]Includes divorced, widowed, separated and never married.
Note: 21 respondents were missing fear of falling score, 29 were missing age, 363 did not provide their income, 14 responses were missing education and 14 were missing marital status.

were moderately or very afraid of falling compared to 33.3% (95% CI 29.4–37.2) of people aged 65–74. People with lower incomes and single people also were more likely to report that they were moderately or very afraid of falling ($P < 0.001$ for both).

An estimated 3.5 million older adults [9.6% (95% CI 7.8–11.4)] reported falling at least once in the past 3 months (Table 3). A higher percentage of people in the oldest age group reported falling [11.4% (95% CI 8.5–14.4)] than in the younger age group [8.5% (95% CI 6.2–10.8)], but this difference was not significant. Fallers were similar by gender, income, education level and marital status. There was a significant association between fear of falling and having fallen in the past 3 months ($P < 0.01$). An estimated 15.9% (95% CI 12.0–19.7) of those who were moderately or very afraid of falling reported a recent fall, compared to 5.7% (95% CI 4.0–7.3) of those who were not or slightly afraid.

Among those who fell, 49.6% (95% CI 39.6–59.6) were injured in their most recent fall (Table 3): 37.7% (95% CI 24.7–50.8) of men and 57.9% (95% CI 44.6–71.2) of women. The proportion of persons injured was similar by age, marital status and fear of falling. More than half [51.8% (95% CI 37.1–66.5)] or an estimated 875,000 people, who were injured in their most recent fall, sought medical treatment (data not shown). There was no association between fear of falling and seeking medical treatment for a recent fall injury.

Few older adults who fell reported changing their behaviour afterwards to prevent future falls. Sixty-five per cent of people reported no change in their physical activity level and 21.4% decreased their physical activity (data not shown). Most people reported that they did not have their medications changed [96.5% (95% CI 93.6–99.3)] and did not make any changes to their home environment [84.4% (95% CI 77.0–91.8)].

Discussion

Falls are the leading cause of fatal and non-fatal injuries among older adults [1]; even those who fall and are not injured often suffer negative health consequences. Older adults who fall are more likely to fall again within a year and are at an increased risk of developing a fear of falling that can lead to depression and mobility restrictions [4, 5]. Estimating the extent of older adult falls can be challenging. This study provides national estimates of the number of older adults who reported a recent fall and subsequent injury, and the number who reported having a fear of falling.

This study found that 3.5 million or nearly 10% of US older adults fell in the past 3 months; about 1.7 million were injured and 875,000 of those injured sought medical treatment. A recent study using Behavioral Risk Factor Surveillance System (BRFSS) data estimated that 5.8 million older adults fell at least once during the past 3 months [12], and among those who fell, 1.8 million, or 31.3%, reported at least one injury. Although our estimate of the number of people who fell recently was lower than that from BRFSS, our estimate of the number injured was similar. Disparities in estimates may be the result of somewhat different survey questions. Both the BRFSS and ICARIS-2 surveys asked

Table 3. Characteristics of adults aged 65 or older who reported falls and fall-related injuries in the past 3 months, Injury Control and Risk Survey-2, 2001–2003

	At least one self-reported fall in the past 3 months			Among those who fell, those who were injured in their most recent fall		
Characteristic	Count	Weighted estimate	Per cent (95% CI[a])	Count	Weighted estimate	Per cent (95% CI[a])
Overall	175	3,458,455	9.6 (7.8–11.4)	81	1,689,791	49.6 (39.6–59.6)
Gender						
Men	74	1,407,947	9.4 (6.9–11.9)	32	530,260	37.7 (24.7–50.8)
Women	101	2,050,509	9.7 (7.2–12.3)	49	1,159,531	57.9 (44.6–71.2)
Age group						
65–74	86	1,892,622	8.5 (6.2–10.8)	43	970,685	51.6 (37.5–65.7)
75+	86	1,525,266	11.4 (8.5–14.4)	36	686,630	46.2 (32.2–60.2)
Income						
≤$19,999	45	820,639	9.4 (6.2–12.7)	19	[b]	[b]
$20,000–34,999	32	531,833	8.4 (5.2–11.7)	16	[b]	[b]
≥$35,000	68	1,380,496	10.6 (7.3–13.9)	29	613,629	45.0 (28.4–61.5)
Education						
<High school	28	549,179	8.1 (4.0–12.2)	18	[b]	[b]
≥High school	147	2,909,276	10.0 (8.0–12.0)	63	1,305,119	45.7 (34.9–56.4)
Marital status						
Single[c]	100	1,339,591	9.6 (7.5–11.8)	44	605,153	45.7 (34.0–57.4)
Married or coupled	73	2,105,673	9.6 (7.0–12.2)	36	1,071,880	51.8 (37.3–66.3)
Fear of falling						
Not or slightly afraid	68	1,285,549	5.7 (4.0–7.3)	33	617,179	48.1 (33.0–63.3)
Moderately or very afraid	102	2,039,768	15.9 (12.0–19.7)	47	988,887	49.7 (36.4–62.9)

[a]CI = confidence interval.
[b]Unstable estimate because sample size <20.
[c]Includes divorced, widowed, separated, and never married.
Note: 3 respondents were missing age, 30 respondents did not provide income, 2 were missing marital status and 5 were missing fear of falling score.

respondents if they had experienced a fall in the past 3 months. However, BRFSS provided a fall definition: 'When a person unintentionally comes to rest on the ground or another lower level', and an injury definition: 'By an injury, we mean the fall caused you to limit your regular activities for at least a day or to go see a doctor'. ICARIS-2 did not define a fall or injury. Therefore, our estimates are based on respondents' perceptions and self-definitions. Without standard definitions, older adults may be reluctant to identify and/or report falls, and the reliability of our fall injury estimates may be uncertain. Researchers have underscored the importance of developing a standardised fall definition, and the differences in fall estimates between these two studies reinforce this need [13, 14].

This study found that a greater proportion of adults aged 75 and older reported a recent fall compared to adults aged 65–74 although this difference was not significant. Previous research has found that falls and fall injury rates increase with age [15]. Consistent with previous research, we found that women were more likely to report being injured than men. Fall-related injury rates have been estimated to be 40–60% higher for women compared to men [15].

To our knowledge, this is the first study to provide national estimates of the number of older adults who fear falling. We found that 12.9 million or 36% of US older adults were moderately or very afraid of falling. Previous estimates have relied on smaller community-based studies or studies from other countries and have produced estimates ranging from 3 to 85% [2–6, 16–20]. Our finding that more than a third of older adults were afraid of falling is of particular concern. Fear of falling has been linked to functional decline, decreased quality of life, increased risk of institutionalisation, activity restriction, depression, loss of social connectivity, decreased self-efficacy and physical frailty [3–6, 16, 17, 19–21]. We further examined those who were moderately or very afraid of falling by demographic characteristics and found that they were more likely to be women, adults aged 75 and older, single and have lower incomes. Previous research supports these findings [2, 3, 5, 16, 18, 20]. It is important to consider these high-risk groups when designing prevention programmes to reduce falls and fear of falling.

Our study found a significant association between a recent fall and fear of falling. Sixteen per cent of older adults who were moderately or very afraid of falling reported a recent fall compared to only 6% who were not or slightly afraid. Research supports this association [2–5]. One prospective study found that experiencing a fall and having a fear of falling were related such that experiencing one resulted in an increased risk of experiencing the other, with a resulting cyclical effect of falls, fear of falling and functional decline [3]. However, our cross-sectional study design did not permit us to examine the temporal relationship between falls and fear of falling. Research also shows that there is a strong association between falls and fear of falling regardless of whether or not

a fall results in injury [3, 6, 16, 17, 21]. Having a fear of falling and being injured in a recent fall were not associated in our study.

Our findings suggest that older adults' fall prevention beliefs may have a little effect on their subsequent behaviour. Seventy per cent of older adults believed that physical activity was extremely important to fall prevention. However, among those who fell, more than 80% either did not change or decreased their physical activity levels. It is unlikely that these findings are the result of older adults being injured and unable to engage in activity. Research shows that most fall injuries are minor and only a small percentage result in severe injury [22]. Previous research also supports our finding that knowledge about physical activity does not match behaviour. One study found that 95% of older persons knew about the benefits of physical activity, yet 53% did less than 2 h of physical activity a week and 36% did none at all [23]. Some researchers have suggested that older adults may not adopt fall prevention measures because they do not believe or want to admit that they are at risk of falling [24]. Others have found that an older person's self-perceived risk of falling was not associated with fall prevention behaviours such as exercising or reviewing medications with a health professional [25]. We found that many older adults believed physical activity was beneficial, but neither this belief nor having had a recent fall influenced their behaviour. This lack of behaviour change may be less of an individual weakness and more of a medical system and public health issue. It is important for healthcare providers to ask older patients about falls and to both review medications and recommend evidence-based physical activity programmes for fall prevention. Furthermore, better coordination is needed between healthcare providers and fall prevention programme coordinators so that evidence-based programmes can reach those most in need.

A number of limitations should be noted. The response rate for ICARIS-2 was 48%, which may limit the generalisability of the results. Changes in the telecommunications environment have increased non-contact rates for telephone surveys [26]. However, based on demographic comparisons, older adult ICARIS-2 respondents were similar to the older adult US population with respect to gender, age, race and ethnicity [27].

ICARIS-2 excluded persons in institutions including nursing homes. Older adults in long-term care facilities are at greatest risk for falling, so this study likely underestimated the prevalence of falls and fear of falling in the US population [28].

Survey questions about falls are not standardised, and ICARIS-2 did not include a fall definition. Older adults may differ in what they consider a fall. Some may classify trips and slips as falls, while others may not [29]. It is also possible that some older adults forgot or downplayed falls, which would bias the results downward. Future national and statewide surveillance of falls and fall outcomes should use validated questions and include standardised definitions. Our question about fear of falling was not a validated question, and we do not know how well it categorised persons with differing levels of fear of falling. Previous research has used a similar question and dichotomised the scale in the same way [20]. However, there is no gold standard, and other questions have been used to assess fear of falling. One scale to consider for future research on fear of falling is the modified Falls Efficacy Scale, which has been recommended recently by researchers and shown to have good reliability and internal consistency [30].

Conclusions

This study found that among US community-dwelling older adults, an estimated 3.5 million reported a recent fall and more than a third said that they were moderately or very afraid of falling. In spite of older adults' beliefs about the value of physical activity and medication review in preventing falls, the vast majority did not change their behaviour after falling. Knowing that older adults may be hesitant to incorporate fall prevention strategies and that a substantial proportion are afraid of falling are important factors to consider when designing community fall prevention programmes.

Key points

- An estimated 3.5 million, or 9.6% of community-dwelling older adults in the United States, reported a recent fall.
- More than a third or 12.8 million older adults acknowledged being moderately or very afraid of falling.
- Although many older adults believed that physical activity and medication review could prevent falls, the vast majority did not change their behaviour or modify their home environment after falling.

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Conflicts of interest declaration

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. The authors do not have any conflicts of interest with this study.

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