



Published in final edited form as:

J Appl Gerontol. 2025 May ; 44(5): 726–736. doi:10.1177/07334648241289933.

Assessing Older Adults' Readiness for Adopting Fall Prevention Recommendations Using the Transtheoretical Stages of Change

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Abstract

Objectives: Reducing fall risk requires older adults (age 65+) to adopt effective prevention strategies. This study has three aims: 1) understand Stage of Change (SOC) for three fall prevention strategies; 2) determine strategies older adults' use; and 3) understand which characteristics relate to readiness to take action.

Methods: A survey of 1063 older adults assessed fall risk, SOC, and use of fall prevention strategies. Data analysis included descriptive statistics and regression analysis.

Results: The most common SOC for older adults by strategy was *action* for overall fall prevention (61%), *contemplation* for medication management (45%), and *preparation* and *action* for strength/balance (29% each). Believing falls are preventable was most strongly related to being in a *Change* stage (e.g., *action*, *maintenance*) for overall fall prevention (Risk Ratio: 1.4, 95% CI: 1.1, 1.7).

Discussion: Health promotion can focus on increasing knowledge of evidence-based fall prevention strategies to encourage older adults to take action.

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Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The findings and conclusions in this article are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention. Janice A. Mark is now at the School of Nursing and Health Professions, University of San Francisco; Ankita Henry is no longer at CDC.

This work was made possible through a cooperative agreement between the American Association of Colleges of Nursing (AACN) and the Centers for Disease Control and Prevention (CDC) award number 1 NU36OE000009-01-00. The data being used is under licensing agreement from Porter Novelli. The authors are not permitted to make the data available to other researchers. Those interested in accessing the data would need to contact Porter Novelli (<https://styles.porternovelli.com>).

Ethical Statement

Ethical Approval

The data being used is under licensing agreement from Porter Novelli for all their "Styles" surveys. No personal identification numbers are included in the datasets licensed to CDC; therefore, no institutional review board approval was obtained.

Supplemental Material

Supplemental material for this article is available online.

Keywords

strength and balance; exercise; medication; unintentional falls; older adults

Introduction

Older adult (aged 65+) falls are a growing public health issue in the United States. Older adults reported 36 million falls and 8 million fall-related injuries in 2018 (Moreland et al., 2020). Falls are the leading cause of unintentional injury deaths for older adults, resulting in about 41,000 deaths annually (Centers for Disease Control and Prevention & National Center for Health Statistics., 2024a). Age-adjusted death rates for unintentional falls have increased 35% between 2013 and 2022 (Centers for Disease Control and Prevention & National Center for Health Statistics., 2024a, 2024b).

Modifiable risk factors associated with falls include gait and balance impairments, lower extremity muscle weakness, adverse drug effects, polypharmacy, vitamin D deficiency, visual impairment, foot problems, improper footwear, and home hazards (Ambrose et al., 2013; Rubenstein & Josephson, 2006). Evidence-based clinical and community fall prevention strategies like exercise and physical therapy to improve strength and balance (Guirguis-Blake et al., 2018; Sherrington et al., 2019), medication management to stop, switch, or reduce the dose of medication that increase fall risk, vitamin D supplementation, cataract surgery to improve vision, reducing foot deformities, and working with an occupational therapist to remove home hazards (e.g., throw rugs, clutter) (Cumming et al., 1999; Gillespie et al., 2012; Karlsson et al., 2013; Stevens & Burns, 2015) are effective in reducing fall risks (Gillespie et al., 2012; Stevens & Burns, 2015).

Conceptual Framework

The Centers for Disease Control and Prevention (CDC) adapted the American and British Geriatric Societies (AGS/BGS) clinical practice guideline for the prevention of falls in older persons (Panel on Prevention of Falls in Older Persons, American Geriatrics Society and British Geriatrics Society [AGS], 2011) to create the Stopping Elderly Accidents, Deaths, and Injury (STEADI) initiative. Core components of STEADI include screening for fall risk, assessing for modifiable risk factors, and intervening to reduce the identified risk with evidence-based fall prevention strategies (Centers for Disease Control and Prevention, 2019a; Lee, 2017; Stevens & Phelan, 2013). The STEADI initiative was developed to encourage healthcare providers to incorporate fall prevention into clinical practice by providing a suite of tools and resources (Lee, 2017; Stevens & Phelan, 2013).

Reducing falls, in addition to requiring changes in healthcare practice, requires older adults to adopt one or more recommended fall prevention strategies. Acknowledging the importance of behavior change, STEADI was developed using Prochaska's *Transtheoretical Stages of Change Model* (SOC) (Prochaska & Velicer, 1997; Stevens & Phelan, 2013). This model was used as it depicts change not as an event, but as a process involving several stages (Centers for Disease Control and Prevention, 2017a; Prochaska & Velicer, 1997; Stevens &

Phelan, 2013). STEADI uses this process to help guide patients' behavior change for fall prevention (Prochaska & Velicer, 1997; Stevens & Phelan, 2013).

In the SOC model, individuals move through five stages when making behavioral changes: *precontemplation*, *contemplation*, *preparation*, *action*, and *maintenance* (Prochaska & Velicer, 1997; United States Department of Health and Human Services [HHS], 2005). Individuals in *pre-contemplation* are in denial or feel they have no control and do not intend to change in the next six months (HHS, 2005; Zimmerman et al., 2000). In *contemplation*, individuals consider the costs and benefits with ambivalence but intend to act within the next six months while those in *preparation* may begin planning and experimenting with the intent of taking action in the next 30 days (Centers for Disease Control and Prevention, 2017a; Prochaska & Velicer, 1997; Zimmerman et al., 2000). Those in *action* have made observable changes within the past six months while those in the last stage of *maintenance* have maintained changes for more than six months (Centers for Disease Control and Prevention, 2017a; Prochaska & Velicer, 1997). By understanding and recognizing each stage, healthcare providers can promote older adult's advancement to later stages using advice and tailored motivational strategies (Burbank et al., 2002; Centers for Disease Control and Prevention, 2017a; Zimmerman et al., 2000).

Objective

While the SOC model was incorporated in the STEADI initiative to assist healthcare providers in encouraging older adults to adopt fall prevention behaviors, older adults' behavior across SOC has not been previously described. Of particular interest is SOC in relation to overall fall prevention (any activity to reduce the risk of falls and fall injuries) and two key evidence-based strategies (strength and balance exercises [hereafter referred to as strength/balance] and medication management [willingness to stop, switch, or reduce the dose of medication that increase fall risk]) which require long-term, continuous behavior change to successfully reduce fall risk. The aims of this study are to assess: 1) community-dwelling older adults' readiness to change behaviors for overall fall prevention, medication management, and strength/balance using the SOC model; 2) what fall prevention actions older adults are engaging in; and 3) which demographic, geographic, and fall-related characteristics relate to moving to an action SOC for fall prevention. Information from this study can be used to inform healthcare providers' efforts to coach older adults in moving them towards *maintenance* of recommended evidence-based fall prevention strategies.

Research Design/Methods

Research Design

This study used data from the *FallStyles* 2019 web-based survey conducted by Porter Novelli Services. Quarterly "*Styles*" surveys collect data on the health attitudes, beliefs, and behaviors of household youth and adults. Participants for this online panel were randomly recruited from Ipsos' KnowledgePanel of approximately 55,000 panelists built using a probability-based sampling of addresses. Households are provided with a laptop or internet access if needed and respondents receive cash-equivalent rewards worth \$5.

FallStyles was the third wave of the 2019 series, fielded from 10/8/2019 to 10/22/2019, where adults (≥ 18 years) from the first wave (*SpringStyles*) were recruited for a sample of 4,677 panelists. Surveys with more than half the questions answered in more than 5 minutes were included in the dataset, totaling 3,624 completed surveys (77.5% response rate). Data were weighted to match US Current Population Survey (CPS) proportions using eight factors (gender, age, household income, race/ethnicity, household size, education, census region, and metro status) and demographics were consistent with the March 2018 CPS estimates. CDC licensed this data from Porter Novelli Services and received de-identified data. While Porter Novelli Public Services and its vendors are not subject to CDC IRB review, they do adhere to all professional standards and codes of conduct set forth by the Council of American Survey Research Organizations. Respondents are informed that their answers are being used for market research and can refuse or end the survey at any time. This analysis was restricted to respondents aged ≥ 65 years for a final sample of 1063 respondents.

Survey Items

In addition to demographic questions (sex, age group, race/ethnicity, marital status, education, metropolitan status, geographical region, and household income), the 2019 *FallStyles* included questions on falls (Supplemental Appendix 1). One question asked if respondents agreed with the statement “Older people fall and there is nothing that can be done about it.” Four fall-related questions asked respondents aged ≥ 65 years about screening, fall history, and attitudes, and were adapted from established and validated surveys, including the New South Wales Fall Prevention Baseline Survey (New South Wales Department of Health [NSW], 2010); the 2014 Behavioral Risk Factor Surveillance Survey ([BRFSS] CDC, 2014), and CDC’s STEADI 3-Key Fall Risk Screening Questions (Centers for Disease Control and Prevention, 2019a; Eckstrom et al., 2017). Three questions, based on the SOC *Model* (Prochaska & Velicer, 1997) and adapted from instruments used in behavior change studies for physical activity (Burbank et al., 2002; Centers for Disease Control and Prevention, 2017a; Kosma & Ellis, 2010; Marcus et al., 1992), were designed to determine SOC for overall fall prevention, medication management, and strength/balance. For overall fall prevention, if the respondent selected the first two responses, they were in pre-contemplation, third response in contemplation, fourth response in preparation, and fifth in action. For medication management and strength/balance the first response corresponded with precontemplation, second with contemplation, third with preparation, fourth with action, and fifth with maintenance. The final fall question asked about the types of evidence-based and limited-evidence-based strategies participants used for fall prevention (Centers for Disease Control and Prevention, 2019a; Stevens & Phelan, 2013).

Statistical Analysis

Frequencies and weighted percentages with 95% Wald confidence intervals (CI) were calculated for all variables. Response categories with less than 20 observations were combined for stability for the following variables: Marital status, education, household income, and preventability of falls. A calculated variable, “At risk of falling,” indicated if the respondent answered yes to any of the validated CDC’s 3 Key Questions for identifying fall risk in the next year: “History of falling,” “Feeling unsteady when standing

or walking,” and “Worrying about falling” (Burns et al., 2022; Centers for Disease Control and Prevention, 2019a; Eckstrom et al., 2017). “Don’t know/Not sure,” “Refused,” or unanswered responses were not included in the analysis.

Frequency distributions and 95% CI for each of the SOC variables were calculated for overall fall prevention, medication management, and strength/balance. The *maintenance* stage was not reported for overall fall prevention, given overall fall prevention includes multiple and varied strategies. Due to limited results in some of the stages, the SOC variables were grouped into three categories: Pre-Contemplation (pre-contemplation), Pre-Behavior change (*contemplation, and preparation*) and Behavior Change (*action and maintenance*) to assure a sufficient sample size for regression and to differentiate where action has not yet taken place. Fall risk reduction activities reported by older adults in Change stages were grouped as evidence-based (addressed specific risk factors and supported by research showing a significant reduction in fall risk) or limited evidence (included actions for which there has been little to no evidence that the action can reduce falls or fall risk) (Centers for Disease Control and Prevention, 2019a; Montero-Odasso et al., 2022). See Supplemental Appendix 1 for strategies included in the survey.

Crude risk ratios (RR) were calculated for older adults being in the *Change* versus *Pre-Change* stages of overall fall prevention, medication management, and strength/balance for all demographic, geographic, and fall-related variables. Modeling did not include older adults in the *Pre-Contemplation stage* as they have not acknowledged falls as a risk and are not ready to take preventive action. Adjusted RRs (aRR) were also calculated controlling for gender, age, and additional demographic, geographic, and fall-related variables with $p < .2$ in the crude models. Crude RRs and aRRs with 95% CI were obtained using a modified Poisson regression model (Zou, 2004) and weighted to match CPS proportions. Significance was assessed at $p < .05$. SAS, version 9.4 (SAS Institute) was used for all statistical analysis.

Results

Of the 1063 older adults who completed the survey, 45% (542) were male and 55% (521) were female; 67% were 65–74 years old, while 29% were 75–84 years old and 5% were aged 85 and older. A quarter (25%) of older adults strongly disagreed and 60% disagreed that there is nothing that can be done to prevent falls (Table 1). About one fifth (20%) of adults reported falling once in the past year and almost 10% reported falling two or more times. About half (53%) were at risk of falling based on STEADI’s 3-Key Fall Risk Screening Questions (Centers for Disease Control and Prevention, 2019a; Eckstrom et al., 2017); one third (33%) had spoken to a healthcare provider about their risk of falling.

The frequency distribution across the SOC varied by type of fall prevention strategy (overall fall prevention, medications, and strength/balance) (Figure 1). For overall fall prevention, 61% of older adults were in the *action* stage. For medication management, 39% of adults were in the *pre-contemplation* stage and 45% in the *contemplation* stage. For strength/balance, older adults were mostly in the *preparation* stage (29%) or *action* stage (29%).

Most older adults in overall fall prevention *Change* stages reported doing at least one activity to prevent falls (92%), with 79% reporting participation in at least one evidence-based strategy (Supplemental Figure 2). Older adults most frequently reported that they “took more care” to prevent falls (e.g., slowing down) (69%), a limited evidence strategy, followed by the evidence-based strategies of vitamin D supplements (39%), strength/balance training (34%), and vision testing (33%). Only 29% of older adults in a medication management *Change* stage reported changing medications (data not shown). About 65% of older adults in a strength/balance *Change* stage reported doing at least one evidence-based strength and balance activity: strength and balance training (53%), physical therapy (19%), or group exercises (19%) (data not shown).

In adjusted models, believing falls are preventable and having talked to healthcare provider about falls increased the likelihood that older adults were in a *Change* stage for overall fall prevention versus a *Pre-change* stage. Those who believed that falls can be prevented were 40% more likely (aRR: 1.4; 95% CI: 1.1–1.7) (Table 2), and those who talked to a healthcare provider were 30% more likely (aRR: 1.3; 95% CI: 1.2–1.4) to be in an overall fall prevention *Change* stage after adjusting for other variables. Older adults who talked to a healthcare provider were over twice as likely (aRR: 2.2; 95% CI: 1.4–3.5) to be in a medication management *Change* stage after adjusting for other variables. Those at risk of a fall (aRR: 0.8; 95% CI: 0.7, 0.9) were 20% less likely to be in a strength/balance *Change* stage while those who talked to a healthcare provider (aRR: 1.3; 95% CI: 1.1–1.5) and those who believed falls were preventable (aRR: 1.3; 95% CI: 1.0, 1.6) were 30% more likely to be in strength/balance *Change* stages after adjusting for other variables.

Discussion/Implications

The purpose of this study was to determine older adults’ readiness to change behaviors using the SOC model. Due to limited results, the five SOC stages were combined into three stages (*Pre-contemplation*, *Pre-change*, and *Change*) and those in *Change* were compared to those in *Pre-change*. For strength/balance behavior, 43% of subjects reported being in one of the *Change* stages (action (29%) or maintenance (14%)) and almost two-thirds (65%) reported doing a strength/balance activity. The Strategies to Reduce Injuries and Develop Confidence (STRIDE) study, a large national fall prevention trial, found that over 90% of those at risk of sustaining fall injuries had strength, gait, and balance problems (Bhasin et al., 2020) and that this was the most common fall risk factor. Although our study did not assess for risk factors, findings from the STRIDE study suggest that strength and balance problems was a likely risk factor for most participants.

Our study revealed a disconnect where older adults in a *Change* stage reported doing strength/balance exercise activities but about one-third did not select any exercise activities when asked what they were doing to prevent this. Some may engage in an appropriate activity that they reported as “Other”; however, the percentage reporting “other” did not make up the difference. Social desirability, participants providing the answers they believe researchers are looking for, may be another explanation. One study of middle-aged women found that social desirability was associated with over reporting physical activity (Swann et al., 2005).

Henry et al. (2024) found that about 83% of older adult participants believed strength/balance exercises help older people prevent falls. Despite this, less than half in this study are in a *Change* stage for strength/balance exercises and only two-thirds of those in a *Change* stage report doing them. Some barriers to strength/balance training participation include not believing or having the knowledge that exercise is effective at reducing fall risks; not remembering or knowing how to do prescribed exercises (Britten et al., 2017; Hill, 2014; Jagnoor et al., 2014; Powell-Cope et al., 2014); existing health or mobility problems; lack of time, (Britten et al., 2017; Hutton et al., 2009; Powell-Cope et al., 2014; Sandlund et al., 2018), financial or physical access to programs, and transportation (Britten et al., 2017; Powell-Cope et al., 2014; Robins et al., 2016). Identifying barriers to strength/balance exercises enables healthcare providers to help their patients move towards maintenance of a specific activity. Healthcare providers are well-positioned to reassure older adults that the activity is appropriate (Stevens et al., 2018) and can use the CDC resource (Helping My Older Patients Reduce Their Risk of Falling ([CDC.gov](https://www.cdc.gov))) to move their patients towards a strength/balance *Change* stage.

For medication management most older adults were in the *precontemplation* and *contemplation* stages. These results are supported by the STRIDE study findings (Bhasin et al., 2020) where only 29% of older adults prioritized and agreed to address identified medications potentially linked to increased fall risk compared to other identified risk factors like poor gait and balance (91%) and vision problems (68%). There are many reasons why older adults are less likely to take action to change medications to prevent falls: not knowing side effects can increase fall risk (NSW, 2010), reluctance to allow a primary care provider to change medication prescribed by a specialist (Gillespie et al., 2018), prioritizing the management of chronic conditions that medications with increased fall risk are treating (Gillespie et al., 2018), and a fear of side effects from stopping, switching, or changing medications (Martin et al., 2018; Martin & Tannenbaum, 2017; Reeve et al., 2016). While this study did not measure which subjects used fall-risk-increasing-drugs (FRID), many were likely at increased fall risk due to medication side effects. In a study of 9,228 older adult veterans who screened positive for a fall, 75% were prescribed at least one FRID and three-fourths were on two or more medications associated with increased fall risk (Elias et al., 2020). Another study found that the percent of older adults prescribed at least one FRID increased from 57% in 1999 to 94% in 2017 (Shaver et al., 2021). Collectively, this emphasizes the need to educate and encourage older adults to consider taking action to stop, switch, or reduce FRID when medically indicated.

A second goal of this study was to explore evidence-based strategies that older adults in *Change* stages take to reduce falls. While 92% of older adults in a *Change* stage for overall fall prevention considered themselves to be taking action to prevent falls, the most common activity was taking care or slowing down. There is no evidence that this is effective at reducing falls. Slowing down may have a negative effect, where restricting activity leads to reduced muscle strength that in turn increases fall risk (Stevens et al., 2018). Older adults may not participate in evidence-based exercise programs for fear it may increase fall risk (Clemson et al., 2012; Kim et al., 2014; Lord et al., 2003; Siegrist et al., 2016). Moreover, the low proportions of older adults in *Change* stages for medication management (29%) and strength/balance (65%) that reported doing corresponding evidence-based activities, suggest

that being in a *Change* stage is not indicative of using evidence-based strategies. These outcomes are noteworthy as they suggest older adults may have a false perception of taking appropriate action and highlights the importance of educating patients on evidence-based fall prevention interventions.

The final goal of this study was to determine factors related to older adults taking action to reduce falls. Those who believed falls are preventable and talked to a healthcare provider about falling were significantly more likely to be in *Change* stages for overall fall prevention. Similarly, those who talked to a healthcare provider were about twice as likely to be in medication management *Change* stages compared to those who had not talked to a provider. These results support previous studies that demonstrate the positive impact providers can have in getting older adults to adopt fall prevention measures (Galazzi et al., 2016; Kohn et al., 2016; Martin & Tannenbaum, 2017; Robins et al., 2016; Sandlund et al., 2018). For those not in *Change* stages, education, especially from a healthcare provider is critical. Finally, medication management advice given by healthcare providers is particularly important. A study that looked at the beliefs and attitudes of older adults regarding deprescribing (medication management) found they were more willing to deprescribe if they discussed it with their provider, knew the rationale behind deprescribing, and were told what to expect during the process (Reeve et al., 2016).

Using the SOC *Model* (Prochaska & Velicer, 1997; Stevens & Phelan, 2013) provided insight regarding older adults' behaviors and readiness to adopt fall prevention strategies. The finding that most older adults are in *Change* stages, except for medication management, informs healthcare providers on the need to increase awareness of medication management as a strategy for fall prevention. The finding that the leading strategy was one with limited evidence highlights the importance of patient education.

Healthcare providers play an important role in older adult fall prevention. While older adults saw falls as potentially preventable, and considered themselves in *Change* stages for prevention, only about one-third had discussed falls with their healthcare providers. Others may not be aware of appropriate strategies needed to reduce their fall risk. Healthcare providers can use CDC's STEADI fall prevention initiative to screen older adults for fall risk, identify modifiable risk factors, and intervene to reduce risk by recommending effective strategies. STEADI contains tools for assessing modifiable risk factors along with recommendations for evidence-based strategies to decrease identified fall risks (CDC, nd; Lee, 2017; Stevens & Phelan, 2013). This includes several resources to assist providers with managing and reducing medication use, including their SAFE (Screen, Assess, Formulate, and Educate) medication review framework, which guides providers on how to conduct a medication review (Centers for Disease Control and Prevention, 2017b) and STEADI-Rx which is designed to improve collaboration between pharmacists and healthcare providers (Centers for Disease Control and Prevention, 2019b). Other important resources used to manage medications include the *AGS Beers Criteria* which outlines medication classes considered inappropriate for geriatric use (American Geriatrics Society Beers Panel, 2019) and [Deprescribing.org](https://www.deprescribing.org), a website dedicated to providing deprescribing resources to patients and providers. Providers can also refer to the AGS response to the World

Falls Guidelines, which includes recommendations for fall risk assessments and prevention pathways (Eckstrom et al., 2024).

Limitations

Our study has a few limitations. Since questions in the FallStyles survey were adapted from existing psychometric tools, there is no established reliability and validity for these modified questions. Combining multiple behaviors and/or risk factors into one category (overall fall prevention) instead of studying them separately limits the accuracy of the findings. Additional limitations include not measuring all of the stages of change by combining them into three categories instead of five, that responses were self-reported and not verified, and the frequency in which adults participated in the activity was not measured. Some fall prevention strategies like medication management are not always under the older adult's control; we could not differentiate between older adults not wanting to alter medications and providers not recommending changing their medications. Finally, risk factors were not assessed related to each preventive activity, making it unclear if older adults in *Change* stages have the specific risk factors for which the activity would be beneficial. Future research could study specific fall risks and related stages of change which will assist healthcare providers in individualizing their fall prevention assessment and intervention approach for each patient.

Conclusion

Older adults at risk for falls are ready to take action but may lack awareness of their risk factors and the most effective strategies for prevention. Healthcare providers can play an important role in guiding their older patients to take appropriate action to prevent falls. STEADI offers tools to assist providers with these tasks. Together providers and older adults can prevent falls so that older adults can maintain their independence longer.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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What this paper adds

- Older adults are generally ready to take action to reduce falls except for medication management.
- Older adults who reported taking action to reduce fall risk were frequently using non-evidence-based fall prevention strategies.
- Believing falls are preventable and talking to a healthcare provider increased the likelihood that older adults are ready or are taking action to reduce their risk of falling.

Applications of study findings

- Healthcare providers should assess older adults' readiness to adopt fall prevention strategies and educate them on the benefits of reducing fall risks.
- Older adults can be educated on evidence-based fall prevention strategies to reduce their risk of falling.
- Fall prevention education by healthcare providers is important in motivating older adults to adopt fall prevention strategies.

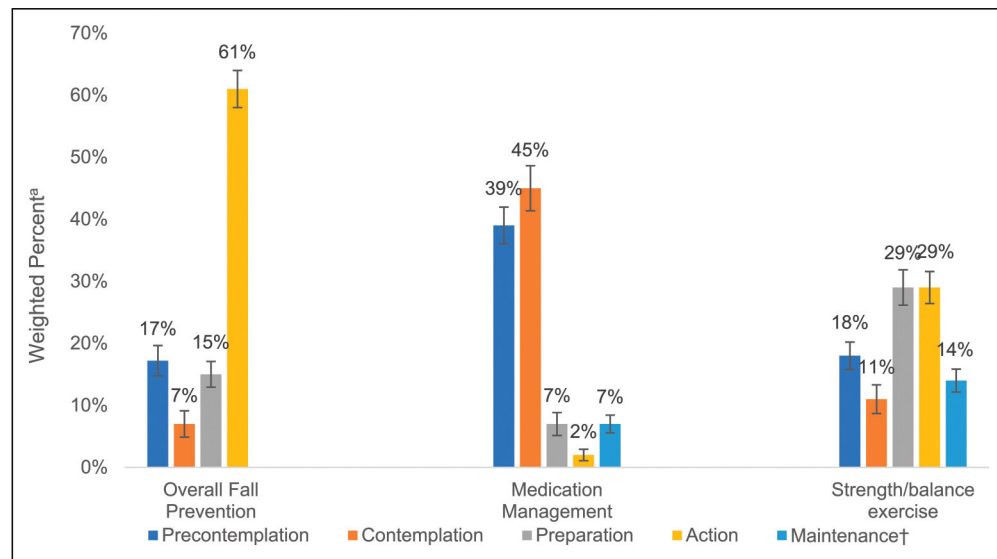


Figure 1. Stages of Change for Overall Fall Prevention, Medication Management, and Strength and Balance Exercises for Older Adults (65+), FallStyles, 2019*.

Note. *Error bars indicate 95% confidence intervals. †The *maintenance* stage was not assessed for overall fall prevention (since this category included multiple rather than one specific behavior). ^a Sample weighted to match US Current Population Survey (CPS) proportions using eight factors: gender, age, household income, race/ethnicity, household size, education, census region, and metro status.

Table 1. Demographic, geographic, and fall-related characteristics of older adults (ages 65+), FallStyles, 2019.

	<u>Unweighted number of people in sample</u>	<u>Weighted^a percent</u>
	N	% (CI ^b)
Total	1063	
Demographics		
Sex		
Male	542	45.2 (42.0, 48.4)
Female	521	54.8 (51.6, 58.0)
Age group		
65–74	705	66.8 (63.7, 69.8)
75–84	311	28.7 (25.8, 31.6)
85+	47	4.6 (3.1, 6.0)
Race/Ethnicity		
White, non-Hispanic	868	74.0 (70.7, 77.3)
Black, non-Hispanic	81	10.7 (8.4, 13.1)
Other, non-Hispanic	33	4.8 (3.1, 6.5)
Hispanic	58	9.5 (7.0, 12.0)
2+ races, non-Hispanic	23	0.9 (0.5, 1.3)
Marital status		
Married	728	69.7 (66.7, 72.7)
Not married	335	30.3 (27.3, 33.3)
Education		
Less than high school	62	11.9 (9.0, 14.7)
High school	295	28.7 (25.8, 31.6)
Some college	340	30.1 (27.3, 33.0)
Bachelor's degree or higher	366	29.3 (26.5, 32.1)
Household income		
Less than \$25,000	141	12.9 (10.7, 15.1)
\$25,000–\$49,999	231	22.3 (19.5, 25.1)
\$50,000–\$74,999	206	20.5 (17.9, 23.2)

	<u>Unweighted number of people in sample</u>	<u>Weighted^a percent</u>
	N	% (CI ^b)
\$75,000 or more	485	44.2 (41.0, 47.4)
Geography		
Metropolitan status		
Non-metro	161	15.9 (13.4, 18.3)
Metro	902	84.1 (81.7, 86.6)
Region		
Northeast	203	18.5 (16.1, 21.0)
Midwest	250	22.1 (19.4, 24.7)
South	373	37.7 (34.5, 40.9)
West	237	21.7 (19.1, 24.4)
Fall attitudes and beliefs		
Nothing can be done to prevent falls ^c		
Strongly disagree	273	25.2 (22.4, 27.9)
Disagree	644	60.0 (56.8, 63.2)
Agree ^d	144	14.8 (12.3, 17.4)
Number of falls in the past 12 months		
None	738	70.0 (67.0, 73.0)
One fall	212	20.4 (17.8, 23.1)
Two or more falls	98	9.5 (7.6, 11.4)
Feel unsteady		
Yes	199	21.1 (18.3, 24.0)
No	818	78.9 (76.0, 81.7)
Fear of falling		
Yes	383	38.9 (35.6, 42.2)
No	632	61.1 (57.8, 64.4)
At risk of falling ^e		
Yes	548	52.5 (49.2, 55.7)
No	514	47.5 (44.3, 50.8)
Talked to a HCP about falling ^f		

	<u>Unweighted number of people in sample</u>	<u>Weighted^a percent</u>
	N	% (CI ^b)
Yes	344	32.6 (29.5, 35.6)
No	713	67.4 (64.4, 70.5)

^aData are weighted to match the US Current Population Survey proportions.

^b95% confidence intervals.

^cRespondents were asked for level of agreement with the statement “Older people fall and there is nothing that can be done about it.”

^d“Strongly don’t believe” was combined with “Don’t believe” due to a cell size less than 20.

^eAt risk if at least one of the three STEADI screening questions was answered with an affirmative.

^fHCP: Healthcare Provider; includes doctor, nurse practitioner, physician’s assistant, pharmacist, nurse, or another health care professional.

Table 2. Crude and Adjusted Risk Ratios for Older Adults in Change Stages of Overall Fall Prevention, Medication Management, and Strength and Balance Exercises by Demographic, Geographic, and Fall-related Characteristics, FallStyles, 2019.

	Overall fall Prevention ^a			Medication management			Strength and balance exercises		
	Crude	Adjusted ^b	RR (CI) ^c	Crude	Adjusted ^b	RR (CI) ^c	Crude	Adjusted ^b	RR (CI) ^c
	RR (CI) ^c	RR (CI) ^c		RR (CI) ^c	RR (CI) ^c		RR (CI) ^c	RR (CI) ^c	
Demographics									
Sex									
Male	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Female	1.1 (1.0, 1.2)	1.1 (1.0, 1.2)		0.9 (0.6, 1.4)	0.8 (0.6, 1.3)		0.9 (0.8, 1.1)	1.0 (0.8, 1.1)	
Age group									
65–74	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
75–84	1.1 (1.0, 1.2)	1.1 (1.0, 1.2)		0.9 (0.6, 1.4)	0.8 (0.5, 1.3)		1.1 (0.9, 1.3)	1.1 (0.9, 1.2)	
85+	1.0 (0.7, 1.3)	1.0 (0.8, 1.3)		0.7 (0.2, 1.9)	0.6 (0.2, 1.7)		0.9 (0.6, 1.4)	1.1 (0.7, 1.6)	
Race/Ethnicity									
White, non-Hispanic	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Other	0.9 (0.7, 1.0)	0.9 (0.8, 1.0)		1.3 (0.8, 2.2)			0.7 (0.6, 0.9)	0.7 (0.6, 0.9)	
Marital status									
Married	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Not married	1.0 (0.9, 1.1)			1.3 (0.9, 2.0)	1.2 (0.8, 2.1)		1.0 (0.9, 1.2)		
Education									
High school or less	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Some college or more	1.1 (1.0, 1.3)	1.1 (1.0, 1.2)		0.9 (0.6, 1.4)			1.5 (1.3, 1.8)	1.4 (1.2, 1.6)	
Household income									
Less than \$25,000	0.9 (0.8, 1.1)			1.7 (0.9, 3.0)	1.4 (0.7, 2.7)		0.8 (0.6, 1.0)	1.0 (0.8, 1.2)	
\$25,000–\$49,999	1.0 (0.9, 1.1)			1.5 (0.8, 2.6)	1.3 (0.7, 2.2)		0.8 (0.6, 0.9)	0.9 (0.7, 1.1)	
\$50,000–\$74,999	1.1 (1.0, 1.2)			1.1 (0.6, 1.9)	0.9 (0.5, 1.6)		0.9 (0.8, 1.1)	1.0 (0.8, 1.2)	
\$75,000 or more	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Geography									
Metropolitan status									
Non-metro	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref

	Overall fall Prevention ^a		Medication management		Strength and balance exercises	
	Crude	Adjusted ^b	Crude	Adjusted ^b	Crude	Adjusted ^b
	RR (CI) ^c	RR (CI) ^c	RR (CI) ^c	RR (CI) ^c	RR (CI) ^c	RR (CI) ^c
Metro	1.1 (0.9, 1.2)		0.6 (0.4, 1.1)	0.6 (0.4, 1.0)	1.3 (1.0, 1.6)	1.1 (0.9, 1.4)
Region						
Northeast	Ref	Ref	Ref		Ref	
Midwest	1.1 (0.9, 1.2)	1.1 (0.9, 1.2)	0.7 (0.4, 1.2)	0.6 (0.3, 1.1)	1.1 (0.9, 1.4)	1.1 (0.9, 1.4)
South	1.1 (0.9, 1.2)	1.1 (1.0, 1.3)	0.7 (0.4, 1.2)	0.7 (0.4, 1.2)	1.0 (0.8, 1.3)	1.1 (0.9, 1.4)
West	1.1 (1.0, 1.3)	1.1 (1.0, 1.3)	0.7 (0.4, 1.3)	0.8 (0.5, 1.5)	1.4 (1.1, 1.7)	1.4 (1.1, 1.7)
Fall-related						
Believe falls are preventable ^d						
No	Ref	Ref	Ref		Ref	Ref
Yes	1.4 (1.2, 1.7)	1.4 (1.1, 1.7)	1.1 (0.6, 2.2)		1.4 (1.1, 1.9)	1.3 (1.0, 1.6)
At risk of falling ^e						
No	Ref	Ref	Ref	Ref	Ref	Ref
Yes	1.1 (1.0, 1.2)	1.1 (1.0, 1.2)	1.8 (1.0, 2.9)	1.6 (0.9, 2.7)	0.8 (0.7, 0.9)	0.8 (0.7, 0.9)
Talked to a HCP ^f						
No	Ref	Ref	Ref	Ref	Ref	Ref
Yes	1.3 (1.2, 1.4)	1.3 (1.2, 1.4)	2.4 (1.5, 3.7)	2.2 (1.4, 3.5)	1.2 (1.1, 1.4)	1.3 (1.1, 1.5)

Note. Bold values indicate $p < .05$.

^a Change stages for overall fall prevention include *preparation* and *action* only since maintenance was not assessed.

^b Adjusted, using a modified Poisson regression model, * for sex, age, and all variables with $p < .2$ for crude risk ratios.

^c RR (CI): Risk ratios with 95% confidence intervals.

^d Respondents were asked for level of agreement with the statement “Older people fall and there is nothing that can be done about it.”

^e At risk if at least one of the three STEADI screening questions was answered with an affirmative: “Have you fallen in the past year?”; “Do you feel unsteady when standing or walking?”; “Are you worried about falling?”

^f HCP: Healthcare Provider.