The Reach and Effectiveness of National Evidence-based Falls Prevention Programs Among Underrepresented Community-dwelling Older Adults.

Thomas John Eagen

A dissertation

submitted in partial fulfillment of

requirements for the degree of

Doctor of Philosophy

University of Washington

2018

Reading Committee:

Ellen McGough, Chair

Ivan Molton

Deborah Kartin

Program Authorized to Offer Degree:

Rehabilitation Medicine

University of Washington

Abstract

The Reach and Effectiveness of National Evidence-based Falls Prevention Programs Among Underrepresented Community-dwelling Older Adults.

Thomas Eagen

Chair of Supervisory Committee:

Ellen McGough

Department of Rehabilitation Medicine

Older adults with a disability and racial minorities experience a disproportionate number of falls compared to those without a disability and non-minorities. Funding is available to support evidence-based falls prevention programs (EBFPP), however these high-risk populations are underrepresented in research examining program effectiveness. The purpose of this research was to examine the reach, effectiveness, and contributing factors in two EBFPP in these underrepresented populations. A Matter of Balance (MOB) and Stepping On were examined using data from the National Falls Prevention Database. Inclusion criteria included: aged 50 years or older, attended MOB or Stepping On program, and complete data. Program reach was defined as attendance percentage and program completion. Program effectiveness was defined as a significant change in falls risk factors: fear of falling (FOF), fall-related activity restriction (FAR), and falls self-efficacy (FSE). Results showed no significant difference in program reach by disability status. Older adults with disabilities were as likely to attend ($M = 0.88$, $SD = 0.14$)

the program compared to those without disabilities ($M = 0.88$, $SD = 0.14$, $p = .30$). Racial minorities were slightly less likely to attend ($M = 0.87$, $SD = 0.15$) the program compared to non-minorities ($M = .88$, $SD = 0.14$, $p < .05$). Program effectiveness was high, with significant improvements in FOF, FAR, and FSE post-program. Despite improvements, older adults with a disability reported significantly higher FOF and FAR and significantly lower FSE at post-program compared to those without a disability. There were significant within-group differences by minority status. Both racial minority and non-minority participants significantly reduced FOF, FAR, and FSE post-program. Factors positively contributing to increased effectiveness across the sample included: lower age, higher education, improved general health, receiving a health care referral, and attending MOB. In summary, MOB and Stepping On are two effective EBFPP that are able to reach community-dwelling older adults, however differences in effects remain by disability status. Representation of racial minorities in the programs remained low compared to national averages. Future research is needed to study access and enrollment of older adults with a disability and racial minorities in federally supported falls prevention programs.

Human Subjects Statement

This research was conducted with the approval of the Human Subjects Division

of the

University of Washington

Application Number: STUDY00004476

Date of Approval: March 20th, 2018

Plain Language Summary

Falls among older people are a growing public health concern. Certain groups of older people have been found to be at greater risk for falls. This includes older people with a disability and those who are not White. Programs to prevent falls have been developed. These programs are supported with money from the United States government to reduce the risk of falls. Older people with a disability and non-White older people have more falls. Programs approved by the government did not consider the needs of older people with a disability or those who are not White when developed. The first purpose of this study was to look at the attendance and completion by people participating in two programs. The second purpose was to look at changes in feelings about falls, activity and balance of older people in two programs. Older people with a disability were compared to older people without a disability. Older people who are not White were compared to older people who are White.

A Matter of Balance and Stepping On were the two programs selected. The number of classes attended was looked at. The number of people that completed the program was also studied. People's fear of falling before and after the program was studied. Activity limitations and confidence in balance were also studied.

Older people with and without a disability went to a similar number of classes. They also had a similar numbers of people finish the programs. People with a disability had less fear of falling after the program. They also felt less limited in activities and felt more steady. When looked at side by side, those with a disability had more improvement in fear of falling than those without a disability. They also had more improvement in activity limitations. Older people with a disability had less change in balance confidence.

Non-White older people attended classes and completed the program at similar rates as

White older people. Older people reported less fear of falling after the program. They also reported less activity limitation and more confidence in balance after the program. There were no differences in the amount of improvement between these two groups.

Older people with more education and who attended the MOB program had better class attendance and program completion. Older people with better health had better change after the program. Older people that got a health care referral to the program also had better change after the program. Finally, older people attending the MOB program had better change after the program.

Older people with a disability were more likely to go to programs at hospitals. Non-White older people were more likely to go to programs at apartments and senior centers. Older people with a disability and non-White older people had more referrals from health care workers. Health care workers may be good partners to increase the number of older people at greater risk for falls. More research is needed to see what might improve the number of older people with a disability in these programs. More research is also need to improve the number of non-White older people in these programs.

Acknowledgements

Thank you to my best friend and mentor, Dr. Kathryn Seigfried-Spellar, whose support and encouragement always got me through the most difficult times.

Thank you to my committee members, especially my committee chair, Dr. Ellen McGough, who challenged me to think deeper and changed the way I approach questions.

Thank you to my fellow cohort members, whose advice, guidance, and friendships were invaluable as we all made our way through the tunnel.

Thank you to my collaborators at the National Council on Aging Center for Healthy Aging, as well as all of the participants, whose engagement in falls prevention programs made this project possible.

Dedicated to my mom, Mary Eagen.

Table of contents

Chapter 1: An Introduction to Falls and Falls Prevention among Community-dwelling Older Adults: Who is Missing? ……page 14

Chapter 2: Study 1 – Participation in Evidence-based Falls Prevention Programs among Community-dwelling Older Adults with a Disability ……..page 27

Chapter 3: Study 2 – Participation in Evidence-based Falls Prevention Programs among Community-dwelling Older Adults who Identify as a Racial Minority ……...…page 80

Chapter 4: Concluding Statements: Next Steps for Falls Prevention …….……page 129

Bibliography ……..page 135

Appendix…….page 153

List of Tables

Table 1. Matter of Balance Program Learning Objectives by Week.

Table 2: Participant Descriptives in the National Falls Prevention Database who were Included or Excluded in the Final Analysis.

Table 3. Comparison of Program Site Type and US Geographic Location by MOB and Stepping On Participants in the National Falls Prevention Database

Table 4. Comparison of Program Site Type and US Geographic Region by Disability Status of Participants Enrolled in MOB or Stepping On in the National Falls Prevention Database

Table 5. Individual-level Demographic and Health Characteristics by Disability Status of Participants in MOB or Stepping On in the National Falls Prevention Database

Table 6. Factors Contributing to Completion of MOB or Stepping On (N =12,667)

Table 7. Logistic Regression Analysis for Factors Contributing to Low FOF Post-Program (N = 12,667)

Table 8. Logistic Regression Analysis for Factors Contributing to Low FAR Post-Program (N = 12,667)

Table 9. Logistic Regression Analysis for Factors Contributing to High FSE Post-Program (N = 12,667)

Table 10. Participant Descriptives in the National Falls Prevention Database who were Included or Excluded in the Final Analysis.

Table 11. Comparison of Program Site Type and US Geographic Region by Racial Minority Status of Participants Enrolled in MOB or Stepping On in the National Falls Prevention Database

Table 12. Individual-level Demographic and Health Characteristics by Racial Minority Status of Participants in MOB or Stepping On in the National Falls Prevention Database

Table 13. Logistic Regression Analysis of Factors Contributing to Completion of MOB or Stepping On (N =12,667)

Table 14. Logistic Regression Analysis for Factors Contributing to Low FOF Post-Program (N = 12,667)

Table 15. Summary of Logistic Regression Analysis for Factors Contributing to Low FAR Post-Program (N = 12,667)

Table 16. Summary of Logistic Regression Analysis for Factors Contributing to High FSE Post-Program *(N = 12,667)*

List of Figures

Figure 1. Percentage of Participants in Evidence-based Falls Prevention Programs by ACL Grantees from 2014 to 2018 in the National Falls Prevention Database.

Figure 2. Distribution of Evidence-based Falls Prevention Programs Implemented Across the United States in the National Falls Prevention Database.

Figure 3. Conceptual Model of the Reach, Effectiveness, and Contributing Factors of ACL-Approved Evidence-based Falls Prevention Programs Using the RE-AIM Framework and Social Ecological Model

Figure 4. Distribution MOB and Stepping On Program Implementation Sites in the National Falls Prevention Database.

Figure 5. Study Flow Diagram of Participants Who Met Inclusion Criteria in the National Falls Prevention Database.

Figure 6. Fear of Falling Scores at Baseline and Post-program by Disability Status

Figure 7. Fall-related Activity Restriction Scores at Baseline and Post-program by Disability Status

Figure 8. Falls Self-Efficacy Scores at Baseline and Post-program by Disability Status

Figure 9. Study Flow Diagram of Participants Who Met Inclusion Criteria in the National Falls Prevention Database.

Figure 10. Fear of Falling Scores at Baseline and Post-program by Racial Minority Status

Figure 11. Fall-related Activity Restriction Scores at Baseline and Post-program by Racial Minority Status

Figure 12. Falls Self-Efficacy Scores at Baseline and Post-program by Racial Minority Status

Chapter 1

Evidence-based Falls Prevention Programs for Community-dwelling Older Adults: Meeting the Needs of Older Adults with a Disability and Racial Minorities

In the United States, older adults with a disability and racial minorities have a higher incidence of injurious falls when compared to the general population of community-dwelling older adults (Matsuda et al., 2015; Quandt et al., 2006). On average, one fourth of older adults will suffer a fall annually, and nearly 30% of these will result in an injury (Tromp, Pluijm, Smit, Deeg, Bouter, & Lips, 2001). Falls create a large economic burden on the healthcare system. In 2013, an estimated $34 billion dollars were spent on treating falls among the Medicare population (Burns, Stevens, & Lee, 2016), and this figure increased to $50 billion in 2015 (Florence, Bergen, Atherly, Burns, Stevens, & Drake, 2018). There has been a national effort to reduce the number of falls experienced by community-dwelling older adults (NCOA, 2015). Programs have been developed to reduce the number of falls and address known fall risk factors (Gillespie et al., 2012), however populations at the greatest risk for falling (e.g., older adults with a disability and racial minorities) are often underrepresented in research studies examining effectiveness. Underrepresented can be defined as exclusion of certain participants or the proportions of participants enrolled in research studies are lower than that if the national average. There is a often a lack of information on disability and racial minority status in fall prevention program research studies, which presents challenges when interpreting program effectiveness for a given population.

National Falls Prevention Effort

The National Council on Aging (NCOA) has championed falls prevention across the United States, through the development of the National Falls Prevention Action Plan (NCOA, 2015). This plan outlines steps and specific goals for the country to reduce the rate of falls over the next five years. NCOA works collaboratively with the Administration on Community Living (ACL), which is a division of the Administration on Aging. In 2010, federal dollars were allocated as part of the Affordable Care Act's Public Health and Prevention Fund (PHPF) to increase the implementation of health promotion programs for community-dwelling older adults. In 2014, two-year grants were awarded by ACL to assist state and tribal organizations with the implementation of evidence-based falls prevention programs. Potential programs were reviewed and approved by ACL. All evidence-based falls prevention programs met the following criteria: 1) demonstrated effectiveness to reduce falls or fall-related risk factors; 2) evaluated using a randomized controlled trial or quasi experimental study with a control group; 3) research findings published in a peer-reviewed journal; 4) fully translated into the community setting; and 5) dissemination material available (ACL, 2017). Once programs have met each of these qualifications, organizations can apply for reimbursement using Title III-D of the Older American's Act (1987), reducing the cost to implement the programs. As of December 2017, eight different falls prevention programs met these requirements. Grantee organizations selected programs to implement in their communities and collected data as part of the grant requirements. These data are sent to the NCOA National Falls Prevention Resource Center, which provides monthly reports to ACL on grantee performance from the National Falls Prevention Database. See Figure 1. for the distribution of program participants across the different regions of the United States from September 2014 to December 2017.

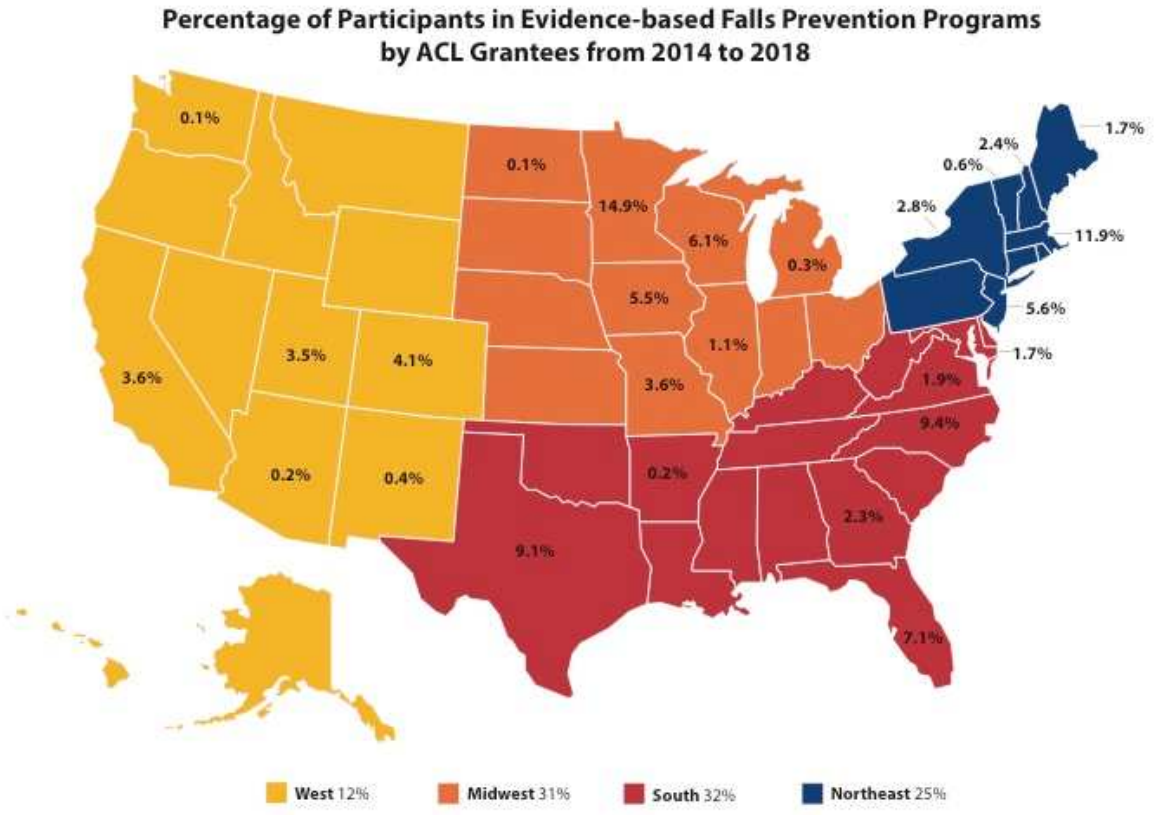

Figure 1.

Percentage of Participants in Evidence-based Falls Prevention Programs by ACL Grantees from 2014 to 2018 in the National Falls Prevention Database.

Note. Figures represent the percentage of participants in the National Falls Prevention Database by state. Map used with permission from the National Council on Aging Center for Healthy Aging.

A Matter of Balance (MOB) (Tennstedt et al., 1998) and Stepping On (Clemson et al., 2004) are two evidence-based fall prevention programs approved by ACL. In the National Falls Prevention Database, MOB and Stepping On account for approximately 80% of the database. Both programs have been disseminated broadly across the United States (Ory, Smith, Wade, Mounce, Wilson, & Parrish, 2010; Ory et al., 2015), however program clusters are observed in

different geographic regions. Other evidence-based falls prevention programs include: FallsScape, Otago Exercise Programme, Stay Independent and Active for Life (SAIL), Stay Safe Stay Active, Tai Chi for Arthritis, and Tai Ji Quan: Moving for Better Balance. See Figure 2. for the distribution of programs implemented across the United States in the National Falls Prevention Database.

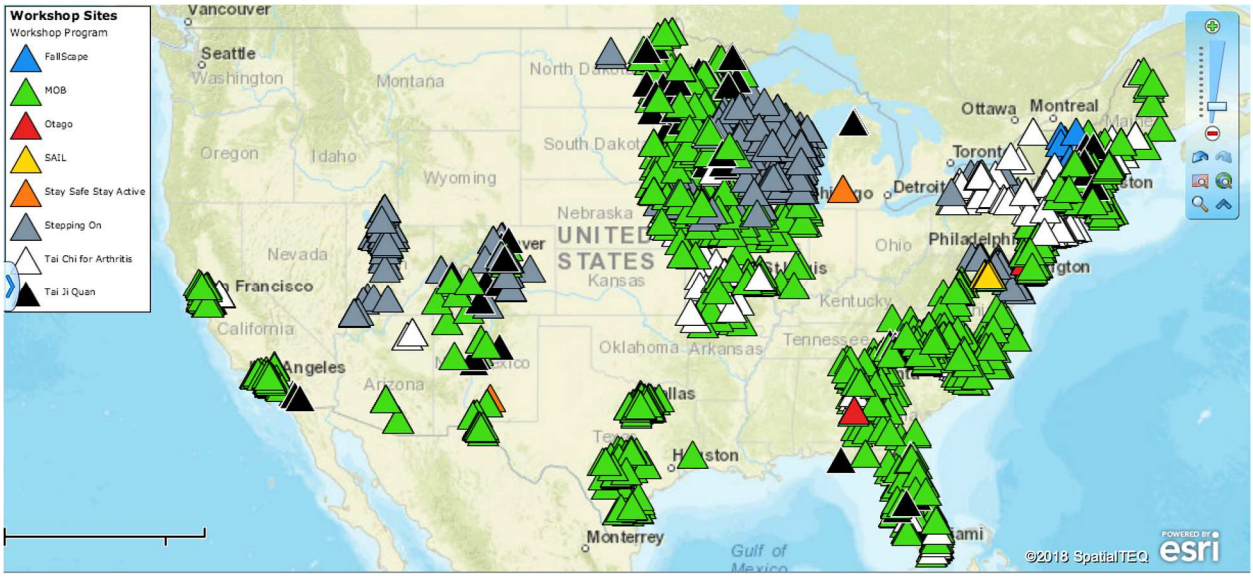

Figure 2.

Distribution of Evidence-based Falls Prevention Programs Implemented Across the United States in the National Falls Prevention Database.

Note. Map use with permission from Fred Widarsson, Founder & CEO, RealZips

Falls Risk Factors in Older Adults with a Disability and Racial Minorities

Community-dwelling older adults with a disability and racial minorities report a higher number of falls risk factors compared to the general population of older adults. Falls risk factors can be physical, psychosocial, or environmental (Ambrose, Paul, & Hausdorff, 2013; Bergland, 2012; Rubenstein, 2006), many of which are modifiable and can be mitigated through falls prevention programs (Gillespie et al., 2012). Physical risk factors include number of chronic conditions, improper footwear, lower extremity weakness, impaired mobility, and poor general health (Peel, 2011). Psychosocial risk factors include fear of falling, low balance confidence, anxiety, and depression (Ambrose, 2015). Environmental risk factors include unpaved sidewalks, busy markets, poor lighting, loose rugs, or a lack of grab bars in the bathroom (Chippendale & Boltz, 2014; Kelsey, Proctor-Gray, Hannan, & Li, 2012). Older adults with a disability and racial minorities often have multiple risk factors (i.e., mobility impairment, poor general health, and increased number of chronic conditions), which places them at even greater risk for falls compared to the general population in the United States (Renfro, Maring, Bainbridge, & Blair, 2016).

Health disparities among participants in fall prevention programs have not been explored. There is a need to understand the reach (attendance and completion) and effectiveness in improvement of evidence-based fall prevention programs for underrepresented populations. Individual as well as organizational factors can affect outcomes of a falls prevention program. Organizational factors that potentially impact reach and effectiveness of fall prevention programs include program implementation site type, program geographic location in the United States, and the program type selected by the organization to be implemented (Child, Goodwin, Garside, Jones-Hughes, Boddy, & Stein, 2012; Dattalo, Wise, Ford, Abramson, & Mahoney, 2017;

Mielenz, Durbin, Hertzberg, Nobile-Hernandez, & Jia, 2016). Organizational factors that create barriers are especially challenging for older adults who have greatest risk of falling (Hammel et al., 2015). The type of program offered can also have a significant contribution to whether older adults attend and complete the protocol. For example, falls prevention programs designed to improve physical activity tend to have lower rates of completion compared to programs that are less physical demanding and focus more on group discussion and psychological components of falls prevention (e.g., fear of falling) (Batra, Coxe, Page, Mechior, & Palmer, 2016).

Frameworks to Explore the Impact of Falls Prevention Programs

Reach, Effectiveness, Adoption, Implementation, and Maintenance Framework

The reach, effectiveness, adoption, implementation, and maintenance (RE-AIM) framework was used to guide this research. RE-AIM is commonly used in health promotion research to evaluate the impact of a program or intervention once it has been disseminated to the intended population (Baba et al., 2017; Glasgow, Vogt, & Boles, 1999; Glasgow et al., 2006; Ory et al., 2015). The current research studies focused on the reach and effectiveness of evidence-based fall prevention programs for community-dwelling older adults. According to RE-AIM, program reach is defined as the absolute number, proportion, and representativeness of individuals willing to participate in a program (Glasgow et al., 1999). Program effectiveness is defined as the impact of the program on important outcomes (Glasgow et al., 1999).

Social Ecological Model

The Social Ecological Model (SEM) is another framework that is frequently used in prevention research (Allegrante, Hanson, Sleet, & Marks, 2010; McLeroy, Bibeau, Steckler, & Glanz; Stokols, 1996). The SEM explores different levels of influence (e.g., individual,

interpersonal, organizational, community and public policy) on health disparities and the idea that behaviors and risks are shaped and influenced by the social environment (Smith, Ory, Ahn, Bazzarre, & Resnick, 2011). The SEM model was appropriate to apply to participation in national falls prevention programs among older adults with a disability and racial minorities due to the multiple levels of influence that may contribute to overall reach and effectiveness for underrepresented populations (Chippendale & Boltz, 2014). In addition to individual-level risk factors certain organizational level factors may contribute to participation in fall prevention programming (Child et al., 2012; Ford, Abramson, Wise, Dattalo, & Mahoney, 2017). This can include the program implementation site type, the program geographic location in the United States, and the type of program offered by the organization. The SEM helped guide this research to expand beyond individual-level factors by examining organizational-level factors that contribute to reach and effectiveness of evidence-based fall prevention programs. With an understanding of the interaction between individual and organizational-level, effective strategies of health promotion can be developed and implemented to meet the needs of all program participants.

The RE-AIM framework and SEM were used as a foundation to explore program reach and effectiveness of evidence-based falls prevention programs among participants within underrepresented older adults. Outcome measures of reach and effectiveness were selected based on the RE-AIM framework. Organizational-level factors that may contribute to differences in participation of falls prevention programs were selected based on SEM, including program implementation site type, U.S. geographic region, and program type. See Figure 3 for the conceptual model incorporating RE-AIM and SEM into the study plan to examine factors that contribute to program outcomes of reach and effectiveness of falls prevention programs.

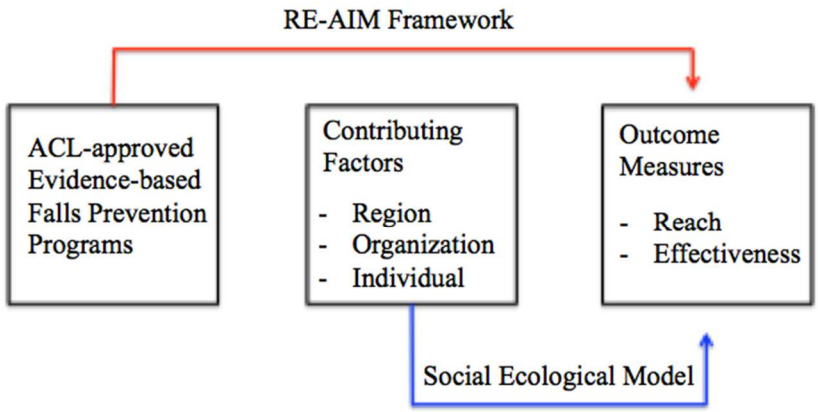

Figure 3.

Conceptual Model of the Reach, Effectiveness, and Contributing Factors of ACL-Approved Evidence-based Falls Prevention Programs Using the RE-AIM Framework and Social Ecological Model

Note. ACL = Administration on Community Living; RE-AIM = Reach, Effectiveness, Adoption, Implementation, Maintenance

Evidence-based Falls Prevention Programs

Community-dwelling older adults can benefit from falls prevention programming to reduce fall risk and decrease fall rates (Tinetti et al., 1994). Fall prevention programs vary in their focus on falls risk factors, with some programs targeting a single factor, while others address multiple factors (Gillespie et al., 2012). Multi-factorial programs address several common falls risk factors within the same program (e.g., medication management, vision screening, reducing fear of falling) compared to programs that address a single risk factor (i.e., improving balance) (Tinetti et al., 1994). Multi-factorial fall prevention programs have been shown to be among the most effective falls prevention programs as measured by reduction in falls and falls risk factors (Guirguis-Blake, Michael, Perdue, Coppola, & Beil, 2018).

Certain populations of older adults are less likely to participate in evidence-based programs due to a variety of individual and organizational-level factors (Black, Wheeler, Tovar,

& Webster, 2015; Goins & Pilkerton, 2010; Korda et al., 2015; O'Loughlin, Maximova, Tan, & Gray-Donald, 2007; Rimmer, Riley, Wang, Rauworth, & Kurkowski, 2004). Factors include living in rural areas with limited access to services (Black et al., 2015), an increased number of chronic health conditions (Goins & Pilkerton, 2010), type and location of facilities where programs are offered (Korda et al., 2015), family and cultural beliefs around health promotion (O'Loughlin et al., 2007), and the attitudes and perceptions of fellow participants (Rimmer et al., 2004). There is a need to understand how these factors contribute to participation in evidence-based falls prevention programs among underrepresented populations.

MOB and Stepping On are similar programs that focus on reducing fear of falling, reducing the amount of activity restriction caused by fear of falling, and improving individual falls self-efficacy. The components of MOB include group-based discussion of falls risk factors and strategies to reduce falls risk factors. Exercises designed to increase lower extremity strength and improve balance are incorporated in the third week of the program. The components of Stepping On include the identification of multiple falls risk factors and the associated prevention strategy. Each week, a different health professional provides information on a specific fall risk factor (i.e., a physical therapist discusses mobility, a pharmacist discusses medication management, an occupational therapist discusses home hazards). The goal is to provide participants with an increase in self-confidence to reduce their risk of falls and maintain active lives. The program addresses strength and balance exercises, safe foot wear, the contribution of vision to falls, home and community safety, medication review and management, bone health, and how to cope after a fall has occurred.

Both MOB and Stepping On use a group-therapy approach in small group sessions (8 to 14 participants) to address perceptions around falls, fear of falling, and prevention strategies,

with the expected outcome of reduced fear of falling and improved falls self-efficacy. As an example, see Table 1. for a description of the program learning objectives of MOB by session. Both programs have been reported to be effective in reducing fall risk factors and overall fall rates in community-dwelling older adults when compared to a control group (Tennstedt et al., 1998; Clemson et al., 1994). In the original research study of MOB, participants in the intervention group reported an increase level of activity and mobility control compared to those in the control group (Tennstedt et al., 1998). In the original research study of Stepping On, with participants in the intervention group reported a 31% reduction in falls compared to those in the control group (Clemson et al., 1994). In both original research studies, older adults with a disability were excluded if they were not ambulatory. Additionally, neither study reported on the racial distribution of participants.

MOB and Stepping On have been implemented in a variety of settings. Implementation site types included federal, non-profit, health care organizations, residential facilities, senior centers, and others (e.g., tribal centers). See Figure 4 for the distribution of program implementation sites in the National Falls Prevention Database. Although MOB and Stepping On have been adopted widely across the United States (Smith, Ory, & Larsen, 2010; Smith, Jiang, & Ory, 2012; Towne et al., 2015), it is unknown to what extent these programs reach underrepresented populations of older adults, whether the programs remain effective in these populations compared to the general population of community-dwelling older adults.

Table 1.

Matter of Balance Program Learning Objectives by Week.

Session	A Matter of Balance
Week 1	The group is introduced to the concept of helpful and unhelpful beliefs about falls and concerns about falling
Week 2	To realize the importance of recognizing our core beliefs about falls before we are able to change them. Emphasis is on not whether or not I can do it, but HOW can I do it?
Week 3	To understand the importance of exercise in preventing falls
Week 4	To recognize three important physical risk factors for falls: low blood pressure, leg weakness, and poor flexibility/balance
Week 5	To learn about balance exercises that can be used as part of an individualized exercise program
Week 6	To determine which activities are and are not fall risk-taking behaviors
Week 7	To recognize potential fall hazards often present in the home and community
Week 8	To practice assertiveness skills in locating and using resources for fall prevention and seeking help after a fall

Note. A Matter of Balance Volunteer Lay Leader Model, MaineHealth's Partnership for Healthy Aging. Used and adapted by permission of Boston University.

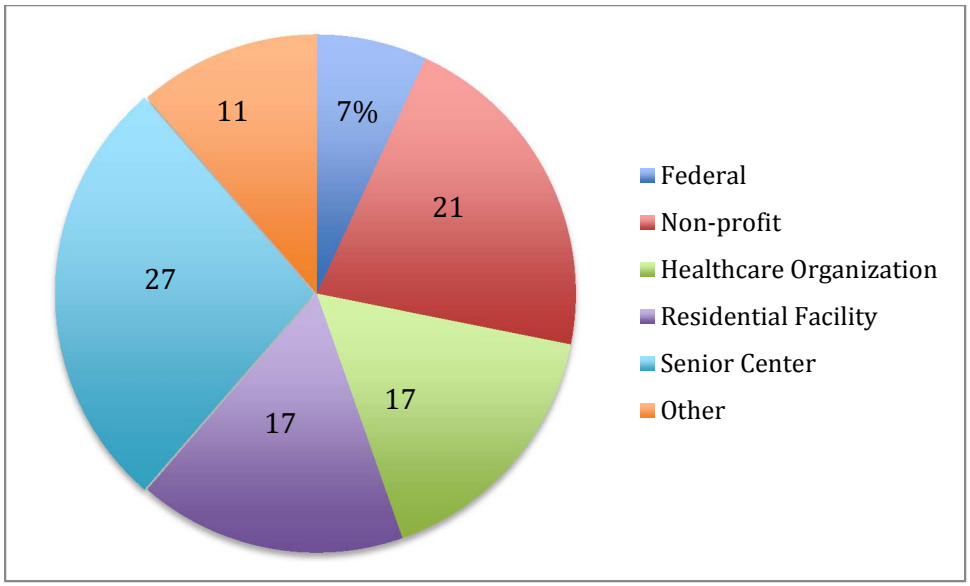

Figure 4.

Distribution MOB and Stepping On Program Implementation Sites in the National Falls Prevention Database.

Note. Federal = Area Agency on Aging (AAA), County Health Department, Municipal Government, State Health Department, State Unit on Aging; Non-profit = Community Center, Educational Institution, Faith-base Organization, Library, Other = Multipurpose Social Services Organization, Other, Recreational Organization, Workplace

Summary

Falls among community-dwelling older adults represent a large economic burden on the United States healthcare system that could be prevented. Falls disproportionally affect older adults with a disability and racial minorities. There is a national effort to reduce the number of falls experienced by older adults by increasing the availability of evidence-based falls prevention programs designed to reduce risk factors, however the reach and effectiveness among these underrepresented populations has not been examined. There is a need to understand how individual- and organizational-level factors influence these outcomes. Using the RE-AIM and SEM frameworks, the following studies explored the reach and effectiveness of MOB and Stepping On among community-dwelling older adults with a disability and racial minorities

compared to those without a disability and non-minority participants in the National Falls Prevention Database.

Chapter 2 – Study 1

The Impact of Evidence-based Falls Prevention Programs in Community-dwelling Older Adults with a Disability

Abstract

Falls are the leading cause of injury and deaths from injuries among older adults, and older adults with a disability are at greater risk for falls compared to those without a disability. Older adults with a disability report high rates of fear of falling, often have mobility impairments, and report a higher number of co-morbid conditions, which are common falls risk factors. Evidence-based falls prevention programs have been developed and disseminated broadly. Older adults with a disability represent a group likely to benefit greatly from fall prevention programs, however older adults with a disability were excluded from original research on program effectiveness. This study used the National Falls Prevention Database from the National Council on Aging to compare the reach and effectiveness of two evidence-based falls prevention programs, Matter of Balance (MOB) or Stepping On, between those with and without a disability. Program reach was measured using attendance percentage and completion rates. Program effectiveness was measured using change in fear of falling (FOF), fall-related activity restriction (FAR), and falls self-efficacy (FSE) post-program. Participants included in the analysis (N = 12,667) met the following inclusion criteria: attended MOB or Stepping On program, aged 50 or older, had complete data on baseline and post-program surveys. Participants were, on average, 76 years old (M = 76.18, SD = 9.86), largely female (75%), well educated (80% some college or higher), and white (90%). Nearly half self-reported a disability (40%). Older adults with a disability were as likely to attend (M = 0.88, SD = 0.14) the program

compared to those without a disability ($M = 0.88$, $SD = 0.14$, $p = .30$). Older adults with a disability reported greater FOF and FAR and lower FSE compared to participants without a disability at baseline. Statistically significant improvements were made in all effectiveness measures, irrespective of disability status. Factors that positively contributed to program completion included: higher education, non-racial minority status, and attending MOB. Factors that contributed to program effectiveness included: no reported disability, younger, higher education, higher general health, MOB program, and receiving a health care referral. In summary, MOB and Stepping On are effective programs were equally well attended by older adults with and without disabilities, however older adults with a disability continued to report higher FOF and FAR, and lower FSE compared to those without a disability. More research is needed to understand the mechanisms of these differences.

Introduction

Community-dwelling older adults with a disability are more likely to fall and report multiple falls compared to those without a disability (Matsuda et al., 2015; Finlayson & Peterson, 2010). Merriam-Webster defines disability as "a physical, mental, cognitive, or developmental condition that impairs, interferes with, or limits a person's ability to engage in certain tasks or actions or participate in typical daily activities and interactions" (Merriam-Webster, 2018). Falls are the leading cause of injury and death from injury among older adults and the rate of mortality due to a fall or fall-related injury has increased from 2007 to 2015 (Burns & Kakara, 2018). Falls can result in severe injury, the loss of independence, activity avoidance or restriction, and depression (Ambrose, Cruz, & Paul, 2015). An estimated $31 billion was spent on treating falls and fall-related injuries in 2013 and this figure is expected to climb to $67.7 billion by 2020 (Burns, Stevens, & Lee, 2016). Falls represent a large portion of the healthcare expenditure that can be prevented. To address this growing public health concern, falls prevention programs have been developed and supported by federal funding (Administration on Community Living, 2017), however it is unknown whether these programs are able to reach older adults with a disability and whether the programs are effective in this population compared to the general community-dwelling older adult population.

Fall prevention programs address known modifiable risk factors. At the individual-level, factors can be classified as intrinsic or extrinsic (Ambrose, Paul, & Hausdorff, 2013; Tinetti, Speechley, & Ginter, 1988). Examples of intrinsic factors include age, health conditions, fall history, medications, and physical limitations. Alternatively, individual-level extrinsic factors include poor lighting, footwear, and polypharmacy. In addition to modifiable factors, research has identified common non-modifiable factors (e.g., age, female gender, and fall history)

(Bergland, 2012). As age increases, the risk of falling increases. Women are more likely to report a fall compared to men, and those who have suffered a fall are at an increased risk for a fall in the future (Rubenstein, 2006).

Psychological factors can also increase the risk of falling in community-dwelling older adults, such as fear of falling, depression, or cognitive impairment (Lach, 2005; Muir et al., 2010; Murphy, Dubin, & Gill, 2003). Fear of falling can lead to activity restriction (Denkinger, Lukas, Nikolaus, & Hauer, 2015), which can result in muscle atrophy and lower extremity weakness, leading to impaired mobility (Donoghue, Cronin, Savya, O'Regan, & Kenny, 2013). In addition to fear of falling, low falls self-efficacy is associated with activity restriction and reduced quality of life and independence (Cumming, Salkeld, Thomas, & Szonyi, 2000; Lin, Chang, Lee, Yang, & Tsauo, 2015; Schepens, Painter, & Murphy, 2012).

Given the broad range of potential risk factors, evidenced-based programs that address multiple common risk factors simultaneously provide a potentially cost effective approach to reducing fall risk among community-dwelling older adults (Ghmire, et al., 2015; Wu, et al., 2010). There is a lack of understanding of program attendance, completion, and effectiveness among community-dwelling older adults with a disability. There is a need to identify and target underrepresented populations who are more likely to fall, yet less likely to participate in evidence-based fall prevention programs. There is also a need to understand which factors contribute to increased program completion and effectiveness among different populations of older adults.

While certain groups of community-dwelling older adults are at an increased risk for falls, these populations are often unrepresented in medical research (Pariera et al., 2017; Williams & Moore, 2011). Physical impairments can increase the risk of falls in community-

dwelling older adults, including physical disability or neurodegenerative disability (Bergland, 2012; Deandrea et al., 2010; Masud & Morris, 2001). Older adults with a disability have lower participation in community health programs when compared to the general population (Rimmer et al., 2004). Older adults aging with physical disabilities (e.g., multiple sclerosis, post polio syndrome, spinal cord injuries, and muscular dystrophies) have an increased risk of falls compared to those who are not aging with a physical disability (Finlayson & Petersen, 2010; Matsuda et al., 2015). These conditions often have a significant effect on mobility and lower extremity strength, which are two key risk factors for falls in the community. Additionally, conditions such as visual impairment and other sensory problems that have an effect on mobility can increase the risk of falls among community-dwelling older adults (Lord, Smith, & Menant, 2010).

Older adults with a disability are often underrepresented in research studies examining evidence-based falls prevention programs (Tennsedt et al., 1998). Some programs require participants be ambulatory to attend, which excludes those who require a wheelchair (Clemson et al., 2004). Additionally, older adults with a disability have reduced participation in evidence-based programs in the community (Rimmer et al., 2004). Although guidelines for the implementation of health promotion programs for individuals with disabilities have been developed, participation remains low (Drum, et al., 2009; Rimmer, et al., 2016; White, et al., 2011). A number of barriers have been identified that contribute to low rates of participation, including: physical access to the building, perceptions and attitudes from fellow participants, and a lack of understanding of disabling conditions by instructors (Turcotte, Carrier, Desrosier, & Levasseur, 2015). Researchers have explored the reach and effectiveness of some evidence-based health promotion programs by disability status (Rimmer et al, 2016), however, little is

known about the impact of falls programs among this population. Therefore, the purpose of this study was to examine the attendance, completion, and effectiveness of falls prevention programs among older adults with a disability compared to those without a disability.

Research Aims and Hypothesis

Aim #1: To describe and compare the reach of A Matter of Balance (MOB) and Stepping On among older adults with a disability compared to older adults without a disability.

Hypothesis Aim #1

There will be a statistically significant difference in program reach between older adults with a disability compared to older adults without a disability. Programs will have smaller reach, as defined by lower attendance and a lower rate of completion, among older adults with a disability compared to older adults without a disability.

Aim #2: To describe and compare the within group and between group effectiveness of MOB and Stepping On among adults with a disability compared to older adults without a disability.

Hypothesis Aim #2

There will be significant within group differences by disability status. Older adults without a disability will report statistically significant improvements in outcome measures post program. Older adults with a disability will not report statistically significant improvements in outcome measures post program. There will be a statistically significant difference in program effectiveness between older adults with a disability compared to older adults without a disability. Programs will be less effective, as defined by lower change score in measures of fear of falling, fall-related activity restriction, and falls self-efficacy, among older adults with a disability compared to older adults without a disability.

Aim #3: To identify factors that positively contribute to program completion and effectiveness of MOB and Stepping On and examines the unique contribution of disability status to the variation in program completion and effectiveness.

Hypothesis Aim #3

Disability status will uniquely contribute to the variation in program completion and effectiveness above and beyond organizational-level factors, demographic factors, and baseline scores.

Methods

Database

Data from the National Falls Prevention Database, housed at the National Council on Aging (NCOA) Center for Healthy Aging was used to answer the research aims. These data include participant information collected by grantee organizations awarded Public Health and Prevention Fund (PHPF) grants from the Administration Community Living (ACL) to implement evidence-based fall prevention programs. Programs that received evidence-based status met the following requirements: 1) demonstrated effectiveness to reduce falls or fall-related risk factors; 2) evaluated using a randomized controlled trial or quasi experimental study with a control group; 3) published research findings in a peer-reviewed journal; 4) translated into the community setting; and 5) dissemination material available (ACL, 2017). As of December 2017, eight different falls prevention programs have met the criteria for evidence-based status, including: FallScape, MOB, Otago Exercise Programme, Stay Independent and Active for Life, Stay Safe Stay Active, Stepping On, Tai Chi for Arthritis, and Tai Ji Quan: Moving for Better Balance.

These data come from 24 states and six tribal organizations across all regions of the United States. Technical assistance is provided by NCOA to grantee organizations to assist with program implementation barriers and challenges. Grantee organizations are required to collect participant data and report back to ACL throughout the course of their two-year grant. Participants complete similar data collection forms at baseline and post-program, which include demographic characteristics (i.e., healthcare referral, current age in years, living arrangement, gender, ethnicity, race, education), health characteristics (i.e., chronic health conditions and general health status), fall risk (i.e., fall history, falls with injuries, fear of falling, fall-related

activity restriction, and falls self-efficacy). Data collection occurs during the first program session and the final program session (See Appendix for data collection forms).

Falls Prevention Programs

The current research project examined the reach and effectiveness of two evidence-based fall prevention programs by disability status: MOB and Stepping On. Both programs are comprised of small group sessions for a set number of weeks (eight weeks – MOB, seven weeks – Stepping On). Each session is dedicated to a specific modifiable risk factor associated with falls, as well as providing participants with recommended balance and strengthening exercises. Among the evidence-based programs approved by ACL, the majority of participants (81%) have joined either MOB or Stepping On. MOB and Stepping On are less physical intensive compared to other evidence-based fall prevention programs. MOB and Stepping On focus on group discussions and slowly introduce physical activity components to participants. Both programs have demonstrated effectiveness in the general population of community-dwelling older adults, however effectiveness among older adults with a disability has not been examined (Clemson et al., 2004; Tennstedt et al., 1998). Following is a brief review of each program.

A Matter of Balance

MOB was developed by the Roybal Center at Boston University (Tennstedt et al., 1998). This program is a cognitive-behavioral intervention that aims to reduce the fear of falling and increase physical activity among older adults at an increased risk for falls. Over the course of eight two-hour sessions delivered weekly, program participants learn that fear of falling is manageable and that a majority of falls can be prevented. Sessions include a minimum of eight and a maximum of 14 participants. The program emphasizes the importance of older adults building relationships with health care providers and developing the skills to communicate their

needs. In addition to managing fear of falling, participants learn exercises to increase strength and balance and are encouraged to set realistic goals to increase physical activity.

A randomized controlled trial of MOB showed program participants reported increased intent to exercise, improved mobility control, improved social function, and mobility range at 6 and 12-month follow-up compared to controls, however people with disabilities were excluded and the sample was 90.8% white with no other race categories identified (Tennstedt et al., 1998). Research studies have examined the dissemination and implementation of MOB, demonstrating cost-effectiveness when implemented in community-settings (Coe et al., 2017; Dauenhauer, Glose, & Watt, 2015; Ory et al., 2010). The program has been show to significantly reduce fear of falling and improve falls self-efficacy and physical function of participants (Cho et al., 2014; Cho et al., 2015; Howland et al., 2015; Mielenz et al., 2017; Page et al., 2015; Smith et al., 2012). Instructors are required to complete an eight hour training, hold a current MOB coach certification, attend 2.5 hours of coach training update each year, and agree to hold two MOB sessions within one year of certification.

Stepping On

Stepping On was developed at the University of Sydney in Australia and was later brought to the United States, where the program was adapted for implementation in North America by researchers at the University of Wisconsin (Clemson et al., 2004). Through a small-group learning environment, Stepping On aims to improve falls self-efficacy, encourage behavior change, and reduce the number of falls experienced by community-dwelling older adults. The program consists of two-hour sessions conducted weekly for seven weeks, with an individual follow-up visit for each participant within three months after the last session by the

program instructor. Participants develop skills to explore risk-taking behavior and options to manage fall risk.

In a randomized trial of older adults who had recently experienced a fall or were concerned about falling, participants in the Stepping On group experienced a 31% reduction in falls compared to the control group, however people with disabilities were exclude and no participant data on race were provided (Clemson et al., 2004). Other research studies have evaluated the dissemination and implementation of Stepping On and have found the program to effectively reduce fear of falling, improve falls self-efficacy, and improve physical function (Carande-Kulis et al., 2015; Dattalo et al., 2017; Ford et al., 2017; Guse et al., 2015; Mahoney 2015; Mahoney et al., 2016; Ory et al., 2014; Schlotthauer et al., 2017). Stepping On leaders are required to hold a current professional licensure or certification, including registered nurse, physical therapist, occupational therapist, social worker, fitness professional, or health educator with experience working with older adults. Additionally, Stepping On Leaders are required to have facilitated some kind of group program based on adult learning. Leaders must complete a 3-day training, conducted by Wisconsin Institute for Healthy Aging, its licensees, or Master Trainers.

Study Flow Diagram

A complete case analysis was conducted of community-dwelling older adults participating in MOB or Stepping On under a current or former ACL grantee. Participants were excluded if they did not participate in MOB or Stepping On, were younger than 50 years old, or if they did not have complete data across all variables (See Figure 5). Missing data was the primary reason for exclusion from the current study, however the proportions of participant characteristics were similar between those included and excluded (See Table 2).

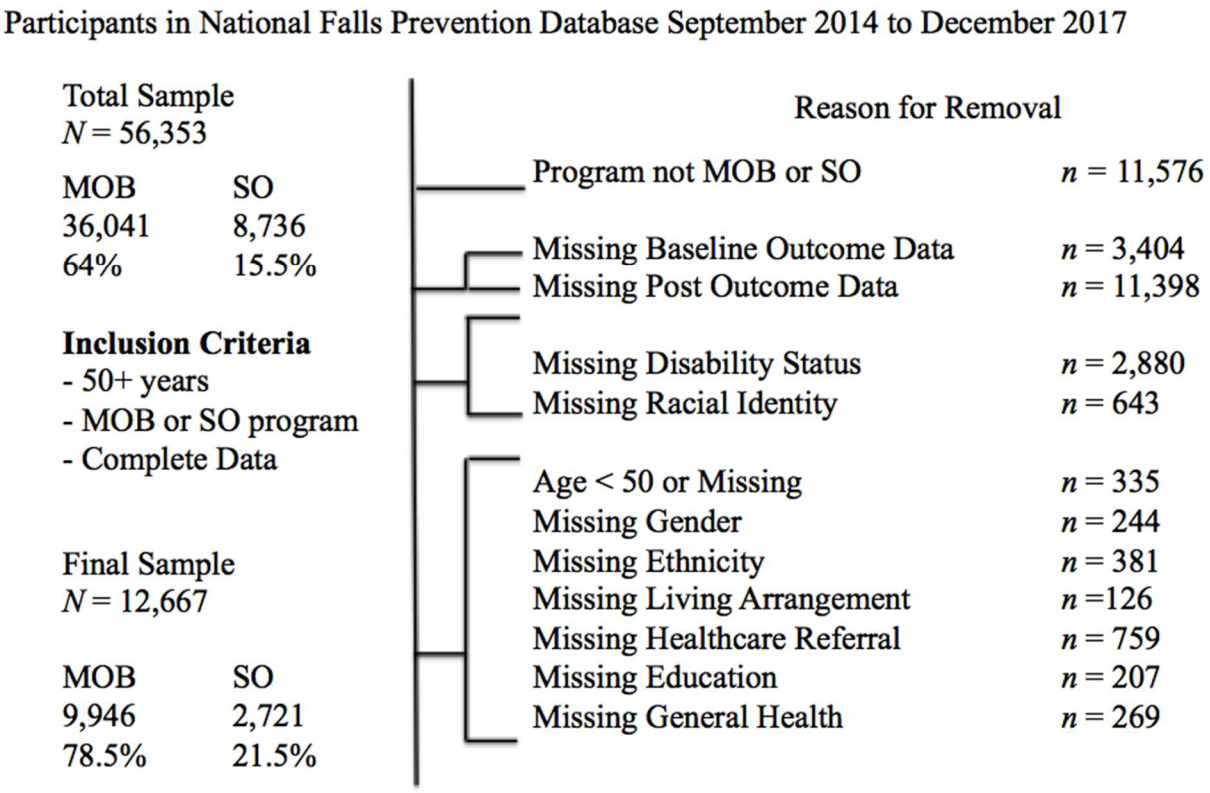

Figure 5.

Study Flow Diagram of Participants Who Met Inclusion Criteria in the National Falls Prevention Database.

Note. MOB = A Matter of Balance; SO = Stepping On

Table 2.

Participant Descriptives in the National Falls Prevention Database who were Included or Excluded in the Final Analysis.

Factors	Total Sample *N*=56,353	Included *n*=12,667	Excluded *n*=43,686
Implementation Site Type			
Federal	3,137, 5.6	874, 6.9	2,263, 5.2
Non-profit	10,654, 18.9	2,691, 21.2	7,963, 18.2
Health care org.	7,527, 13.4	2,088, 16.5	5,439, 12.5
Residential Facility	11,256, 20.0	2,119, 16.7	9,137, 20.9
Senior Center	14,948, 26.5	3,456, 27.3	11,492, 26.3
Other	8,831, 15.7	1,439, 11.4	7,392, 16.9
U.S. Geographic Region			
Midwest	17,760, 31.5	4,759, 37.6	13,001, 29.8
Northeast	14,035, 24.9	2,394, 18.9	11,641, 26.6
South	17,810, 31.6	4,198, 33.1	13,612, 31.2
West	6,748, 12.0	1,316, 10.4	5,432, 12.4
Program Type			
FallScape	325, 0.6	-	325, 0.7
MOB	36,041, 64.0	9,946, 78.5	26,095, 59.7
Otago	162, 0.3	-	162, 0.4
Stay Safe, Stay Active	700, 1.2	-	700, 1.6
SAIL	145, 0.3	-	145, 0.3
Stepping On	8,736, 15.5	2,721, 21.5	6,015, 13.8
Tai Chi for Arthritis	4,085, 7.2	-	4,085, 9.4
Tai Ji Quan	6,159, 10.9	-	6,159, 14.1
Age (*n*=47,561)			
< 50	432, 0.9	-	432, 1.2
50-59	4,163, 8.8	240, 1.9	3,259, 9.3
60-69	15,419, 32.4	2,411, 19.0	11,128, 31.9
70-79	18,571, 39.0	5,217, 41.2	13,377, 38.3
80+	8,976, 18.9	4,799, 37.9	6,698, 19.2
Missing (*n*=8,792)			
Sex (*n*=49,256)			
Female	39,796, 80.8	10,208, 80.6	29588, 80.9
Male	9,460, 19.2	2,459, 19.4	7001, 19.1
Missing (*n*=7,097)			

Table 2 Continued.

Participant Descriptives in the National Falls Prevention Database who were Included or Excluded in the Final Analysis.

Race (*n*=43,380)			
Asian	1,114, 2.6	273, 2.2	841, 2.7
Black	3,250, 7.5	705, 5.6	2,545, 8.3
Hispanic	2,272, 5.2	679, 5.4	1,593, 5.2
Other	954, 2.2	201, 1.6	753, 2.5
White	35,790, 82.5	10,809, 85.3	24,981, 81.3
Missing (*n*=12,973)			
Live Alone (*n*=46,412)			
Yes	22,249, 47.9	6,007, 47.4	16,242, 48.1
No	24,163, 52.1	6,660, 52.6	17,503, 51.9
Missing (*n*=9,941)			
Education (*n*=41,736)			
Less than HS	1,721, 4.1	362, 2.9	1,359, 4.7
Some HS	1,914, 4.6	448, 3.5	1,466, 5.0
HS Grad or GED	10,244, 24.5	3,106, 24.5	7,138, 24.6
Some College	12,553, 30.1	4,020, 31.7	8,533, 29.4
College Grad	15,304, 36.7	4,731, 37.3	10,573, 36.4
Missing (*n*=14,617)			
Healthcare Referral (*n*=38,488)			
Yes	6,858, 17.8	2,041, 16.1	4,817, 18.7
No	31,630, 82.2	10,626, 83.9	21,004, 81.3
Missing (*n*=17,865)			
Disability Status (*n*=35,445)			
Yes	13,562, 38.3	5,068, 40.0	8,494, 37.3
No	21,883, 61.7	7,599, 60.0	14,284, 62.7
Missing (*n*=20,908)			
Cardiovascular Condition			
Yes	13,741, 24.4	4,215, 33.3	9,526, 21.8
No	42,612, 75.6	8,452, 66.7	34,160, 78.2
Sensory Condition			
Yes	7,057, 12.5	2,237, 17.7	4,820, 11.0
No	49,296, 87.5	10,430, 82.3	38,866, 89.0
Musculoskeletal Condition			
Yes	25,020, 44.4	7,513, 59.3	17,507, 40.1
No	31,333, 55.6	5,154, 40.7	26,179, 59.9

Table 2. Continued

Participant Descriptives in the National Falls Prevention Database who were Included or Excluded in the Final Analysis.

Cancer			
Yes	1,057, 1.9	320, 0.5	737, 1.7
No	55,296, 98.1	12,347, 97.5	42,949, 98.3
Rheumatic Condition			
Yes	552, 1.0	152, 1.2	400, 0.9
No	55,801, 99.0	12,515, 98.8	43,286, 99.1
Mental/Cognition Condition			
Yes	6,689, 11.9	1,806, 14.3	4,883, 11.2
No	49,664, 88.1	10,861, 85.7	38,803, 88.8
Respiratory Condition			
Yes	6,519, 11.6	1,940, 15.3	4,579, 10.5
No	49,834, 88.4	10,227, 84.7	39,107, 89.5
Brain/Nervous System Condition			
Yes	1,367, 2.4	421, 3.3	946, 2.2
No	54,986, 97.6	12,246, 86.7	42,740, 97.8
Digestive Condition			
Yes	397, 0.7	134, 1.1	263, 0.6
No	55,956, 99.3	9,811, 77.5	43,423, 99.4
Endocrine/Metabolic/Immune Condition			
Yes	9,790, 17.4	2,856, 22.5	6,934, 15.9
No	46,563, 82.6	9,811, 77.5	36,752, 84.1
Urinary Condition			
Yes	320, 0.8	109, 0.9	211, 0.5
No	56,033, 99.4	12,558, 99.1	43,475, 99.5
Other Condition			
Yes	18,461, 32.8	1,329, 10.5	17,132, 39.2
No	37,892, 67.2	11,338, 89.5	26,554, 60.8
General Health (*n*=42,416)			
Excellent	2,435, 5.7	709, 5.6	1,726, 5.8
Very good	12,478, 29.4	3,824, 30.2	8,654, 29.1
Good	20,132, 47.5	6,215, 49.1	13,917, 46.8
Fair	6,746, 15.9	1,796, 14.2	4,950, 16.6
Poor	625, 1.5	123, 1.0	503, 1.7
Missing (*n*=13,936)			
Falls in past 3 months (*n*=38,286)	0.61 (1.83)	0.59 (1.77)	0.61 (1.86)
Missing (*n*=18,067)			

Table 2.

Participant Descriptives in the National Falls Prevention Database who were Included or Excluded in the Final Analysis.

Falls with injuries (*n*=29,555) Missing (*n*=26,798)	0.20 (0.62)	0.20 (0.57)	0.20 (0.65)
Two or more falls past 3 months (*n*=38,286) Yes No Missing (*n*=18,067)	 11,788, 30.8 26,498, 69.2	 3,649, 31.2 8,036, 68.8	 8,136, 30.6 18,462, 69.4
Attendance (*n*=45,264) Missing (*n*=12,089)	0.74 (0.27)	0.88 (0.14)	0.69 (0.29)
Completer (*n*=45,264) Yes No Missing (*n*=11,089)	 35,160, 77.7 10,104, 22.3	 12,284, 97.0 383, 3.0	 22,876, 70.2 9,721, 29.8
FOF baseline (*n*=41,193) Missing (*n*=15,160)	2.53 (0.91)	2.61 (0.87)	2.50 (0.92)
FAR baseline (*n*=44,151) Missing (*n*=12202)	2.12 (1.21)	2.12 (1.18)	2.12 (1.22)
FSE baseline (*n*=44,584) Missing (*n*=11,951)	2.76 (0.92)	2.73 (0.89)	2.78 (0.93)

Note. Figures represent *n,* % or *M* (*SD*); excluded = all participants excluded for any reason (i.e., < 50 years old, programs other than MOB and Stepping On, incomplete data).

Outcome Measures

Disability Status

Disability status was determined by the question "are you limited in any activities due to physical, mental, or emotional problems?" (yes/no) collected at baseline. Participants who responded yes were classified as disability and participants who responded no were classified as no disability.

Reach (Attendance and Completion)

Participant attendance was tracked at each program session. Attendance percentage was calculated using the number of sessions attended divided by total number of sessions offered. Individuals were classified as completers and given a score of 1 if they had attended five of eight sessions in a program, and classified as 0 otherwise. Previous studies have shown attendance to be an important indicator of evidence-based program reach and effectiveness (McGuire et al., 2013). Program completion was defined by program developers as attending five or more of eight sessions (Clemson et al., 2004; Tennesdt et al., 1998).

Fear of Falling (FOF)

FOF was measured by a single-item on a four-point Likert-type scale with the question "how fearful of falling are you?" ranging from 1 'not at all fearful' to 4 'a lot fearful'. FOF was collected using pre and post program surveys, with mean change scores and standard deviations reported. Higher scores indicated that the participant was more afraid of falling. This measure has been used in many studies as a simple way to evaluate change in fear of falling over time (Greenberg, Sullivan-Marx, Soomers, Chittams, & Cacchione, 2016; Cumming et al., 2000; Lachman et al., 1998; Murphy, Dubin, & Gill, 2003).

Fall-related Activity Restriction (FAR)

FAR was measured by a single-item on a five-point Likert-type scale with the question "During the last four weeks, to what extent has your concern about falling interfered with your normal social activities with family, friends, neighbors, or groups?" ranging from 1 'not at all' to 5 'extremely'. FAR was converted into a continuous variable with mean change scores and standard deviations reported. Higher scores indicated greater restriction of activities. This measure has been used previously in cross-sectional studies looking at the relationship between fear of falling and activity restriction (Mendes da Costa et al., 2012).

Falls Self-efficacy (FSE)

FSE was measured using a subset of five questions related to perceived ability and confidence around fall prevention activities, adapted from the Falls Efficacy Scale (Yardley, Beyer, Hauer, Kempen, Piot-Ziegler, & Todd, 2005). Each item was measured on a four point Likert-type scale of 1 'not at all sure' to 4 'very sure'. Items were converted into a continuous variable and combined to create a simple sum with mean change scores and standard deviations reported. Questions included ability to get up after a fall, ability to protect oneself during a fall, ability to find ways to reduce falls, ability to increase physical strength, and ability to become more steady on ones feet. Higher scores indicated a greater confidence in falls-related ability. This measure has been used in similar studies of effectiveness of falls prevention programs (Smith, Jiang, & Ory, 2012).

Organizational-level measures

Organizational-level measures included site type, region, and program type. Site type indicates the venue in which the workshop was held, and classified into one of six

types: federal, non-profit, health care organization, residential facility, senior center, or other. Organizations were recoded by state into one of four regions: West, Midwest, Northeast, or South (US Census Bureau, 2010). Program type included MOB or Stepping On.

Individual-level measures

Individual-level measures included demographic variables, fall history, healthcare provider referral, number and type of chronic health conditions, and general health status. Age was collected as current age in year, gender as male or female, and education was reported on a five point scale from 1 'less than high school' to 5 'college graduate or higher'. Race and ethnicity were reported separately; ethnicity as Hispanic, Latino, or Spanish origin (yes/no); and six race categories: American Indian/Alaska Native, Asian, Black or African American, Multiracial, Native Hawaiian/Pacific Islander, and White. Living arrangement was collected with the question "do you live alone?" (yes/no). Healthcare referral was collected with the question "have you been referred to the program by a healthcare professional?" (yes/no). Falls and falls with injuries were reported with means and standard deviations.

Co-morbid conditions lasting for 3 months or longer were collected at baseline. Category options included: arthritis or other bone/joint problem, heart disease, breathing condition, glaucoma, depression, diabetes, heart condition, and other with the option to specify. All conditions in the 'other' category were hand-coded and discrete condition categories were created. All conditions were classified by body system consistent with ICD-10 coding scheme where applicable resulting in the following categories: cardiovascular, respiratory, musculoskeletal, cancer, rheumatic, mental/cognition, sensory, brain/nervous, digestive, endocrine/immune/metabolic, urinary, and other. These categories were used to

calculate average number of co-morbid conditions (See Appendix for coding scheme). Self-reported general health was measured using a single question "how would you rate your general health" with a five point Likert-type scale from 5 'excellent' to 1 'poor'.

Statistical Analyses

Descriptive statistics, baseline, and post-program survey responses are reported for all participants, including age, gender, living arrangement, ethnicity, race, education, healthcare referral, and co-morbid health conditions organized by body system. Data is presented as a pooled total across the sample and stratified by disability status. Outcome variables included continuous measures of attendance percentage, completion rate, FOF, FAR, and FSE. For organizational and individual-level descriptives, chi-square analyses were used to examine group differences of categorical variables and one-way ANOVAs were used to examine group differences of continuous variables. Analyses of Covariance (ANCOVAs) were used to examine between group change scores across outcome measures by disability status. Covariates were selected based on correlations with any of the outcome measures or disability status, including: implementation site type, U.S. geographic region, program type, age, gender, race, ethnicity, education, healthcare referral, and living arrangement. Follow-up post-hoc t-tests examine within-group differences baseline and post-program. To examine positive contributing factors for program completion and program effectiveness, multiple logistic regressions with sequential block entry were used. Using pre-established program completion criteria of attending five sessions or more, a completer variable was created (0 = completer, 1 = non-completer). To measure effectiveness post-program, a binary variable of high/low FOF post-program was created and responses of ‘a lot’ or ‘somewhat’ were coded as 0 (negative outcome) and responses of ‘not at all’ and ‘a little’ were coded as 1 (positive outcome). Similar methods were used for FAR. A binary variable of how/low activity restriction post-program was created and responses of ‘extremely’ ‘moderately’ and ‘quite a bit’ were coded as 0 (negative outcome) and responses of ‘not at all’ and ‘slightly’ were coded as 1 (positive outcome). To measure FSE post-

program, a binary variable was created using the simple sum scores of five FSE questions and responses of 'not at all sure' and 'somewhat sure' were coded as 0 (negative outcome) and responses of 'very sure' and 'sure' were coded as 1.

The logistic regression models explaining program effectiveness of low FOF, low FAR, and high FSE post-program included five blocks. Block 1 included the baseline score of each respective outcome measure. Block 2 included age (standardized with *Z*-scores), gender (female/male), racial minority status (white/non-white), living arrangement (alone/not alone), and education (less than high school, some high school, high school graduate/GED, some college, college graduate). Block 3 included baseline self-reported general health (standardized with *Z*-scores), average number of chronic conditions, and healthcare referral (yes/no). Block 4 included dummy-coded implementation site type (federal as reference, non-profit, healthcare organization, residential facility, senior center, and other), dummy-coded region (Midwest as reference, West, Northeast, and South), and program type (MOB/Stepping On). Block 5 included disability status (no/yes). All data were analyzed using SPSS statistical software (IBM Corp. Released 2016. IBM SPSS Statistics for Windows, Version 19.0. Armonk, NY: IBM Corp).

Results

Description of Programs and Participants

A final sample of (N = 12,667) community-dwelling adults over the age of 50 who attended at least one MOB (n = 9946, 78.5%) or Stepping On (n = 2721 21.5%) session and completed baseline and post-program surveys were evaluated. Sessions were offered in a variety of settings including federal (i.e., health departments), non-profit (i.e., educational institutions), healthcare organizations, residential facilities, senior centers, and others. Regionally, most of the sessions were held in the Midwest (37.6%) and the South (33.1%) with only 10.4% and 18.9% in the West and Northeast, respectively, however this differed by program type. There were statistically significant organizational-level differences between the two programs. Federal, non-profit, and healthcare organizations had a greater percentage of Stepping On sessions, whereas senior centers had a greater percentage of MOB sessions. Regionally, the West, and the Midwest had a greater percentage of Stepping On sessions and the Northeast and the South had a greater percentage of MOB sessions. See Table 3 for organizational variables by program.

Table 3.

Comparison of Program Site Type and US Geographic Location by MOB and Stepping On Participants in the National Falls Prevention Database

Organizational-level Factors	% participants enrolled in MOB *n* = 9,946	% participants enrolled in Stepping On *n* =2,721
Program Site Type		
Federal	5.8	10.9***
Non-profit	22.4	16.9***
Healthcare Organization	12.6	30.7***
Residential Facility	18.1	11.7
Senior Center	29.9	17.7***
Other	11.1	12.2
US Geographic Region		
West	5.2	29.4***
Midwest	29.6	66.8***
Northeast	24.0	0.1***
South	41.2	3.7***

Note. ** $p < .01$; *** $p < .001$; Federal = Area Agency on Aging (AAA), County Health Department, Municipal Government, State Health Department, State Unit on Aging; Non-profit = Community Center, Educational Institution, Faith-based Organization, Library, Other = Multipurpose Social Services Organization, Other, Recreational Organization, Workplace

Overall, participants who enrolled in the programs were largely female (80.6%), white (90.%), and non-Hispanic (94.6%). The average age of participants was 76.53 (*SD* = 8.25) and 16% of participants were referred to the program by a healthcare provider. Of the total sample, nearly half self-reported a disability (*n* = 5,068, 40.0%) compared to those who did not report a disability (*n* = 7,599, 60.0%). Completion rates for both programs were high (MOB completer rate = 97.6%, SO completer rate = 94.5%). A subanalysis examined those who did not complete the program (*n* = 383). Participants who did not complete the program attended, on average, 42.6% of the sessions offered. Of the non-completers, 44% (*n* = 168) reported a disability, 48%

lived in the Midwest, and 39% attended SO sessions compared to the 61% that attended MOB sessions.

Organizational Factors by Disability Status

At the organizational-level, older adults with a disability were significantly more likely to attend programs implemented at healthcare organizations and residential facilities and significantly less likely to participate in programs implemented at non-profit organizations and senior centers compared to older adults without a disability ($\chi^2 = 34.15, p < .001, \upsilon = 0.05$). Regionally, older adults with a disability were significantly more likely to participate in programs in the West and Midwest and significantly less likely to participate in programs in the South and Northeast compared to those without a disability ($\chi^2 = 59.61, p < .001, \upsilon = 0.07$). Older adults with a disability were also significantly more likely to participate in Stepping On and significantly less likely to participate in MOB compared to those without a disability ($\chi^2 = 45.26, p < .001, \upsilon = 0.06$). See Table 4. for a comparison of organizational-level variables by disability status.

Table 4.

Program Site Type and US Geographic Region by Disability Status of Participants Enrolled in MOB or Stepping On in the National Falls Prevention Database

Organizational-level Factor	Total Sample N = 12,667	No Disability n =7,599	Disability n = 5,068
Program Site Type			
Federal	6.9	6.6	7.3
Non-profit	21.2	22.0	20.2
Healthcare Organization	16.5	15.3	18.2***
Residential Facility	16.7	16.2	17.6
Senior Center	27.3	28.4	25.7**
Other	11.4	11.6	11.1
US Geographic Region			
West	10.4	9.0	12.4**
Midwest	37.6	36.6	39.0**
Northeast	18.9	20.0	17.2**
South	33.1	34.4	31.3
Program Name			
MOB	78.5	80.5	75.5***
Stepping On	21.5	19.5	24.5***

Note. ** $p < .01$, *** $p < .001$; Federal = Area Agency on Aging (AAA), County Health Department, Municipal Government, State Health Department, State Unit on Aging; Non-profit = Community Center, Educational Institution, Faith-base Organization, Library, Other = Multipurpose Social Services Organization, Other, Recreational Organization, Workplace Regions designated by United States Census Bureau (U.S. Census, 2010); MOB = A Matter of Balance.

Participant Descriptives by Disability Status

At the individual-level, older adults with a disability were significantly more likely to be male ($\chi^2 = 14.89$, $p < .001$, $\varphi = 0.03$), non-Hispanic ($\chi^2 = 19.37$, $p < .001$, $\varphi = 0.04$), white ($\chi^2 = 39.18$, $p < .001$, $\varphi = 0.06$) and were more likely to live alone ($\chi^2 = 22.17$, $p < .001$, $\varphi = 0.04$) compared to older adults without a disability. Older adults with a disability were significantly more likely to be referred to participate in a falls prevention program by a healthcare provider ($\chi^2 = 129.18$, $p < .001$, $\varphi = 0.1$) compared to older adults without a disability. Older adults with a disability were significantly more likely to report most of the co-morbid health conditions ($p <$

.001) and, on average, reported a higher total number of co-morbid conditions (M = 2.20, SD = 1.22) compared to older adults without a disability (M = 1.55, SD = 1.07). Older adults with a disability were also significantly more likely to be recurrent fallers, with 39% reporting two or more falls compared to 26% of older adults without a disability ($p < .001$). There was no difference in age by disability status ($p > 0.05$). See Table 5 for a full description of participant demographics by disability status.

Table 5.

Individual-level Demographic and Health Characteristics by Disability Status of Participants in MOB or Stepping On in the National Falls Prevention Database

Individual-level Factors				
		Total Sample N = 12,667	No Disability n = 7,599	Disability n = 5,068
Age		76.53 (8.25)	76.62 (8.03)	76.38 (8.58)
Gender				
	Male	19.4	18.3	21.1***
	Female	80.6	81.7	78.9
Living Arrangement				
	Alone	47.4	45.7	50.0***
	Not Alone	52.6	54.3	50.0
Ethnicity				
	Hispanic	5.4	6.1	4.3***
	Non-Hispanic	94.6	93.9	95.7
Race				
	AI/AN	1.0	1.1	0.8
	Asian	2.2	2.8	1.3***
	Black	5.6	5.9	5.2
	NH/PI	0.1	0.1	0.1
	White	90.4	89.4	91.9
	Multiracial	0.7	0.7	0.8
Education				
	Less than HS	2.9	3.1	2.5
	Some HS	3.5	3.7	3.3
	HS Graduate or GED	24.5	25.7	22.7***
	Some College	31.7	32.0	31.4
	College Graduate	37.3	35.5	40.1***

Table 5. Continued

Individual-level Demographic and Health Characteristics by Disability Status of Participants in MOB or Stepping On in the National Falls Prevention Database

Healthcare Referral			
Yes	16.1	13.1	20.7***
No	83.9	86.9	79.3
General Health			
Excellent	5.6	7.8	2.3***
Very Good	30.2	37.0	19.9***
Good	49.1	46.3	53.2*
Fair	14.2	8.5	22.7***
Poor	1.0	0.4	1.9*
# Falls Past 3 months	0.59 (1.77)	0.41 (0.94)	0.86 (1.5)***
# Injuries from Falls	0.20 (0.56)	0.15 (0.45)	0.27 (0.69)
Recurrent Falls	28.8	25.7	39.3
Co-morbid Conditions			
Cardiovascular	33.3	28.6	40.3***
Respiratory	15.3	11.5	21.1***
Musculoskeletal	59.3	51.3	71.3***
Cancer	2.5	2.1	3.2***
Rheumatic	1.2	0.7	2.0***
Mental/Cognition	14.3	10.1	20.4***
Sensory	17.7	15.4	21.0***
Brain/Nervous	3.3	1.7	5.7***
Digestive	1.1	0.9	1.3
Endocrine/Metabolic	22.5	20.3	26.0***
Urinary	0.9	0.5	1.4***
Other	10.5	12.3	7.7***

Note. * $p < .05$; ** $p < .01$, *** $p < .001$; Figures represent % of participants with and without a disability. AI/AN = American Indian/Alaska Native; NH/PI = Native Hawaiian/Pacific Islander; HS = high school; recurrent fall = 2 or more falls in last 3 months; See Appendix for full description of conditions included in each chronic condition category.

Reach by Disability Status

On average, participants with a disability had a slightly lower total percentage of program sessions attended ($M = 0.879$, $SD = 0.14$) compared to those without a disability ($M = 0.882$, $SD = 0.14$). Contrary to the a priori hypothesis, this difference, -0.003, 95% CI [-0.008, 0.002], was not statistically significant $t(12665) = -1.20$, $p = .30$. The association between attendance

percentage and disability status remained non-significant after controlling for organizational and demographic covariates: site type, program type, region, age, gender, ethnicity, race, education, and living arrangement ($p < .05$). Program completion rates were high between both groups. A total of 4900 (96.7%) older adults with a disability and 7384 (97.2%) older adults without a disability completed the programs.

The final binary logistic regression model of factors contributing to program completion was statistically significant ($p < .001$), accounting for 3% of the variation in program completion (See Table 6). Contrary to the hypothesis, disability status did not significantly predict program completion ($p > .05$). Racial minority status, education, and program type were statistically significant factors contributing to program completion. Racial minority participants were significantly less likely to complete the program compared to non-minority participants (OR = 0.72, 95% CI [0.53, 0.99], $p < .05$). As education increased, participants were significantly more likely to complete the program compared to participants with lower education (OR = 1.15, 95% CI [1.04, 1.28], $p < .01$). Participants enrolled in Stepping On were significantly less likely to complete the program compared to those enrolled in MOB (OR = 0.64, 95% CI [0.56, 0.74], $p < .001$).

Table 6.

Factors Contributing to Completion of MOB or Stepping On (N =12,667)

	Model 1		Model 2		Model 3		Model 4	
Factor	*OR*	95%CI	*OR*	95% CI	*OR*	95% CI	*OR*	95% CI
Constant	18.64		19.37		12.48		12.27	
Age	1.02	.92, 1.14	1.02	.92, 1.13	1.00	.90, 1.11	1.00	.90, 1.11
Gender								
Male	Reference							
Female	1.02	.89, 1.17	1.02	.89, 1.17	1.01	.88. 1.15	1.01	.88, 1.15
Minority								
No	Reference							
Yes	.99	.73, 1.17	.98	.73, 1.32	.73	.54, 1.00	.72	.53, .99*
Lives Alone								
Yes	Reference							
No	1.01	.91, 1.13	1.01	.91, 1.13	1.01	.90, 1.12	1.01	.91. 1.12
Education	1.15	1.04, 1.27	1.14	1.03, 1.26	1.15	1.03, 1.27	1.15	1.04, 1.28**
# CC			.89	.80, .99	.92	.83, 1.03	.93	.84, 1.04
General Health			1.00	.90, 1.12	1.02	.91, 1.14	1.00	.89, 1.13
HC Referral								
Yes	Reference							
No			1.03	.90, 1.19	1.08	.72, 1.61	1.03	.90, 1.19
Site Type								
Federal	Reference							
Non-profit					1.08	.72, 1.61	1.08	.72, 1.61
Healthcare					1.44	.95, 2.19	1.44	.95, 2.17
Residential					1.35	.88, 2.07	1.35	.88, 2.07
Senior Center					1.46	.97, 2.18	1.45	.97, 2.17
Other					1.07	.69, 1.66	1.07	.69, 1.65

Table 6 Continued

Factors Contributing to Completion of MOB or Stepping On (N =12,667)

				β	95% CI		β	95% CI
Region								
Midwest	Reference							
South				1.21	.89, 1.64	1.21	.89, 1.64	
Northeast				1.01	.71, 1.42	1.00	.71, 1.41	
West				1.11	.79, 1.55	1.12	.80, 1.57	
Program								
MOB	Reference							
Stepping On				.64	.56, .74	.64	.56, .74***	
Disability								
No	Reference							
Yes						.95	.85, 1.06	
R^2	0.003	0.01		.028		0.03		

Note. *$p < .05$; **$p < .01$; ***$p < .001$; # CC = average number of chronic conditions; HC Referral = health care referral; MOB = A Matter of Balance.

Within-Group Effectiveness by Disability Status

Fear of Falling (FOF)

Older adults with a disability reduced FOF (baseline $M = 2.87$, $SD = 0.85$; post-program $M = 2.53$, $SD = 0.82$). This change, 0.34, 95% CI [0.36, 0.32] was statistically significant $t(5067) = 28.47$, $p < 0.001$. Older adults without a disability also reduced FOF (baseline $M = 2.43$, $SD = 0.84$; post-program $M = 2.23$, $SD = 0.78$), and the change in scores, 0.2, 95% CI [0.18, 0.21] was significant $t(7598) = 20.86$, $p < 0.001$.

Fall-related Activity Restriction (FAR)

Older adults with a disability also reported a reduction in FAR following the program (baseline $M = 2.49$, $SD = 1.20$; post-program $M = 2.03$, $SD = 1.14$). This change, 0.46, 95% CI [0.42, 0.5], was statistically significant $t(5067) = 24.21$, $p < 0.001$. Older adults without a disability also improved FAR scores from baseline ($M = 1.87$, $SD = 1.12$), to post-program ($M = 1.73$, $SD = 1.06$,). This change, 0.14, 95% CI [0.12, 0.17], was statistically significant $t(7598) = 10.19$, $p < 0.001$.

Falls Self-Efficacy (FSE)

Older adults with a disability significantly increased in FSE from baseline to post-program (baseline $M = 2.51$, $SD = 0.66$; post-program $M = 3.05$, $SD = 0.62$; difference = 0.54, 95% CI [0.52, 0.55], $t(5067) = 58.93$, $p < 0.001$). Older adults without a disability also significantly improved in FSE scores from baseline ($M = 2.87$, $SD = 0.69$) to post-program ($M = 3.27$, $SD = 0.58$), with a difference of 0.40, 95% CI [0.38, 0.42], $t(7598) = 55.51$, $p < 0.001$.

Between-Group Effectiveness by Disability Status

Fear of Falling

Between-group analysis showed a statistically significant effect of disability status on FOF change post-program after controlling for implementation site type, U.S. geographic region, program type, age, gender, ethnicity, race, education, and health care referral [$F(1,12655) = 96.94$, $p < .001$]. Contrary to the a priori hypothesis, older adults with a disability had a significantly greater change in FOF ($M = 0.54$, $SD = 0.65$) compared to older adults without a disability ($M = 0.40$, $SD = 0.63$), with a mean difference of 0.15, 95% CI [0.12, 0.18], $t(126665) = 9.68$, $p < 0.001$). Follow-up t-tests showed a significant difference between groups at baseline and post-survey, however the change among people with a disability had a steeper slope (See Figure 6).

Fall-related Activity Restriction

Between-group analysis showed a statistically significant effect of disability status on FAR change post-program after controlling for implementation site type, U.S. geographic region, program type, age, gender, ethnicity, race, education, and health care referral [$F(1,12655) = 178.48$, $p < .001$]. Contrary to the a priori hypothesis, older adults with a disability had a significantly greater change in FAR ($M = 0.46$, $SD = 1.35$) compared to older adults without a disability ($M = 0.14$, $SD = 1.22$), with a mean difference of 0.32, 95% CI [0.27, 0.36], $t(12665) = 13.68$, $p < 0.001$. Follow-up t-tests showed a significant difference between groups at baseline and post-survey, however the change among people with a disability had a steeper slope (See Figure 7).

Falls Self-Efficacy

Between-group analysis showed a statistically significant effect of disability status on FAR change post-program after controlling for implementation site type, U.S. geographic region, program type, age, gender, ethnicity, race, education, and health care referral [$F(1,12655) =$

145.52, $p < .001$]. Contrary to the a priori hypothesis, older adults with a disability had significantly greater change in FSE scores ($M = 0.54$, $SD = 0.65$) compared to older adults without a disability ($M = 0.40$, $SD = 0.63$), with a mean difference of 0.13, 95% CI [0.11, 0.16], $t(12665) = 11.41$, $p < 0.001$). Follow-up t-tests showed a significant difference between groups at baseline and post-survey, however the change among people with a disability had a steeper slope (See Figure 8).

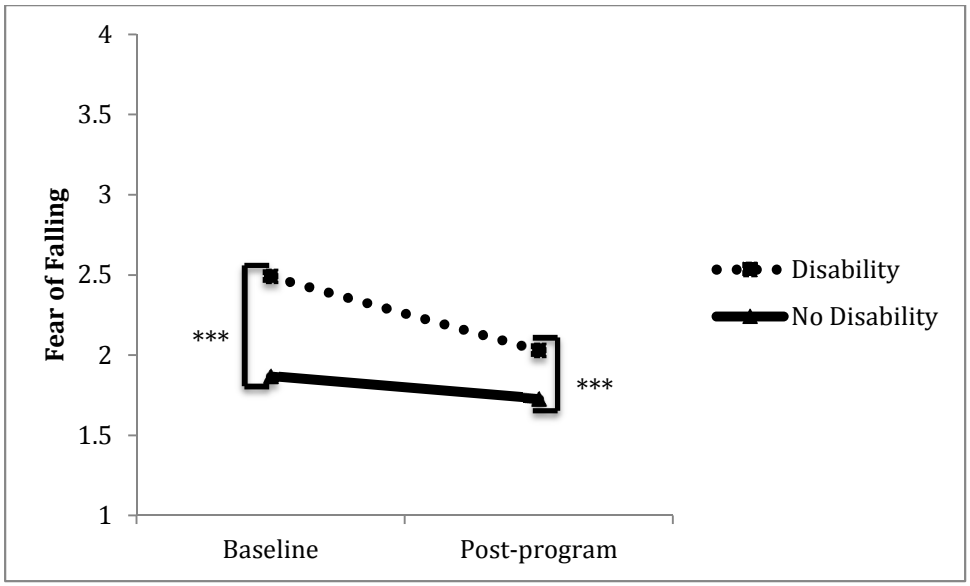

Figure 6.

Fear of Falling Scores at Baseline and Post-program by Disability Status

Note. *** $p < .001$ for between group comparisons by disability status.

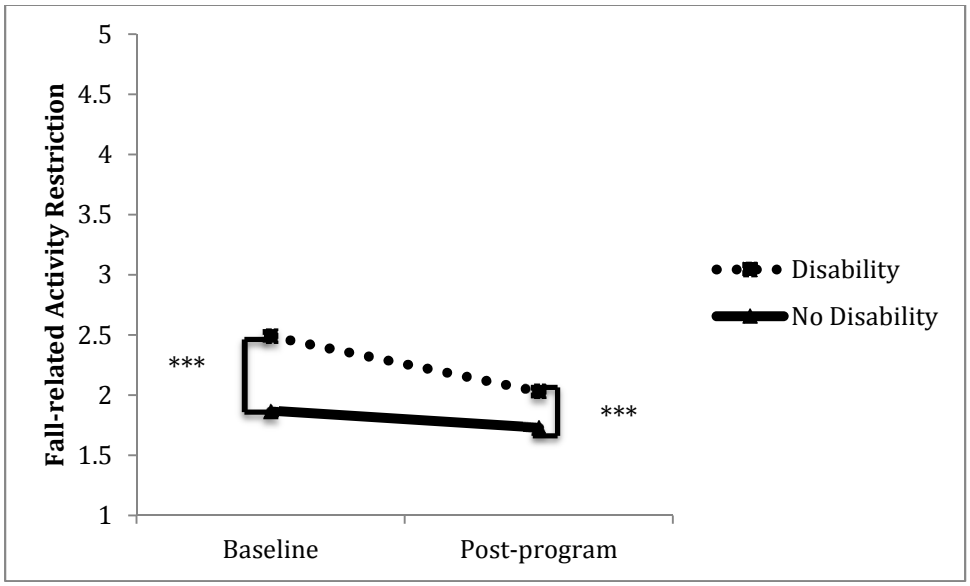

Figure 7.

Fall-related Activity Restriction Scores at Baseline and Post-program by Disability Status

Note. *** $p < .001$ for between group comparisons by disability status.

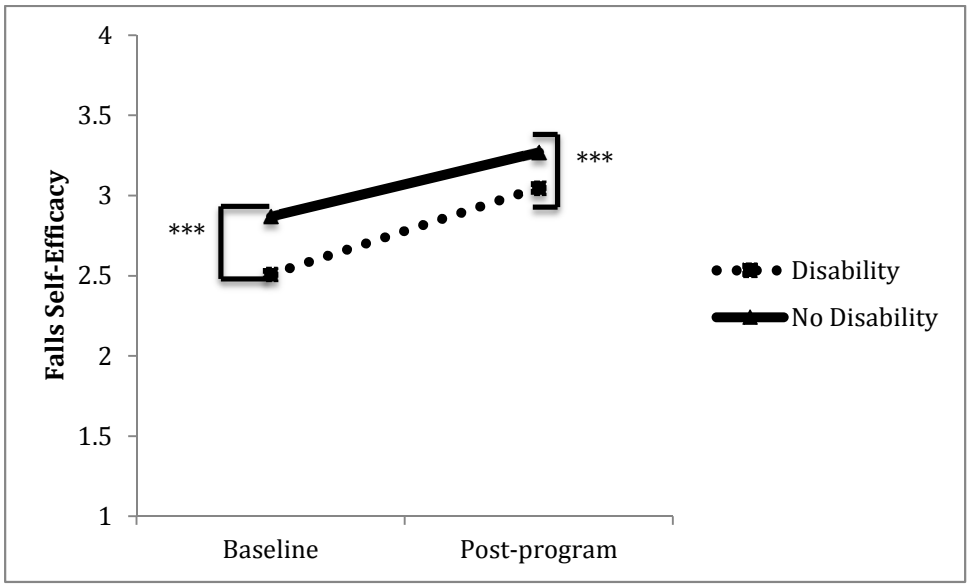

Figure 8.

Falls Self-Efficacy Scores at Baseline and Post-program by Disability Status

Note. *** $p < .001$ for between group comparisons by disability status.

Factors Contributing to Program Effectiveness

Fear of Falling

The final binary logistic regression model of factors contributing to low FOF post-program was statistically significant ($p < .001$), accounting for approximately 25% of the variance. Block 1 included baseline FOF score and accounted for the majority of the variation in post-program FOF score ($R^2 = 0.22$). Participants with high FOF at baseline were significantly less likely to report low FOF post-program ($OR = 0.36$, 95% CI [0.34, 0.38], $p < .001$). Subsequent blocks accounted for an additional 3% of the variation in post-program FOF score. As hypothesized, disability status uniquely contributed to the variation in FOF levels post-program, above and beyond baseline FOF score, individual- and organizational-level factors. Older adults with a disability were significantly less likely to report low FOF post-program compared to older adults without a disability ($OR = .94$, 95% CI [0.90, 0.98], $p < .01$). Other significant factors in the final model included: age, gender, racial minority status, general health, health care referral, U.S. geographic region, and program type (See table 7). As age increased, participants were significantly less likely to report low FOF post-program. Female participants were significantly less likely to report low FOF post-program compared to male participants. Racial minority participants were significantly more likely to report low FOF post-program compared to non-minority participants. As general health improved, participants were significantly more likely to report low FOF post-program. Participants who received a health care referral to attend the program were significantly more likely to report low FOF post-program compared to participants who did not receive a health care referral. Participants in the Northeast were significantly less likely to report low FOF post-program compared to participants

in the Midwest. Participants attending Stepping On were significantly less likely to report low FOF post-program compared to participants attending MOB.

Table 7.

Logistic Regression Analysis for Factors Contributing to Low FOF Post-Program (N = 12,667);

	Model 1		Model 2		Model 3		Model 4		Model 5	
Factor	*OR*	95%CI	*OR*	95%CI	*OR*	95% CI	*OR*	95% CI	*OR*	95% CI
Constant	29.54		24.04		22.71		20.80		19.07	
FOF Baseline	.33	.31, .35	.33	.32, .35	.35	.34, .37	.35	.34, .37	.36	.34, .38***
Age			.87	.84, .91	.86	.82, .89	.85	.82, .89	.85	.81, .89***
Gender										
Male										
Female			.96	.91, 1.01	.93	.88, .98	.92	.87, .97	.92	.87, .97**
Minority										
No										
Yes			1.22	1.08, 1.37	1.33	1.18, 1.50	1.24	1.09, 1.41	1.22	1.08, 1.39**
Lives Alone										
Yes										
No			1.00	.96, 1.04	1.01	.97, 1.05	1.00	.96, 1.05	1.01	.96, 1.05
Education			1.05	1.01, 1.09	1.01	.97, 1.05	1.01	.97, 1.06	1.02	.99, 1.07
# CC					.96	.92, 1.00	.97	.93, 1.01	.98	.94, 1.03
General Health					1.22	1.17, 1.28	1.23	1.17, 1.28	1.21	1.16, 1.27***
HC Referral										
Yes										
No					.92	.87, .97	.93	.88, .98	.94	.89, .99*
Site Type										
Federal										
Non-profit							1.07	.90, 1.28	1.07	.91, 1.27
Healthcare							.94	.78, 1.12	.94	.79, 1.12
Residential							1.02	.85, 1.22	1.02	.86, 1.22
Senior Center							1.05	.88, 1.24	1.04	.88, 1.23
Other							1.02	.84, 1.23	1.02	.86, 1.23

Table 7 Continued				β	95% CI	β	95% CI
Region							
Midwest							
South				.94	.84, 1.04	.91	.82, 1.01
Northeast				.82	.73, .93	.83	.74, .94**
West				1.01	.87, 1.16	1.02	.88, 1.18
Program							
MOB							
Stepping On				.80	.76, .85	.80	.76, .85***
Disability							
No							
Yes						.94	.90, .98**
R^2	.22	.23	.24	.25		0.25	

Note. *$p < .05$; **$p < .01$; ***$p < .001$; # CC = average number of chronic conditions; HC Referral = health care referral

Fall-related Activity Restriction

The final binary logistic regression model of factors contributing to low FAR post-program was statistically significant ($p < .001$), accounting for approximately 17% of the variance (See table 8). Block 1 included baseline FAR score and accounted for the majority of the variation in post-program FOF score ($R^2 = 0.22$). Participants with high FAR at baseline were significantly less likely to report low FAR post-program (*OR* = 0.36, 95% CI [0.34, 0.38], $p < .001$). Subsequent blocks accounted for an additional 3% of the variation in post-program FAR score. Contrary to the hypothesis, disability status did not uniquely contributed to the variation in FAR levels post-program. Significant factors in the final model included: age, gender, racial minority status, education, general health, health care referral, and program type. As age increased, participants were significantly less likely to report low FAR post-program. Female participants were significantly more likely to report low FAR post-program compared to male participants. Racial minority participants were significantly less likely to report low FAR post-program compared to non-minority participants. As education increased, participants were significantly more likely to report low FAR post-program. As general health increased, participants were significantly more likely to report low FAR post-program. Participants who received a health care referral to the program were significantly more likely to report low FAR post-program compared to participants who did not receive a referral. Participants attending Stepping On were significantly less likely to report low FAR post-program compared to participants attending MOB.

Table 8.

Logistic Regression Analysis for Factors Contributing to Low FAR Post-Program (N = 12,667)

	Model 1		Model 2		Model 3		Model 4		Model 5	
Factor	*OR*	95%CI	*OR*	95%CI	*OR*	95% CI	*OR*	95% CI	*OR*	95% CI
Constant	16.50		9.69		8.98		8.43		8.33	
FAR Baseline	.55	.53, .57	.55	.53, .57	.57	.50, .59	.57	.55, .59	.57	.55, .59***
Age			.83	.79, .87	.82	.78, .86	.82	.78, .86	.82	.78, .86***
Gender										
Male										
Female			1.09	1.03, 1.16	1.07	1.01, 1.14	1.07	1.01, 1.13	1.07	1.01, 1.13*
Minority										
No										
Yes			.66	.58, .75	.71	.62, .80	.70	.62, .80	.70	.61, .80***
Lives Alone										
Yes										
No			.96	.91, 1.00	.97	.92, 1.02	.97	.92, 1.02	.97	.92, 1.02
Education			1.15	1.10, 1.20	1.12	1.07, 1.17	1.12	1.07, 1.17	1.12	1.07, 1.18***
# CC					.98	.93, 1.02	.98	.93, 1.03	.98	.93, 1.03
General Health					1.19	1.13, 1.26	1.19	1.13, 1.26	1.19	1.13, 1.25***
HC Referral										
Yes										
No					.84	.79, .89	.83	.78, .88	.83	.78, .88***
Site Type										
Federal										
Non-profit							1.03	.82, 1.23	1.00	.82, 1.23
Healthcare							1.06	.86, 1.31	1.06	.86, 1.31
Residential							.95	.77, 1.17	.95	.76, 1.17
Senior Center							.99	.81, 1.21	.99	.81, 1.21
Other							1.06	.84, 1.33	1.06	.84, 1.32

Table 8 Continued

Logistic Regression Analysis for Factors Contributing to Low FAR Post-Program (N = 12,667)

					β	95% CI	β	95% CI
Region								
Midwest								
South					.97	.85, 1.10	.97	.85, 1.10
Northeast					1.15	.99, 1.33	1.15	.99, 1.33
West					.92	.78, 1.09	.92	.78, 1.09
Program								
MOB								
Stepping On					.93	.87, 1.00	.93	.87, 1.00*
Disability								
No								
Yes							.98	.93, 1.03
R^2	.13	.15	.16	.17			.17	

Note. **p* < .05; ***p* < .01; ****p* <.001; # CC = average number of chronic conditions; HC Referral = Healthcare Referral; MOB = A Matter of Balance.

Falls Self-Efficacy

The final binary logistic regression model predicting high FSE post-program was statistically significant ($p < .001$), accounting for approximately 24% of the total variance (See Table 9). As hypothesized, disability status uniquely predicted high FSE post-program. Older adults who self-reported a disability were less likely to report high FSE post-program compared to those who did not report a disability ($OR = 0.88$, 95% CI [0.80, 0.96], $p < .01$. These results remained statistically significant after controlling for baseline FSE score, demographic factors, health factors, and organizational factors. Other statistically significant factors in the final model included: baseline self-efficacy, age, racial minority status, education, general health and health care referral. Participants who reported high FSE at baseline were significantly more likely to report high FSE post-program. As age increased, participants were significantly less likely to report high FSE post-program. Racial minority participants were significantly more likely to report high FSE post-program compared to non-minority participants. As education increased, participants were significantly more likely to report high FSE post-program. As general health increased, participants were significantly more likely to report high FSE post-program. Participants who received a health care referral to the program were significantly more likely to report high FSE post-program compared to participants who did not receive a referral.

Table 9.

Logistic Regression Analysis for Factors Contributing to High FSE Post-Program (N = 12,667)

	Model 1		Model 2		Model 3		Model 4		Model 5	
Factor	*OR*	95%CI	*OR*	95%CI	*OR*	95% CI	*OR*	95% CI	*OR*	95% CI
Constant	.19		.14		.21		.20		.21	
FSE Baseline	6.96	6.01, 8.06	6.43	5.52, 7.48	5.58	4.76, 6.54	5.51	4.70, 6.46	5.32	4.53, 6.25***
Age			.69	.63, .76	.67	.61, .73	.68	.62, .74	.68	.62, .74***
Gender										
Male										
Female			1.04	.93, 1.17	1.00	.89, 1.13	1.01	.90, 1.13	1.00	.89, 1.04
Minority										
No										
Yes			1.24	.96, 1.59	1.35	1.05, 1.74	1.42	1.09, 1.86	1.39	1.06, 1.81*
Lives Alone										
Yes										
No			.92	.85, 1.01	.93	.85, 1.01	.95	.87, 1.04	.95	.87. 1.04
Education			1.17	1.08, 1.27	1.14	1.05, 1.23	1.13	1.04, 1.23	1.15	1.06, 1.24**
# CC					.94	.87, 1.03	.94	.86, 1.02	.96	.88, 1.05
General Health					1.33	1.20, 1.46	1.31	1.19, 1.45	1.29	1.17, 1.42***
HC Referral										
Yes										
No					.85	.77, .94	.85	.77, .94	.86	.77, .95***
Site Type										
Federal										
Non-profit							1.28	.89, 1.85	1.28	.89, 1.85
Healthcare							1.42	.98, 2.07	1.46	.98, 2.08
Residential							.91	.65, 1.29	.91	.64, 1.29
Senior Center							1.26	.90, 1.78	1.25	.89, 1.76
Other							1.20	.81, 1.79	1.20	.80, 1.78

Table 9 Continued

Logistic Regression Analysis for Factors Contributing to High FSE Post-Program (N = 12,667)

				β	95% CI	β	95% CI
Region							
Midwest							
South				.94	.75, 1.19	.94	.74, 1.18
Northeast				.84	.66, 1.08	.84	.65, 1.07
West				.87	.64, 1.19	.89	.66, 1.22
Program							
MOB							
Stepping On				.99	.87, 1.12	.99	.87, 1.12
Disability							
No							
Yes						.88	.80, .96**
R^2	.20	.22	.23	.24		.24	

Note. *$p < .05$; **$p < .01$; ***$p < .001$; # CC = average number of chronic conditions; HC Referral = Healthcare Referral; MOB = A Matter of Balance.

Discussion

This study examined program reach and effectiveness of two evidence-based falls prevention programs, MOB and Stepping On, in participants with and without a disability. High rates of attendance, completion, and overall effectiveness among community-dwelling older adults with and without a disability were demonstrated. On average, those with a disability attended the same number of sessions and were just as likely to complete the program compared to those without a disability. Both groups improved across all outcome measures, demonstrating program effectiveness, however older adults with a disability continued to report lower scores across the outcome measures when compared to older adults without a disability. Multiple factors significantly contributed to program completion, including: non-racial minority status, higher education, and attending the MOB program. Multiple factors also significantly contributed to program effectiveness, including: lower age, higher education, higher general health, receiving a health care referral to attend the program, and attending the MOB program. Overall, participants enrolled in these evidence-based falls prevention programs were able to significantly reduce falls risk factors, however the differences in effect post-program by disability status suggest the programs may need adaptations to fully meet the unique needs of older adults with a disability.

The current study found a high dose of the two programs by disability status once participants were enrolled. Dose includes program attendance, adherence, and completion (Mielenz et al., 2016). Previous studies examining the relationship between MOB attendance and dose found that those who attending five or more sessions had significant improvements in physical function and a reduction in falls risk factors (Smith et al., 2012). The current study expands on the literature by comparing those with and without a disability. These findings are

consistent with other researchers who have explored the relationship between falls prevention program dose and attendance and completion rates among community-dwelling older adults (Stineman et al., 2011; Smith et al., 2012).

The a priori hypothesis of the current study was that disability participants would have lower completion rates, based on increased co-morbidity, reduced physical function, and reduced access to prevention services (Rimmer, Riley, Wang, Rauworth, & Jurkowski, 2004; Okoro, Dhingra, & Li, 2014), which was not confirmed. Instead, the study results showed that older adults with a disability were able to maintain attendance throughout the program, suggesting that there was value in the programs that outweighed the known barriers of access. Others have found high attrition rates from physical activity falls prevention program (e.g., Tai Chi) among community-dwelling older adults who self-report mobility disability (Day et al., 2015). The results from the current study demonstrate that it is possible those who have the most to gain from the programs, such as community-dwelling older adults who self-report a disability, remain engaged throughout the length of the program. In a review of attendance and adherence rates of fall prevention programs, researchers found that adherence rates above 80% may result in greater fall risk reduction compared to lower adherence rates (Osho, Owoeye, & Armijo-Olivo, 2017), suggesting that those who attended and completed MOB and Stepping On were more likely to reduce fall risk factors.

The high dose of the programs among participants with and without a disability resulted in significant improvements in self-reported FOF, FAR, and FSE. Both groups obtained a similar amount of education in the small group setting of MOB and Stepping On. While older adults with a disability appear to show a greater improvement following the programs, there remained a significantly difference in post-program outcome measures when compared to older adults

without a disability. On average, older adults with a disability self-reported lower scores at baseline compared to those without a disability, suggesting that they had more room for improvement at the completion of the program. In a review of older adults perspectives on falls prevention programming, one major theme included the need for personal relevance (McMahon, Talley, & Wyman, 2011). It is possible the structure of MOB and Stepping On allows for individualization of the intervention to meet the needs of participants in the program, which makes the program more relevant. It is also possible that the role of supervision by a program leader and social support from the group contributed to the overall program effectiveness. Social support is a potential moderator in falls prevention programming, where programs with more social support show greater changes in falls self-efficacy (Fukukawa, Kozakai, Niino, Nishita, Ando, & Shimokata, 2008). MOB and Stepping On are supervised programs, with a trained program leader conducting each session. Supervision of evidence-based programs for older adults can have a significant effect on program outcomes (Shier, Trieu, & Ganz, 2016). Future studies will need to examine the relationship between program completion, effectiveness, supervision, and social support and how these factors can reduce fall risk factors among older adults with a disability.

The current study found a significant improvement in FOF from baseline to post-program, irrespective of disability status, suggesting that, on average, participants who attended either MOB or Stepping On program were able to reduce their level of fear. FOF is highly prevalent among community-dwelling older adults (Scheffer et al., 2008). Older adults often discuss FOF as prominent theme when ask about perceptions of falls, which leads to the restriction or ceasing of activities as a result of their fear (Denkinger et al., 2015). Several studies have shown the association between fear of falling and gait stability, leg strength, and balance

performance (Toebes, Hoozemans, Furrer, Dekker, & van Dieen, 2015; Cho et al., 2015). The current study found significantly reduced FOF rates within both groups of older adults, displaying high effectiveness in a prevalent falls risk factor and adds to the FOF literature by demonstrating similar rates of improvement of FOF scores at post-program among community-dwelling older adults who self-report a disability compared to those without a disability.

This study also found significant improvements in self-reported FAR and FSE. These findings are consistent with others who have explored the effects of MOB and Stepping On (Ory et al., 2010; Towne et al., 2014; Zijlstra et al., 2009). A small study exploring predictive factors of fall-related outcomes among community-dwelling older adults participating in MOB found that those who self-reported FAR were five times more likely to attend all eight sessions offered, suggesting that it is possible those who self-restrict their activities view themselves as high-risk for falls and are more likely to benefit from fall prevention programming (Mielenz et al., 2017). In addition to confirming the effect of reduced FAR and the increased FSE following MOB and Stepping On, this study demonstrates program effectiveness among individuals with a disability when administered in community settings, outside of the controlled research environment, however more research is needed to explain why older adults with a disability continue to report higher FAR and lower FSE post-program when compared to older adults without a disability.

There were organizational- and individual-level differences by disability status that may inform future program recruitment and implementation strategies. Older adults with a disability were more likely to be male and live alone, yet they attended and completed the program at the same rate of those without a disability. Additionally, older adults with a disability were more likely to be referred to the program by a health care professional and were more likely to attend programs at health care organization implementation sites. Previous research has shown that

older adults with a disability are less likely to access and utilize optimal prevention services (Okoro, Denny, McGyure, Balluz, Goins, & Mokdad, 2007; Okoro, Dhingra, & Li, 2014; Reichard, Stolzle, & Fox, 2011). The current study suggests that MOB and Stepping On are two fall prevention programs that are able to reach and have a positive effect on this vulnerable population.

Overall results of the current study were positive, however participants who self-reported a disability were significantly less likely to report positive outcomes post-program. These results remained significant after controlling for a number of demographic and organizational-level factors. Participants with a disability reported higher rates of fear of falling and activity restriction post-program compared to those without a disability. Health care referral was a significant factor contributing to program completion and effectiveness. Participants who received a referral to attend the program were significantly more likely to report positive results following the program. It is possible that health care professionals are able to identify those at the greatest risk who are more likely to benefit from the program. It is also possible that the referral places extra accountability to the participant to attend and complete. Across the full sample, 16% of participants reported that they received a referral to the program from a healthcare provider. Over 20% of the participants who self-reported a disability received a referral, which may have contributed to the high attendance and effectiveness observed. More research is needed to explore the relationship between healthcare referral and participation in other falls prevention programs.

Policy Implications

Evidence-based falls prevention programs only reach a very small percentage of individuals who could potentially benefit from them. Despite strong evidence, there are very few

dedicated funding streams to support community-based organization implementing evidenced-based falls prevention programs, particularly for individuals aging with disabilities. Additional funding for the prevention and support for community-based organizations could significantly scale up the reach of evidence-based falls prevention programs. More work is needed to integrate evidence-based falls prevention programs into health care systems (Rimmer, Vanderbom, & Graham, 2016). The current study found that older adults with a disability were more likely to be referred to the program by a health care professional compared to older adults without a disability. This is a potential recruitment stream for program administers to reach a vulnerable population at a high risk for falls.

Limitations

This study is not without certain limitations that must be considered when results are interpreted. Disability status was self-reported and there is no way to distinguish between physical, mental, and emotional disability. The two programs examined may have different reach and effectiveness for different disability types. Similarly, chronic health conditions were reported in a sum total of conditions. Different conditions may have a different effect on attendance, completion, and program effectiveness. The study was a secondary data analysis and there was no data on recruitment protocols or strategies by grantee organizations implementing the evidence-based falls prevention program. Therefore, the current study was only able to examine older adults who registered for the programs and there is no information on the total number of older adults eligible for the programs that did not attend or enroll. The data examined was designed for administrative purposes and there was a large portion of post-program outcome data missing. It is unknown if the programs were effective for participants who did not attend the final session.Next, due to missing data, results cannot be generalized to participants who did not

attend the last session, however when missing data was removed the distributions of outcome measures and demographic characteristics were largely unchanged and there was a smaller percentage of older adults with a disability in the excluded group compared to participants included in the final sample. Finally, only two out of eight programs from the National Falls Prevention Database were evaluated, however the programs selected represented 80% of the total sample of community-dwelling older adults in the database. Future studies can expand on this research by examining the reach and effectiveness of the other evidence-based falls prevention programs offered by ACL grantees by disability status.

Conclusion

The results of the current study suggest that MOB and Stepping On are effective programs that are well attended by older adults with and without disabilities. Furthermore, these results show that despite reporting greater FOF and FAR, older adults with a disability were able to significantly reduce falls risk factors and improve their confidence. While older adults with a disability significantly improved across all outcome measures, disability status was a unique predictor of program effectiveness. Older adults with a disability were less likely to report positive outcomes post-program. Health care referral was also a significant factor contributing to program effectiveness. Older adults with a disability received a greater percentage of health care referrals and were more likely to participate in programs offered in healthcare organizations. Exploring the relationship between health care referral and disability status can expand this research.

Chapter 3

Impact of Evidence-based Falls Prevention Programs among Community-dwelling Older Adults who Identify as a Racial Minority

Abstract

Falls among community-dwelling older adults are a growing public health concerns and a greater incidence of falls are reported among racial minorities. Evidence-based falls prevention programs have been designed to reduce falls risk factors, yet information on the racial distribution of participants is often lacking. It is unknown to what extent current programs are able to reach racial minority older adults and whether the programs remain effective for racial minority groups when compared to non-minority older adults. The National Falls Prevention Database was used to compare the reach and effectiveness of two programs, A Matter of Balance (MOB) and Stepping On, by racial minority status. A total of 12,667 participants were included in the final analyses. Nearly 10% identified as a race other than white. Results showed that racial minorities were slightly less likely to attend (M = 0.87, SD = 0.15) the program compared to non-minorities (M = .88, SD = 0.14, p <.05). There were significant within-group differences by racial minority status. Minorities significantly reduced FOF (baseline M = 2.46, SD = 0.94; FOF post-program M = 2.21, SD = 0.86, p < .001). Non-minority participants also reduced FOF (baseline M = 2.62, SD = 0.84; FOF post-program M = 2.37, SD = 0.80, p < .001). Both groups significantly reduced FAR and improved FSE. There was a significant difference in FOF between racial minority and non-minority participants. Follow-up t-tests showed racial minority participants reported a significantly lower FOF at baseline and post-program compared to non-minority participants (p <.01). Factors contributing to increased program completion included

higher education and attending the MOB program. Factors contributing to increased effectiveness included higher baseline score, younger age, male gender, non-disability status, higher general health, receiving a health care referral, and attending the MOB program. In conclusion, both racial minority and non-minority participants benefitted from MOB and Stepping On by demonstrating high reach and effectiveness, however the number of racial minority participants did not represent that of the U.S. population of older adults. Future research is needed to understand factors associated with the disproportionate enrollment of racial minority participants in evidence-based falls programs.

Introduction

Falls and fall-related injuries among older adults are a growing public health challenge and disproportionally affect racial minority populations. Racial minority older adults represent a growing population, with projections of 21.1 million by the year 2030, accounting for 28.5% of the older adults population (Administration on Community Living, 2018). A high number of falls are reported among racial minorities (Quandt, Stafford, Bell, Smith, Snively, & Arcury, 2006; Reyes-Ortiz, Al, Loera, Ray, & Markides, 2004). Racial minorities report more co-morbid conditions that can influence their ability to participate in community programs (Goins, Tincher, & Spencer, 2003; Goins & Pilkerton, 2010). Few studies have examined the participation in evidence-based falls prevention programs among this high-risk population.

Falls are the leading cause of injury and death from injury among community-dwelling older adults and the rate of mortality has increased by an average of 3% from 2007 to 2016 (Burns & Kakara, 2018). Research suggests that, on average, one fourth of older adults will suffer a fall, and nearly 30% of these will result in an injury (Bergen, Stevens, & Burns, 2016;

Peel, 2011). Falls and fall-related injuries create a large economic burden on the healthcare system. In 2015, an estimated $50 billion were spent on treating falls and fall-related injuries among older adults and this number is expected to continue to rise with the growing aging population (Florence, Bergen, Atherly, Burns, Stevens, & Drake, 2018). Research has shown falls to be the result of known risk factors and can largely be prevented through modification of identified risk factors (Gillespie et al. 2012; Guirguis-Blake, Michael, Perdue, Coppola, & Beil, 2018).

Falls are largely caused by preventable risk factors, which can be physical, psychosocial, or environmental (Bergland, 2012). Over 400 different factors have been identified that can contribute to increased fall risk (Mausad & Morris, 2010). Examples of physical risk factors include poor balance, lower extremity weakness, and impaired vision (Ambrose et al. 2014). Psychosocial factors can include fear of falling, depression, anxiety, and low balance confidence (Boelens, Hekman, & Verkerke, 2013; Burnette et al., 2017; Cesari, Landi, Torre, Onder, Lattanzio, & Bernabei, 2002). Environmental factors include loose rugs around the home, poor lighting, or unsafe sidewalks (Gill, Williams, Robison, & Tinnetti, 1999; Lord, Menz, & Sherrington, 2006). These factors can be modified to reduce the risk of falling. Some factors at the individual-level are not modifiable and place groups of older adults at a greater risk than others. Increased age, female gender, racial identity, and fall history can all contribute to increased fall risk.

Racial minorities often report high levels of fear of falling (Scheffer, Schuurman, van Dijk, van der Hooft, & de Rooij, 2008). Research has shown that high levels of fear of falling can have serious consequences on quality of life, physical function, mental performance, and risk of falling in community-dwelling older adults (Li et al., 2003) The prevalence of fear of falling

varies largely (3 and 85%) among the general population of community-dwelling older adults (Scheffer et al., 2008). High scores on measures of fear of falling are highly correlated with fall-related activity restriction and isolation (Denkinger, Lukas, Nikolaus, & Hauer, 2015; Li et al. 2003). Furthermore, higher levels of fear of falling are correlated with reduced physical performance, such as reduced gait speed and stride length, increased duration of double support phase, and poor balance (Donoghue et al., 2013; Park et al., 2014), however few studies have explored the association between these falls risk factors and racial minority status.

Fall-related activity restriction and falls self-efficacy are highly correlated with fear of falling, however the pathway to balance and mobility impairment remains unclear (Allison, Painter, Emory, Whitehurst, & Raby, 2013). High levels of activity restriction or avoidance can have negative affects on physical performance and may be predictive of future falls (Delbaere, Crombez, Vanderstraeten, Willems, & Cambier, 2004). A systematic review of the factors associated with both fear of falling and associated activity restriction in community-dwelling older adults found few risk factors that were robustly associated with fear of falling, including female gender, physical function, and the use of a walking aid (Denkinger et al., 2014). Another study found an association between fear of falling, fall-related activity restriction, increased age, and disability status (Kempen, van Haastregt, McKee, Delbaere, & Zijlstra, 2009), however no information on racial distribution of the participants was reported.

Falls prevention programs have been developed to reduce falls risk factors among community-dwelling older adults and have been implemented widely across the United States. However, there is limited information on the reach and effectiveness of these programs among racial minority older adults living in the community. There is also limited information on whether racial identity uniquely contributes to program completion and effectiveness above and

beyond individual and organizational-level factors. Therefore the purpose of the present study was to compare the attendance, completion, and effectiveness of two evidence-based fall prevention programs between racial minority older adults and non-minority older adults.

Research Aims and Hypothesis

Aim #1: To describe and compare the reach (attendance and completion) of MOB and Stepping On between racial minority older adults and non-minority older adults.

Hypothesis Aim #1

There will be a statistically significant difference in program reach between racial minority older adults compared to non-minority older adults. Programs will have lower reach, as defined by lower attendance and fewer completers, among racial minority older adults compared to non-minority older adults.

Aim #2: To describe and compare the effectiveness of MOB and Stepping On between racial minority older adults and non-minority older adults.

Hypothesis Aim #2

There will be a significant difference in program effectiveness by racial minority status. Programs will be less effective, as defined by lower change score in measures of fear of falling (FOF), fall-related activity restriction (FAR), falls self-efficacy (FSE), among racial minority older adults compared to non-minority older adults.

Aim #3: To identify factors that contribute to the reach and effectiveness of MOB and Stepping On among older adults and to observe if racial minority status uniquely contributes to the overall variation in program reach and effectiveness.

Hypothesis Aim #3

Racial minority status will uniquely contribute to the variation in program reach and effectiveness above and beyond baseline scores, demographics, health-related, and organizational factors.

Methods

Database

Data from the National Falls Prevention Database, housed at the National Council on Aging (NCOA) Center for Healthy Aging was used to answer the research aims. These data include participant information collected by grantee organizations awarded Public Health and Prevention Fund (PHPF) grants from the Administration Community Living (ACL) to implement evidence-based fall prevention programs. Programs that received evidence-based status met the following requirements: 1) demonstrated effectiveness to reduce falls or fall-related risk factors; 2) evaluated using a randomized controlled trial or quasi experimental study with a control group; 3) published research findings in a peer-reviewed journal; 4) translated into the community setting; and 5) dissemination material available (ACL, 2017). As of December 2017, eight different falls prevention programs have met the criteria for evidence-based status, including: FallScape, MOB, Otago Exercise Programme, Stay Independent and Active for Life, Stay Safe Stay Active, Stepping On, Tai Chi for Arthritis, and Tai Ji Quan: Moving for Better Balance.

These data come from 24 states and six tribal organizations across all regions of the United States. Technical assistance is provided by NCOA to grantee organizations to assist with program implementation barriers and challenges. Grantee organizations are required to collect participant data and report back to ACL throughout the course of their two-year grant. Participants complete similar data collection forms at baseline and post-program, which include demographic characteristics (i.e., healthcare referral, current age in years, living arrangement, gender, ethnicity, race, education), health characteristics (i.e., chronic health conditions and general health status), fall risk (i.e., fall history, falls with injuries, fear of falling, fall-related

activity restriction, and falls self-efficacy). Data collection occurs during the first program session and the final program session (See Appendix for data collection forms).

Falls Prevention Programs

The current research project examined the reach and effectiveness of two evidence-based fall prevention programs by disability status: MOB and Stepping On. Both programs are comprised of small group sessions for a set number of weeks (eight weeks – MOB, seven weeks – Stepping On). Each session is dedicated to a specific modifiable risk factor associated with falls, as well as providing participants with recommended balance and strengthening exercises. Among the evidence-based programs approved by ACL, the majority of participants (81%) have joined either MOB or Stepping On. MOB and Stepping On are less physical intensive compared to other evidence-based fall prevention programs. MOB and Stepping On focus on group discussions and slowly introduce physical activity components to participants. Both programs have demonstrated effectiveness in the general population of community-dwelling older adults, however effectiveness among older adults with a disability has not been examined (Clemson et al., 2004; Tennstedt et al., 1998). Following is a brief review of each program.

A Matter of Balance

MOB was developed by the Roybal Center at Boston University (Tennstedt et al., 1998). This program is a cognitive-behavioral intervention that aims to reduce the fear of falling and increase physical activity among older adults at an increased risk for falls. Over the course of eight two-hour sessions delivered weekly, program participants learn that fear of falling is manageable and that a majority of falls can be prevented. Sessions include a minimum of eight and a maximum of 14 participants. The program emphasizes the importance of older adults building relationships with health care providers and developing the skills to communicate their

needs. In addition to managing fear of falling, participants learn exercises to increase strength and balance and are encouraged to set realistic goals to increase physical activity.

A randomized controlled trial of MOB showed program participants reported increased intent to exercise, improved mobility control, improved social function, and mobility range at 6 and 12-month follow-up compared to controls, however people with disabilities were excluded and the sample was 90.8% white with no other race categories identified (Tennstedt, et al., 1998). Research studies have examined the dissemination and implementation of MOB, demonstrating cost-effectiveness when implemented in community-settings (Coe, et al., 2017; Dauenhauer, Glose, & Watt, 2015; Ory, et al., 2010). The program has been show to significantly reduce fear of falling and improve falls self-efficacy and physical function of participants (Cho et al., 2014; Cho et al., 2015; Howland et al., 2015; Mielenz et al., 2017; Page et al., 2015; Smith et al., 2012). Instructors are required to complete an eight hour training, hold a current MOB coach certification, attend 2.5 hours of coach training update each year, and agree to hold two MOB sessions within one year of certification.

Stepping On

Stepping On was developed at the University of Sydney in Australia and was later brought to the United States, where the program was adapted for implementation in North America by researchers at the University of Wisconsin (Clemson et al., 2004). Through a small-group learning environment, Stepping On aims to improve falls self-efficacy, encourage behavior change, and reduce the number of falls experienced by community-dwelling older adults. The program consists of two-hour sessions conducted weekly for seven weeks, with an individual follow-up visit for each participant within three months after the last session by the

program instructor. Participants develop skills to explore risk-taking behavior and options to manage fall risk.

In a randomized trial of older adults who had recently experienced a fall or were concerned about falling, participants in the Stepping On group experienced a 31% reduction in falls compared to the control group, however people with disabilities were exclude and no participant data on race were provided (Clemson et al., 2004). Other research studies have evaluated the dissemination and implementation of Stepping On (Dattalo et al., 2017; Guse et al., 2015; Mahoney, 2015; Mahoney et al., 2016; Schlotthauer et al., 2017), the cost effectiveness of the program (Carande-Kulis et al., 2015), and the effectiveness to reduce fear of falling, improve falls efficacy, and improve physical function (Ford et al., 2017; Ory et al., 2014). Stepping On leaders are required to hold a current professional licensure or certification, including registered nurse, physical therapist, occupational therapist, social worker, fitness professional, or health educator with experience working with older adults. Additionally, Stepping On Leaders are required to have facilitated some kind of group program based on adult learning. Leaders must complete a 3-day training, conducted by Wisconsin Institute for Healthy Aging, its licensees, or Master Trainers.

Study Flow Diagram

A complete case analysis was conducted of community-dwelling older adults participating in MOB or Stepping On under a current or former ACL grantee organization. Participants were excluded if they did not participate in MOB or Stepping On, were younger than 50 years old, or if they did not have complete data across all variables (See Figure 9). Missing data was the primary reason for exclusion from the current study, however the proportions of participant characteristics were similar between those included and excluded (See Table 10).

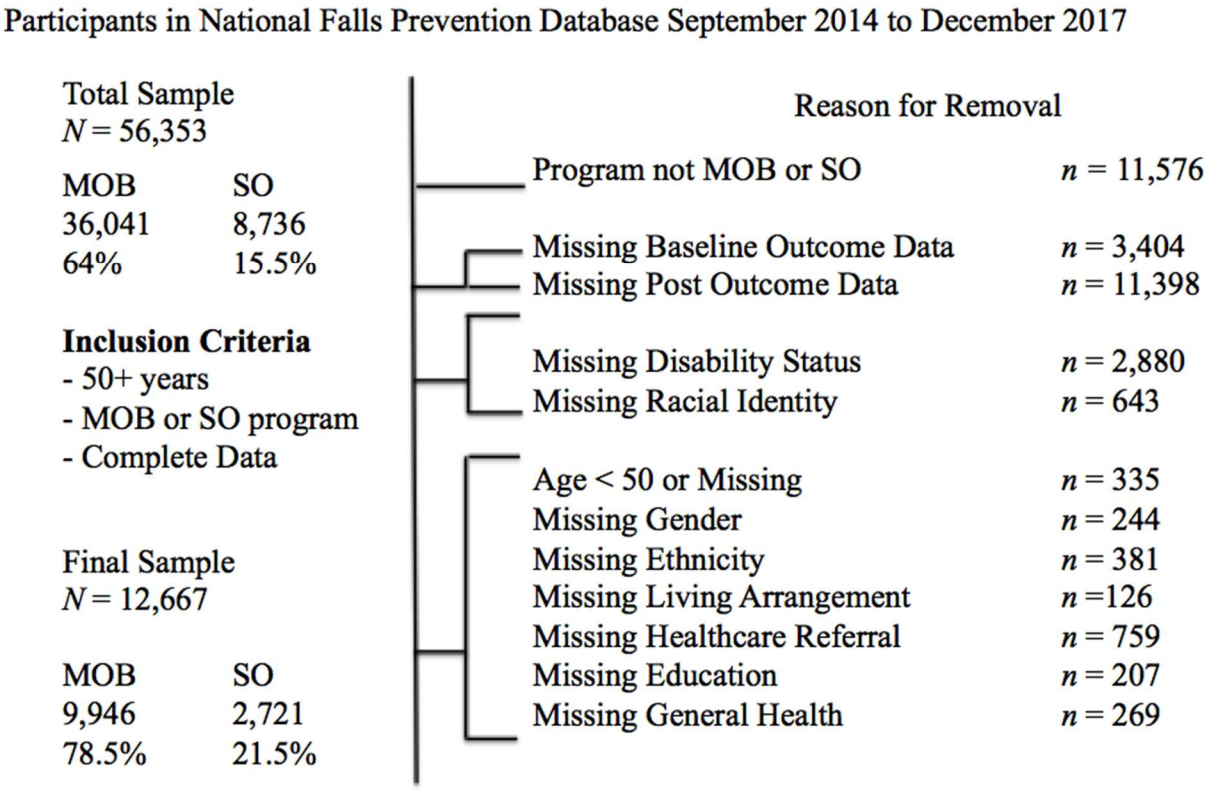

Figure 9.

Study Flow Diagram of Participants Who Met Inclusion Criteria in the National Falls Prevention Database.

Note. Figure represents a stepwise removal of participants who did not meet inclusion criteria. MOB = A Matter of Balance; SO = Stepping On.

Table 10.

Participant Descriptives in the National Falls Prevention Database who were Included or Excluded in the Final Analysis.

Factors	Total Sample *N*=56,353	Included *n*=12,667	Excluded *n*=43,686
Implementation Site Type			
Federal	3,137, 5.6	874, 6.9	2,263, 5.2
Non-profit	10,654, 18.9	2,691, 21.2	7,963, 18.2
Health care org.	7,527, 13.4	2,088, 16.5	5,439, 12.5
Residential Facility	11,256, 20.0	2,119, 16.7	9,137, 20.9
Senior Center	14,948, 26.5	3,456, 27.3	11,492, 26.3
Other	8,831, 15.7	1,439, 11.4	7,392, 16.9
U.S. Geographic Region			
Midwest	17,760, 31.5	4,759, 37.6	13,001, 29.8
Northeast	14,035, 24.9	2,394, 18.9	11,641, 26.6
South	17,810, 31.6	4,198, 33.1	13,612, 31.2
West	6,748, 12.0	1,316, 10.4	5,432, 12.4
Program Type			
FallScape	325, 0.6	-	325, 0.7
MOB	36,041, 64.0	9,946, 78.5	26,095, 59.7
Otago	162, 0.3	-	162, 0.4
Stay Safe, Stay Active	700, 1.2	-	700, 1.6
SAIL	145, 0.3	-	145, 0.3
Stepping On	8,736, 15.5	2,721, 21.5	6,015, 13.8
Tai Chi for Arthritis	4,085, 7.2	-	4,085, 9.4
Tai Ji Quan	6,159, 10.9	-	6,159, 14.1
Age (*n*=47,561)			
< 50	432, 0.9	-	432, 1.2
50-59	4,163, 8.8	240, 1.9	3,259, 9.3
60-69	15,419, 32.4	2,411, 19.0	11,128, 31.9
70-79	18,571, 39.0	5,217, 41.2	13,377, 38.3
80+	8,976, 18.9	4,799, 37.9	6,698, 19.2
Missing (*n*=8,792)			
Sex (*n*=49,256)			
Female	39,796, 80.8	10,208, 80.6	29588, 80.9
Male	9,460, 19.2	2,459, 19.4	7001, 19.1
Missing (*n*=7,097)			

Table 10 Continued.

Participant Descriptives in the National Falls Prevention Database who were Included or Excluded in the Final Analysis.

Race (*n*=43,380)			
Asian	1,114, 2.6	273, 2.2	841, 2.7
Black	3,250, 7.5	705, 5.6	2,545, 8.3
Hispanic	2,272, 5.2	679, 5.4	1,593, 5.2
Other	954, 2.2	201, 1.6	753, 2.5
White	35,790, 82.5	10,809, 85.3	24,981, 81.3
Missing (*n*=12,973)			
Live Alone (*n*=46,412)			
Yes	22,249, 47.9	6,007, 47.4	16,242, 48.1
No	24,163, 52.1	6,660, 52.6	17,503, 51.9
Missing (*n*=9,941)			
Education (*n*=41,736)			
Less than HS	1,721, 4.1	362, 2.9	1,359, 4.7
Some HS	1,914, 4.6	448, 3.5	1,466, 5.0
HS Grad or GED	10,244, 24.5	3,106, 24.5	7,138, 24.6
Some College	12,553, 30.1	4,020, 31.7	8,533, 29.4
College Grad	15,304, 36.7	4,731, 37.3	10,573, 36.4
Missing (*n*=14,617)			
Healthcare Referral (*n*=38,488)			
Yes	6,858, 17.8	2,041, 16.1	4,817, 18.7
No	31,630, 82.2	10,626, 83.9	21,004, 81.3
Missing (*n*=17,865)			
Disability Status (*n*=35,445)			
Yes	13,562, 38.3	5,068, 40.0	8,494, 37.3
No	21,883, 61.7	7,599, 60.0	14,284, 62.7
Missing (*n*=20,908)			
Cardiovascular Condition			
Yes	13,741, 24.4	4,215, 33.3	9,526, 21.8
No	42,612, 75.6	8,452, 66.7	34,160, 78.2
Sensory Condition			
Yes	7,057, 12.5	2,237, 17.7	4,820, 11.0
No	49,296, 87.5	10,430, 82.3	38,866, 89.0

Table 10. Continued

Participant Descriptives in the National Falls Prevention Database who were Included or Excluded in the Final Analysis.

Musculoskeletal Condition			
Yes	25020, 44.4	7513, 59.3	17507, 40.1
No	31333, 55.6	5154, 40.7	26179, 59.9
Cancer			
Yes	1,057, 1.9	320, 0.5	737, 1.7
No	55,296, 98.1	12,347, 97.5	42,949, 98.3
Rheumatic Condition			
Yes	552, 1.0	152, 1.2	400, 0.9
No	55,801, 99.0	12,515, 98.8	43,286, 99.1
Mental/Cognition Condition			
Yes	6,689, 11.9	1,806, 14.3	4,883, 11.2
No	49,664, 88.1	10,861, 85.7	38,803, 88.8
Respiratory Condition			
Yes	6,519, 11.6	1,940, 15.3	4,579, 10.5
No	49,834, 88.4	10,227, 84.7	39,107, 89.5
Brain/Nervous System Condition			
Yes	1,367, 2.4	421, 3.3	946, 2.2
No	54,986, 97.6	12,246, 86.7	42,740, 97.8
Digestive Condition			
Yes	397, 0.7	134, 1.1	263, 0.6
No	55,956, 99.3	9,811, 77.5	43,423, 99.4
Endocrine/Metabolic/Immune Condition			
Yes	9,790, 17.4	2,856, 22.5	6,934, 15.9
No	46,563, 82.6	9,811, 77.5	36,752, 84.1
Urinary Condition			
Yes	320, 0.8	109, 0.9	211, 0.5
No	56,033, 99.4	12,558, 99.1	43,475, 99.5
Other Condition			
Yes	18,461, 32.8	1,329, 10.5	17,132, 39.2
No	37,892, 67.2	11,338, 89.5	26,554, 60.8
General Health (n=42,416)			
Excellent	2,435, 5.7	709, 5.6	1,726, 5.8
Very good	12,478, 29.4	3,824, 30.2	8,654, 29.1
Good	20,132, 47.5	6,215, 49.1	13,917, 46.8
Fair	6,746, 15.9	1,796, 14.2	4,950, 16.6
Poor	625, 1.5	123, 1.0	503, 1.7
Missing (n=13,936)			

Table 10.

Participant Descriptives in the National Falls Prevention Database who were Included or Excluded in the Final Analysis.

Falls in past 3 months (*n*=38,286) Missing (*n*=18,067)	0.61 (1.83)	0.59 (1.77)	0.61 (1.86)
Falls with injuries (*n*=29,555) Missing (*n*=26,798)	0.20 (0.62)	0.20 (0.57)	0.20 (0.65)
Two or more falls past 3 months (*n*=38,286) Yes No Missing (*n*=18,067)	 11,788, 30.8 26,498, 69.2	 3,649, 31.2 8,036, 68.8	 8,136, 30.6 18,462, 69.4
Attendance (*n*=45,264) Missing (*n*=12,089)	0.74 (0.27)	0.88 (0.14)	0.69 (0.29)
Completer (*n*=45,264) Yes No Missing (*n*=11,089)	 35,160, 77.7 10,104, 22.3	 12,284, 97.0 383, 3.0	 22,876, 70.2 9,721, 29.8
FOF baseline (*n*=41,193) Missing (*n*=15,160)	2.53 (0.91)	2.61 (0.87)	2.50 (0.92)
FAR baseline (*n*=44,151) Missing (*n*=12202)	2.12 (1.21)	2.12 (1.18)	2.12 (1.22)
FSE baseline (*n*=44,584) Missing (*n*=11,951)	2.76 (0.92)	2.73 (0.89)	2.78 (0.93)

Note. Figures represent *n,* % or *M* (*SD*); excluded = all participants excluded for any reason (i.e., < 50 years old, programs other than MOB and Stepping On, incomplete data).

Outcome Measures

Racial Minority

Race and ethnicity were reported separately; ethnicity as Hispanic, Latino, or Spanish origin (yes/no). Race was collected using six race categories: American Indian/Alaska Native, Asian, Black or African American, Multiracial, Native Hawaiian/Pacific Islander, and White. Two racial minority variables were created for the analysis. First, a dichotomous racial minority variable was created which included Hispanic participants and all non-White race categories (Minority/White). Next, a categorical variable was created which included White, Black, Asian, Other, and Hispanic. Other racial identity group included participants who identified as American Indian/Alaska Native, Native Hawaiian/Other Pacific Islander, Multiracial, and Other. Approximately 10% of multiracial category selected a race combination that did not include American Indian/Alaska Native or Native Hawaiian/Other Pacific Islander.

Reach (Attendance and Completion)

Participant attendance was tracked at each session. Attendance percentage was calculated using the number of sessions attended divided by total number of sessions offered. Individuals were classified as completers and given a score of 1 if they had attended 5 of 8 sessions in a program, and classified as 0 otherwise. Previous studies have shown attendance to be an important indicator of evidence-based program reach and effectiveness (McGuire et al., 2013).

Fear of Falling (FOF)

FOF was measured by a single-item on a four-point Likert-type scale to the question "how fearful of falling are you?" ranging from 1 'not at all fearful' to 4 'a lot fearful'. This

item was collected using pre and post program surveys, with mean change scores and standard deviations reported. Higher scores indicated that the participant was more afraid of falling. This measure has been used in multiple studies as a simple way to evaluate change in FOF over time (Arfken et al., 1994; Cumming et al., 2000; Lachman et al., 1998; Murphy, Dubin, & Gill, 2003).

Falls-related Activity Restriction (FAR)

FAR was measured by a single-item on a five-point Likert-type scale to the question "During the last four weeks, to what extent has your concern about falling interfered with your normal social activities with family, friends, neighbors, or groups?" ranging from 1 'not at all' to 5 'extremely'. This item was converted into a continuous variable with mean change scores and standard deviations reported, with higher scores indicated greater FAR. FAR has been used previously in cross-sectional studies looking at the relationship between fear of falling and activity restriction (Mendes da Costa et al., 2012).

Falls Self-Efficacy (FSE)

FSE was measured using a subset of five questions related to perceived ability around fall prevention activities, adapted from the Falls Efficacy Scale (Yardley, Beyer, Hauer, Kempen, Piot-Ziegler, & Todd, 2005). Each item was measured on a four-point Likert-type scale of 1 'not at all sure' to 4 'very sure' and was converted into a continuous variable with mean change scores and standard deviations reported. Questions included ability to get up after a fall, ability to protect oneself during a fall, ability to find ways to reduce falls, ability to increase physical strength, and ability to become more steady on ones feet. Higher scores indicated a greater confidence in falls-related ability. This measure

has been used in similar studies of effectiveness of falls prevention programs (Smith, Jiang, & Ory, 2012).

Organizational-level Measures

Organizational-level measures included program site type and US geographic region. Site type indicates the venue in which the workshop was held, and classified into one of six types: federal, non-profit, health care organization, residential facility, senior center, or other. Organizations reported their address, city, state, and zip code, which was recoded by state into one of four regions: West, Midwest, Northeast, or South.

Individual-level Measures

Individual-level measures included a range of demographic factors, questions on falls and falls with injuries, healthcare provider referral, number and type of co-morbid condition, and self-reported general health status. Age was collected as current age in year, gender as male or female, and education reported on a 5-point scale from 1 'less than high school' to 5 'College graduate or higher'. Living arrangement was collected with the question "do you live alone?" (yes/no). Healthcare referral was collected with the question "have you been referred to the program by a healthcare professional?" (yes/no). Falls and falls with injuries were reported with means and standard deviations. Health-related measures included self-reported disability, general health, number of falls and falls with injuries in the past 3-months, and co-morbid conditions. Self-reported disability was reported at baseline with the question "are you limited in any activities because of physical, mental, or emotional problems" (yes/no). General health was reported at baseline and post-program using a single item with a five-point Likert-type scale 5 'excellent health' and 1 'poor health'. Falls and falls with injuries in the past 3 months were collected at baseline. A

recurrent falls variable was created to identify participants who suffered more than one fall in the past three months. Co-morbid conditions lasting for 3 months or longer were collected at baseline. Category options included: arthritis or other bone/joint problem, heart disease, breathing condition, glaucoma, depression, diabetes, heart condition, and other with the option to specify. All conditions in the 'other' category were hand-coded and discrete condition categories were created. All conditions were classified by body system consistent with ICD-10 coding scheme where applicable (WHO, 2010), resulting in the following categories: cardiovascular, respiratory, musculoskeletal, cancer, rheumatic, mental/cognition, sensory, brain/nervous, digestive, endocrine/immune/metabolic, urinary, and other (See Appendix for chronic condition coding scheme).

Statistical Analyses

Descriptive statistics and pre/post survey responses are reported for all participants, including age, gender, living arrangement, disability status, education, healthcare referral, and chronic health conditions organized by body system. Data is presented as a pooled total across the sample and stratified by dichotomous racial minority status. Outcome variables included continuous measures of attendance percentage, completer status, FOF, FAR, and FSE. Chi-square analyses were used to examine group differences of categorical variables by racial minority status. One-way ANOVA was used to examine group differences of continuous variables by racial minority status. Paired *t*-tests were used to test with-in group change from baseline to post-program across outcome measures by racial minority status. Analysis of Covariance (ANCOVA) was used to examine between group change scores across outcome measures by racial minority status. Covariates were selected based on chi-square analyses of organizational and demographic variables, including: program type, implementation site, region,

program start year, age, education, healthcare referral, disability, cancer, sensory condition, mental/cognition condition, brain/nervous system condition, digestive condition, endocrine/metabolic/immune condition, and other condition. Follow-up post-hoc *t*-tests examine between-group differences baseline and post-program.

To examine contributing factors for program completion and program effectiveness, multiple logistic regressions with sequential block entry were used. Using pre-established program completion criteria of attending five sessions or more, a completer variable was created (0 = completer, 1 = non-completer). To measure effectiveness post-program, a binary variable of high/low FOF post-program was created. Responses of 'a lot' or 'somewhat' were coded as 0 (negative outcome) and responses of 'not at all' and 'a little' were coded as 1 (positive outcome). Similar methods were used for FAR. A binary variable of how/low FAR post-program was created and responses of 'extremely' 'moderately' and 'quite a bit' were coded as 0 (negative outcome) and responses of 'not at all' and 'slightly' were coded as 1 (positive outcome). To measure FSE post-program, a binary variable was created and responses of 'not at all sure' and 'somewhat sure' were coded as 0 (negative outcome) and responses of 'very sure' and 'sure' were coded as 1.

To examine factors contributing to program completion, four blocks of factors were entered. Block 1 included age (standardized with *Z*-scores), gender (female/male), living arrangement (alone/not alone), disability (yes/no), and education (less than high school, some high school, high school graduate/GED, some college, college graduate). Block 2 included baseline self-reported general health (standardized with *Z*-scores), average number of chronic conditions, and healthcare referral (yes/no). Block 3 included dummy-coded implementation site type (federal as reference, non-profit, healthcare organization, residential facility, senior center,

and other), dummy-coded region (Midwest as reference, West, Northeast, and South), and program type (MOB/Stepping On). Block 4 included the categorical race variable (White as reference, Black, Asian, Other, and Hispanic).

To examine factors contributing to program effectiveness, five blocks of factors were entered. Block 1 included the baseline score of each respective outcome measure. Block 2 included age (standardized with *Z*-scores), gender (female/male), living arrangement (alone/not alone), disability (yes/no), and education (less than high school, some high school, high school graduate/GED, some college, college graduate). Block 3 included baseline self-reported general health (standardized with *Z*-scores), average number of chronic conditions, and healthcare referral (yes/no). Block 4 included dummy-coded implementation site type (federal as reference, non-profit, healthcare organization, residential facility, senior center, and other), dummy-coded region (Midwest as reference, West, Northeast, and South), and program type (MOB/Stepping On). Block 5 included the categorical race variable (White as reference, Black, Asian, Other, and Hispanic). All data were analyzed using SPSS statistical software (IBM Corp. Released 2016. IBM SPSS Statistics for Windows, Version 19.0. Armonk, NY: IBM Corp).

Results

A complete case analysis was conducted on a final sample of 12,667 community-dwelling older adults who enrolled in MOB or Stepping On. The majority of participants joined MOB (79%) compared to Stepping On (21%). Sessions took place in a variety of settings including federal, non-profit, and healthcare organizations, residential facilities, senior centers, and others (i.e. tribal centers). Programs were held across the United States, with the majority located in the Midwest (38%) and the South (33%). Participants were, on average, 76 years old. The majority of participants were White (90%), well educated (69% with at least some college), who identified as female (81%). Approximately 16% of participants received a referral from a healthcare professional to attend the falls prevention program. Common chronic conditions listed included musculoskeletal, cardiovascular, and sensory. See Tables 11 and 12 for organizational and individual-level descriptive variables, respectively.

Group differences were examined by racial minority status for organizational and individual-level descriptive variables. Of the total sample, nearly 10% (n = 1,213) identified as a race other than white. At the organizational-level, racial minority participants were significantly more likely to enroll in MOB and less likely to enroll in Stepping On compared to white participants. Racial minority participants were significantly more likely to attend programs held at residential facilities, senior centers, and other types of facilities, and less likely to attend programs at federal, non-profit, and health care organizations. Regionally, racial minority participants were significantly more likely to attend programs in the South and the Northeast, and were significantly less likely to attend programs in the Midwest.

Table 11.

C*omparison of Program Site Type and US Geographic Region by Racial Minority Status of Participants Enrolled in MOB or Stepping On in the National Falls Prevention Database.*

Organizational-level Factors	Total Sample N = 12,667	White n = 11,454	Racial Minority n = 1,213
Program Name			
MOB	78.5	76.9	93.5***
Stepping On	21.5	23.1	6.5***
Implementation Site Type			
Federal	6.9	7.3	3.5***
Non-profit	21.2	21.7	17.3***
Healthcare Organization	16.5	17.2	9.7***
Residential Facility	16.7	16.2	21.2***
Senior Center	27.3	26.8	32.2***
Other	11.4	10.9	16.1***
US Geographic Region			
Midwest	37.6	40.1	13.5***
Northeast	18.9	18.5	22.3***
South	33.1	30.9	53.8***
West	10.4	10.3	10.4

Note. *** $p < .001$ Federal = Area Agency on Aging (AAA), County Health Department, Municipal Government, State Health Department, State Unit on Aging; Non-profit = Community Center, Educational Institution, Faith-base Organization, Library, Other = Multipurpose Social Services Organization, Other, Recreational Organization, Workplace Regions designated by United States Census Bureau (U.S. Census, 2010); MOB = A Matter of Balance.

Table 12.

Individual-level Demographic and Health Characteristics by Racial Minority Status of Participants in MOB or Stepping On in the National Falls Prevention Database.

Individual-level Factors	Total Sample *N* = 12,667	White *n* = 11,454	Racial Minority *n* = 1,213
Age	76.53 (8.25)	76.89 (8.11)	73.08 (8.74)***
Gender			
Male	19.4	19.5	18.7
Female	80.6	80.5	81.3
Living Arrangement			
Alone	47.4	47.3	48.1
Not Alone	52.6	52.7	51.9
Education			
Less than HS	2.9	2.4	7.3***
Some HS	3.5	2.9	9.6***
HS Graduate or GED	24.5	24.9	20.6***
Some College	31.7	31.9	30.0
College Graduate	37.3	37.9	32.5***
Healthcare Referral			
Yes	16.1	15.5	22.3***
No	83.9	84.5	77.7***
Disability			
Yes	40.0	40.7	33.9***
No	60.0	59.3	66.1***
General Health			
Excellent	5.6	5.9	3.1***
Very Good	30.2	31.3	19.8***
Good	49.1	49.1	48.7
Fair	14.2	12.9	26.4***
Poor	1.0	0.9	2.0*
Falls past 3 months	0.59 (1.77)	0.60 (1.56)	0.54 (3.20)
Injuries from falls past 3 months	0.20 (.57)	0.20 (.57)	0.18 (.51)
Average # Chronic Conditions	1.81 (1.17)	1.80 (1.16)	1.85(1.22)
Chronic Conditions			
Cardiovascular	33.3	33.3	32.6
Respiratory	15.3	15.3	15.0
Musculoskeletal	59.3	59.5	57.7
Cancer	2.5	2.7	0.6*
Rheumatic	1.2	1.2	0.7

Table 12. Continued.

Individual-level Demographic and Health Characteristics by Racial Minority Status of Participants in MOB or Stepping On in the National Falls Prevention Database.

Mental/Cognition	14.3	14.5	12.0***
Sensory	17.7	17.4	20.1
Brain/Nervous	3.3	3.5	1.4***
Digestive	1.1	1.1	0.5*
Endocrine/Metabolic	22.5	21.2	35.3***
Urinary	0.9	0.8	1.0
Other	10.5	10.7	8.5***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; HS = high school; recurrent fall = 2 or more falls in last 3 months; See Appendix for full description of conditions included in each chronic condition category.

Reach by Racial Minority Status

On average, racial minority participants had a slightly lower total percentage of sessions attended ($M = 86.58$, $SD = 0.15$) compared to white participants ($M = 88.24$, $SD = 0.14$). This mean difference, -0.017, 95% CI [-0.02, -0.01], was statistically significant $t(12665) = -3.94$, $p < .001$. The association between attendance percentage and racial minority status remained statistically significant after controlling for organizational and demographic covariates: program type, implementation site type, region, program start year, age, ethnicity, education, healthcare referral, disability status, mental/cognition, brain/nervous system, digestive, endocrine/metabolic/immune, and other chronic conditions. The covariate age ($p = 0.001$), healthcare referral ($p = 0.05$), and mental/cognition chronic condition ($p = 0.008$) were significantly associated with attendance percentage. Program completion rates were high between both groups. A total of 1,174 (96.8%) racial minority participants and 11,110 (97.0%) white participants completed the programs.

The final logistic regression model predicting program completion was statistically significant, $p < .001$, accounting for 3% of the variation in completion (See Table 13). As hypothesized, racial identity was a significant predictor of program completion. Participants who identified as Black were significantly less likely to complete the program compared to those who identify as White ($OR = 0.60$, 95% CI [0.38, 0.93], $p < .05$). Education and program type were also significant predictors in the final model. As education increased, participants were significantly more likely to complete the program. Participants who enrolled in MOB were significantly more likely to complete the program compared to participants enrolled in Stepping On.

Table 13.

Logistic Regression Analysis of Factors Contributing to Completion of MOB or Stepping On (N =12,667)

	Model 1		Model 2		Model 3		Model 4	
Factor	*OR*	95%CI	*OR*	95% CI	*OR*	95% CI	*OR*	95% CI
Constant	32.07		18.05		11.30		12.18	
Age	1.02	.92, 1.14	1.02	.92, 1.23	1.02	.92, 1.13	1.00	.90, 1.11
Gender								
Male								
Female	1.02	.89, 1.16	1.02	.89, 1.17	1.01	.88, 1.16	1.01	.88, 1.16
Disability								
No								
Yes	.92	.83, 1.01	.93	.84, 1.05	.96	.86, 1.07	.95	.85, 1.06
Lives Alone								
Yes								
No	1.01	.91, 1.13	1.02	.91, 1.13	1.01	.90, 1.12	1.01	.91. 1.12
Education	1.15	1.05, 1.27	1.15	1.04, 1.27	1.17	1.06, 1.30	1.15	1.04, 1.28**
# CC					.93	.84, 1.04	.93	.84, 1.04
General Health					1.02	.91, 1.14	1.00	.89, 1.13
HC Referral								
Yes								
No					1.02	.89, 1.18	1.03	.90, 1.19
Site Type								
Federal								
Non-profit							1.08	.72, 1.61
Healthcare Org.							1.44	.95, 2.18
Residential							1.34	.87, 2.06
Senior Center							1.46	.97, 2.18
Other							1.06	.68, 1.64

Table 13 Continued.

Logistic Regression Analysis of Factors Contributing to Completion of MOB or Stepping On (N =12,667)

			β	95% CI	β	95% CI
Region						
	Midwest					
	South		1.12	.84, 1.51	1.24	.91, 1.69
	Northeast		.98	.70, 1.38	.99	.70, 1.40
	West		1.08	.77, 1.51	1.12	.80, 1.56
Program						
	MOB					
	Stepping		.65	.57, .75	.64	.56, .74***
	On					
Race						
	White					
	Black				.60	.38, .93*
	Asian				.84	.40, 1.76
	Other				1.04	.46, 2.39
	Hispanic				.72	.45, 1.16
R^2	0.003	0.01	.028		0.03	

Note. * $p < .05$; ** $p < .01$; *** $p < .001$; # CC = average number of chronic conditions; HC Referral = health care referral; MOB = A Matter of Balance; Other Race = American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, and Multiracial.

Within-Group Effectiveness by Racial Minority Status

Fear of Falling (FOF)

Within group tests showed that racial minority and non-minority participants significantly improved, across all outcome measures from baseline to post-program, demonstrating program effectiveness. Racial minority participants reduced FOF (baseline $M = 2.46$, $SD = 0.94$; post-program $M = 2.21$, $SD = 0.86$). This change, 0.25, 95% CI [0.19, 0.30] was statistically significant $t(1212) = 9.14$, $p < 0.001$. Non-minority participants also reduced FOF (baseline $M = 2.62$, $SD = 0.84$; post-program $M = 2.37$, $SD = 0.80$), and the change in scores, 0.25, 95% CI [0.24, 0.27] was significant $t(11453) = 33.11$, $p < 0.001$.

Fall-related Activity Restriction (FAR)

Both groups also reported significant reduction in FAR from baseline to post-program. Racial minority participants reported an average rating of 2.12 ($SD = 1.21$) at baseline and reduced to an average rating of 1.97 ($SD = 1.16$), which was a significant change of 0.15, 95% CI [0.08, 0.23], $t(1212) = 3.83$, $p < .001$. Non-minority participants also reported a significant change in FAR, baseline $M = 2.12$, $SD = 1.18$, post-program $M = 1.84$, $SD = 1.10$, change = 0.28, 95% CI [0.26, 0.30], $t(11453) = 23.72$, $p < .001$.

Falls Self-Efficacy (FSE)

Finally, there were significant within group differences in FSE among both racial minority and non-minority participants. Racial minority participants reported an average rating of 2.71 ($SD = 0.78$) at baseline and increased to an average rating of 3.22 ($SD = 0.62$) at post-program, which was a significant change of 0.52, 95% CI [0.48, 0.56], $t(1212) = 26.12$, $p < .001$. Non-minority participants also improved significantly in FSE rating from baseline ($M = 2.73$, SD

= 0.69) to post-program (M = 3.18, SD = 0.61), with a change of 0.45, 95% CI [0.44, 0.46], $t(11453) = 75.62$, $p < .001$.

Between-Group Effectiveness by Racial Minority Status

Fear of Falling (FOF)

Racial minority participants reported significantly lower fear of falling at baseline (M = 2.46, SD = 0.95) compared to non-minority participants (M = 2.62, SD = 0.86), with a mean difference of -0.17, $t(1433.20) = -5.83$, $p <.001$. This difference remained at post-program, with minority participants reporting significantly lower fear of falling (M = 2.21, SD = 0.86) compared to non-minority participants (M = 2.37, SD = 0.80), a difference of -0.16, $t(1445.52)$ = -5.99, $p < .001$. However, there was no significant difference between mean change scores from baseline to post-program by racial minority status (See Figure 10).

Fall-related Activity Restriction (FAR)

There was no difference in FAR by racial minority status at baseline ($p > .05$). Both racial minority and non-minority participants reported an average score of 2.12 (SD = 1.21, 1.18) at baseline. Following the program, non-minority participants reported significantly lower score (M = 1.84, SD = 1.10) compared to minority participants (M = 1.97, SD = 1.16), a difference of 0.13, $t(1452.48) = 3.75$, $p < .001$. There was also a significantly different change from baseline to post-program between minority and non-minority participants. On average, racial minority participants had a significantly smaller change following the program compared to non-minority participants (See Figure 11).

Falls Self-Efficacy (FSE)

There was no difference in FSE by minority status at either baseline or post-program ($p >$ .05), however there was a significantly different average change from baseline to post-program.

On average, racial minority participants reported slightly lower FSE (M = 2.70, SD = 0.78) compared to non-minority participants (M = 2.73, SD = 0.69) at baseline and slightly higher FSE (M = 3.22, SD = 0.62) compared to non-minority (M = 3.18, SD = 0.61) at post-program. Racial minority participants had a significantly higher change in FSE (M = 0.52, SD = 0.69) compared to non-minority participants (M = 0.45, SD = 0.64), a difference of 0.07, t(1440.09) = 3.22, p = 0.001 (See Figure 12).

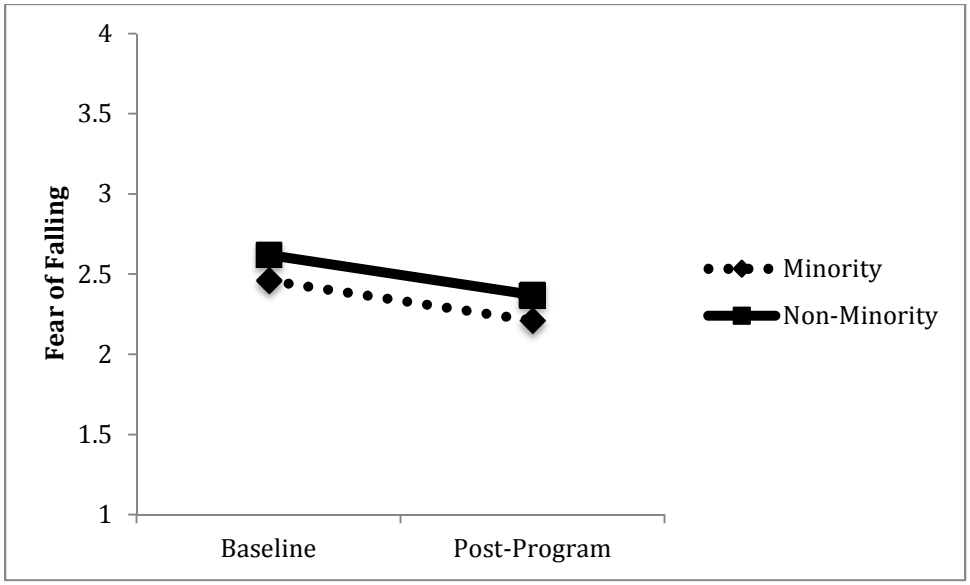

Figure 10.

Fear of Falling Scores at Baseline and Post-program by Racial Minority Status.

.

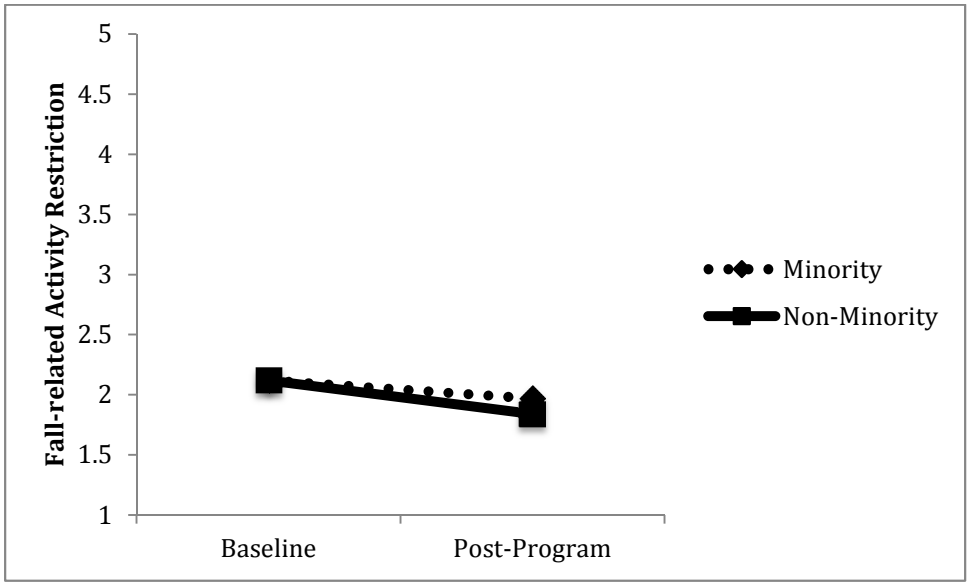

Figure 11.

Fall-related Activity Restriction Scores at Baseline and Post-program by Racial Minority Status

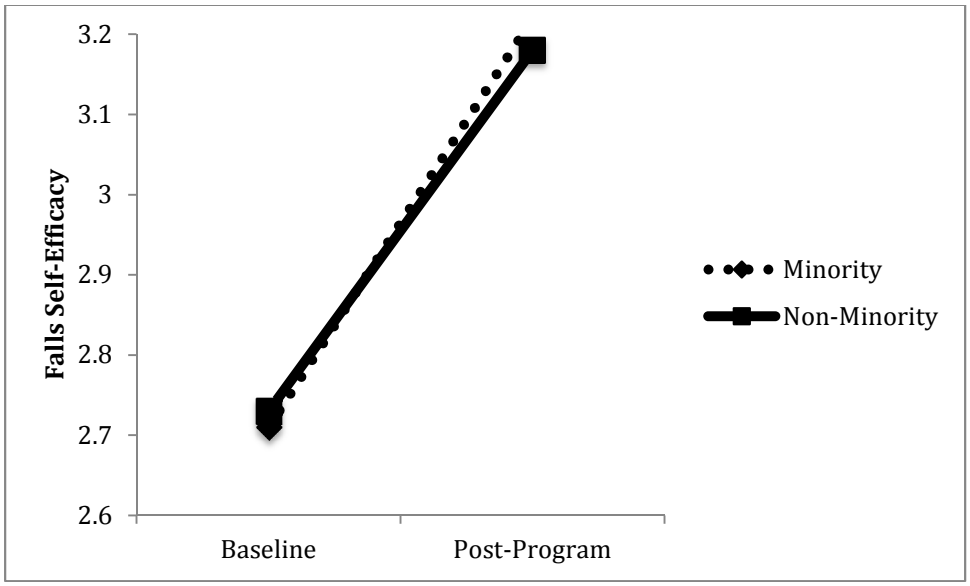

Figure 12.

Falls Self-Efficacy Scores at Baseline and Post-program by Racial Minority Status.

Factors Predicting Effectiveness

Fear of Falling

The final logistic regression model predicting low FOF scores post-program was statistically significant (p <.05), accounting for 25% of the variation in fear of falling (See Table 14). As hypothesized, racial identity significantly contributed to FOF scores post-program. Older adults who identified as Hispanic were significantly more likely to report low FOF post-program compared to White participants (OR = 1.82, 95% CI [1.49, 2.24], p < .001) after controlling for baseline FOF score, demographic factors, and organizational factors. Other statistically significant factors in the final model included: FOF at baseline, age, gender, disability status, general health, health care referral, geographic region, and program type were all significant predictors in the final regression model. Participants who report higher FOF scores at baseline were significantly less likely to report low FOF scores post-program. As age increased, participants were significantly less likely to report low FOF post-program. Female participants were significantly less likely to report low FOF post-program compared to male participants. Participants with a disability were significantly less likely to report low FOF post-program compared to participants without a disability. As general health improved, participants were significantly more likely to report low FOF post-program. Participants who received a health care referral were significantly more likely to report low FOF post-program compared to participants who did not receive a referral. Regionally, participants in the Northeast were significantly less likely to report low FOF post-program compared to participants in the Midwest. Participants in Stepping On were significantly less likely to report low FOF post-program compared to participants in MOB.

Table 14.

Logistic Regression Analysis for Factors Contributing to Low FOF Post-Program (N = 12,667)

	Model 1		Model 2		Model 3		Model 4		Model 5	
Factor	*OR*	95%CI	*OR*	95%CI	*OR*	95% CI	*OR*	95% CI	*OR*	95% CI
Constant	29.54		23.04		23.89		20.82		19.01	
FOF Baseline	.33	.31, .35	.34	.33, .36	.36	.34, .38	.36	.34, .38	.36	.34, .38***
Age			.86	.82, .89	.84	.81, .88	.84	.81, .88	.85	.81, .88***
Gender										
Male										
Female			.95	.90, 1.00	.92	.88, .97	.92	.87, .97	.92	.87, .97**
Disability										
No										
Yes			.88	.85, .92	.93	.89, .97	.93	.89, .97	.93	.89, .98**
Lives Alone										
Yes										
No			1.00	.96, 1.05	1.01	.97, 1.05	1.01	.97, 1.05	1.00	.96, 1.05
Education			1.04	1.00, 1.08	1.00	.96, 1.04	1.01	.97, 1.05	1.03	.99, 1.07
# CC					.97	.93, 1.01	.98	.94, 1.03	.98	.94, 1.03
General Health					1.19	1.14, 1.24	1.20	1.15, 1.26	1.21	1.16, 1.27***
HC Referral										
Yes										
No					.93	.88, .98	.94	.89, .99	.94	.89, .99*
Site Type										
Federal										
Non-profit							1.08	.91, 1.28	1.08	.91, 1.28
Healthcare							.94	.78, 1.12	.95	.79, 1.13
Residential							1.04	.87, 1.24	1.04	.86, 1.24
Senior							1.05	.89, 1.25	1.05	.88, 1.24
Center										
Other							1.03	.85, 1.25	1.04	.86, 1.25

Table 14 Continued

Logistic Regression Analysis for Factors Contributing to Low FOF Post-Program (N = 12,667)

				β	95% CI	β	95% CI
Region							
Midwest							
South				.97	.87, 1.08	.91	.82, 1.01
Northeast				.83	.73, .93	.83	.74, .94**
West				1.04	.90, 1.20	1.02	.88, 1.18
Program							
MOB							
Stepping				.80	.75, .85	.80	.76, .85***
On							
Race							
White							
Black						1.15	.95, 1.39
Asian						.85	.64, 1.13
Other						.84	.61, 1.15
Hispanic						1.82	1.49, 2.24***
R^2	0.22	.23	.24	.25		.25	

Note. * $p < .05$; ** $p < .01$; *** $p < .001$; # CC = average number of chronic conditions; HC Referral = health care referral; MOB = A Matter of Balance; Other Race = American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, and Multiracial.

Fall-related Activity Restriction

The final logistic regression model predicting low fall-related activity restriction (FAR) was statistically significant (p <.05), accounting for approximately 17% of the variation in FAR (See Table 15). In accordance with the a priori hypothesis, racial identity significantly contributed to variation in FAR scores post-program. These results remained significant after controlling for baseline fall-related activity restriction, health-related factors, demographic factors, and organizational factors. Participants who identified as Black were significantly less likely to report low FAR post-program compared to White participants (*OR* = 0.67, 95% CI [0.55, 0.82], p < .001). Participants who identified as Asian were significantly less likely to report low FAR post-program compared to White participants (*OR* = 0.69, 95% CI [0.51, 0.94], p < .05). Participants who identified as Other were significantly less likely to report low FAR post-program compared to White participants (*OR* = 0.69, 95% CI [0.49, 0.97], p < .05). Participants who identified as Hispanic were significantly less likely to report low FAR post-program compared to White participants (*OR* = 0.74, 95% CI [0.60, 0.90], p < .01). Other statistically significant factors in the final model included: baseline FAR score, age, gender, education, self-reported general health, health care referral, and program type were all significant factors in the final model. Participants who reported higher FAR scores at baseline were significantly less likely to report low FAR post-program. As age increased, participants were significantly less likely to report low FAR post-program. Female participants were significantly more likely to report low FAR post-program compared to male participants. As education increased, participants were significantly more likely to report low FAR post-program. As general health improved, participants were significantly more likely to report low FAR post-program. Participants who received a health care referral were significantly more likely to report

low FAR post-program compared to participants who did not receive a health care referral. Participants enrolled in Stepping On were significantly less likely to report low FAR post-program compared to participants enrolled in MOB.

Table 15.

Summary of Logistic Regression Analysis for Factors Contributing to Low FAR Post-Program (N = 12,667)

	Model 1		Model 2		Model 3		Model 4		Model 5	
Factor	*OR*	95%CI	*OR*	95%CI	*OR*	95% CI	*OR*	95% CI	*OR*	95% CI
Constant	16.46		7.59		7.60		7.59		8.28	
FAR Baseline	.55	.53, .57	.55	.53, .57	.57	.55, .60	.57	.55, .60	.57	.55, .59***
Age			.85	.81, .89	.84	.80, .88	.84	.80, .88	.82	.78, .86***
Gender										
Male										
Female			1.10	1.03, 1.16	1.07	1.01, 1.14	1.07	1.01, 1.14	1.07	1.01, 1.13*
Disability										
No										
Yes			.93	.89, .98	.99	.94, 1.04	.99	.94, 1.04	.98	.93, 1.03
Lives Alone										
Yes										
No			.96	.91, 1.01	.97	.92, 1.01	.97	.92, 1.02	.97	.92, 1.03
Education			1.19	1.14, 1.25	1.15	1.10, 1.20	1.15	1.10, 1.20	1.12	1.07, 1.18***
# CC					.98	.94, 1.03	.98	.94, 1.03	.98	.93, 1.03
General Health					1.21	1.15, 1.28	1.21	1.14, 1.27	1.19	1.13, 1.25***
HC Referral										
Yes										
No					.84	.79, .88	.82	.78, .87	.83	.78, .88****
Site Type										
Federal										
Non-profit							.99	.80, 1.21	1.00	.82, 1.23
Healthcare							1.06	.85, 1.30	1.06	.86, 1.31
Residential							.91	.74, 1.13	.95	.77, 1.17
Senior Center							.97	.80, 1.19	.99	.81, 1.21
Other							1.03	.82, 1.28	1.06	.84, 1.33

								β	95% CI	β	95% CI
Region											
	Midwest										
	South							.90	.80, 1.02	.97	.85, 1.10
	Northeast							1.12	.97, 1.30	1.15	.99, 1.33
	West							.88	.75, 1.04	.92	.78, 1.09
Program											
	MOB										
	Stepping							.94	.88, 1.01	.93	.87, 1.00*
	On										
Race											
	White										
	Black									.67	.55, .82***
	Asian									.69	.51, .94*
	Other									.69	.49, .97*
	Hispanic									.74	.60, .90**
R^2		.13		.15		.16		.16		.17	

Note. * $p < .05$; ** $p < .01$; *** $p < .001$; # CC = average number of chronic conditions; HC Referral = health care referral; MOB = A Matter of Balance; Other Race = American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, and Multiracial.

Falls Self-Efficacy

The final logistic regression model predicting high FSE post-program was statistically significant (p <.05), accounting for approximately 24 percent of the variation in FSE (See Table 16). Contrary to the a priori hypothesis, racial identity was a positive significant factor in the final model. Participants who identified as Black were significantly more likely to report high FSE post-program compared to White participants (OR = 2.57, 95% CI [1.36, 4.85], p < .01). Participants who identified as Hispanic were significantly more likely to report high FSE post-program compared to White participants (OR = 1.73, 95% CI [1.13, 2.66], p <.05). Other significant factors in the final model included: baseline FSE score, age, disability status, education, general health, and health care referral. Participants who reported higher FSE scores at baseline were significantly more likely to report high FSE post-program. As age increased, participants were significantly less likely to report high FSE post-program. Participants with a disability were significantly less likely to report high FSE post-program. As education increased, participants were significantly more likely to report high FSE post-program. As general health improved, participants were significantly more likely to report high FSE post-program. Participants who received a health care referral were significantly more likely to report high FSE post-program compared to participants who did not receive a referral.

Table 16.

Summary of Logistic Regression Analysis for Factors Contributing to High FSE Post-Program (N = 12,667)

	Model 1		Model 2		Model 3		Model 4		Model 5	
Factor	*OR*	95%CI	*OR*	95%CI	*OR*	95% CI	*OR*	95% CI	*OR*	95% CI
Constant	.19		.17		.25		.23		.19	
FSE Baseline	6.96	6.01, 8.06	5.93	5.08, 6.92	5.34	4.55, 6.26	5.28	4.50, 6.19	5.39	4.59, 6.33***
Age			.68	.62, .74	.65	.60, .71	.66	.61, .73	.67	.62, .74***
Gender										
Male										
Female			1.02	.91, 1.15	.99	.89, 1.11	.99	.89, 1.12	1.01	.90, 1.13
Disability										
No										
Yes			.82	.75, .89	.87	.80, .95	.87	.79, .95	.88	.80, .96**
Lives Alone										
Yes										
No			.93	.85, 1.01	.93	.85, 1.02	.95	.87, 1.04	.96	.86, 1.05
Education			1.17	1.08, 1.27	1.13	1.05, 1.22	1.12	1.04, 1.21	1.17	1.07, 1.27***
# CC					.96	.88, 1.05	.96	.88, 1.05	.97	.89, 1.06
General Health					1.28	1.16, 1.41	1.27	1.15, 1.40	1.30	1.18, 1.44***
HC Referral										
Yes										
No					.86	.78, .95	.86	.78, .95	.86	.78, .95**
Site Type										
Federal										
Non-profit							1.30	.91, 1.88	1.27	.88, 1.84
Healthcare							1.42	.98, 2.09	1.41	.97, 2.06
Residential							.95	.67, 1.33	.89	.63, 1.25
Senior Center							1.27	.90, 1.79	1.26	.90, 1.78
Other							1.24	.83, 1.84	1.19	.80, 1.77

Table 16 Continued

Summary of Logistic Regression Analysis for Factors Contributing to High FSE Post-Program (N = 12,667)

				β	95% CI	β	95% CI
Region							
	Midwest						
	South			1.00	.80, 1.26	.95	.75, 1.20
	Northeast			.86	.67, 1.10	.79	.61, 1.02
	West			.94	.69, 1.27	.87	.64, 1.19
Program							
	MOB						
	Stepping			.98	.87, 1.11	.99	.87, 1.12
	On						
Race							
	White						
	Black					.94	.65, 1.35
	Asian					2.57	1.36, 4.85**
	Other					1.11	.52, 2.34
	Hispanic					1.73	1.13, 2.66*
R^2	.20	.23	.24	.24		.24	

Note. * $p < .05$; ** $p < .01$; *** $p < .001$; # CC = average number of chronic conditions; HC Referral = Healthcare Referral; MOB = A Matter of Balance; Other Race = American Indian/Alaska Native, Native Hawaiian/Pacific Islander, and Multiracial.

Discussion

This study examined program reach and effectiveness of two falls prevention programs, MOB and Stepping On, among racial minority and non-minority participants. Overall, participants who enrolled in these federally supported evidence-based programs, demonstrated greater than 95% completion rates. A reduction of falls risk factors for both racial minority and non-minority community-dwelling older adults was also found. There were, however, differences in program effectiveness that warrant further investigation. For example, racial minority participants reported lower change in FAR compared to white participants.

The current study found relatively equal dose of the two programs by racial minority status once participants were enrolled, as defined by program attendance, adherence, and completion. These findings are consistent with other researchers who have explored the relationship between falls prevention program dose and attendance and completion rates among community-dwelling older adults (Stineman et al., 2011), however, Smith et al., (2012) found that ethnicity was a significant factor predicting program completion. Hispanic participants were significantly less likely to receive an adequate dose of MOB compared to non-Hispanic whites (Smith et al., 2012). The a priori hypothesis was that racial minority participants would have lower completion rates was confirmed for racial minority participants, however attendance and completion rates were high across the full sample. In a review of attendance and adherence rates of fall prevention programs, researchers found that adherence rates above 80% may result in greater fall risk reduction compared to lower adherence rates (Osho, Oweye, Armijo-Olivo, 2018), suggesting that those who attended and completed MOB and Stepping On were more likely to reduce fall risk factors.

The current results show that racial minority participants were able to receive an adequate dose of the programs. High attendance among racial minority and non-minority participants likely contributed to higher levels of effectiveness, shown by significant within-group improvements in self-reported FOF, FAR, and FSE. Both groups obtained a similar amount of education in the small group setting of MOB and Stepping On. There may be a dose-response between number of sessions attended and the effect of evidence-based falls prevention programs to reduce fall risk factors (Shubert, 2011).

The current study found a significant improvement in fear of falling from baseline to post-program, irrespective of racial minority status, suggesting that, on average, participants who attended either MOB or Stepping On sessions were able to reduce their level of fear. There is an association between fear of falling and gait stability, leg strength, and balance performance (Toebes, Hoozemans, Furrer, Dekker, & van Dieen, 2015), however, few studies have examined fear of falling by racial minority status. Wilson et al. (2005) found a high prevalence of fear of falling and related activity restriction among middle-aged African-American adults, with a trend of declining health as fear of falling increase. Similar results have been observed by other research groups, showing a significant association between fear of falling, fall rates, and lower-body function among middle-aged and older African Americans (Tiernan, Lysack, Neufeld, Goldberg, & Lichtenberg, 2014). The current study found similar rates of fear of falling post-program by racial minority status, demonstrating program effectiveness in a prominent falls risk factor. This study adds to the fear of falling literature by showing similar rates of improvement of fear of falling scores following participation in evidence-based falls prevention programs, irrespective of racial minority status.

This study also found significant improvements in self-reported falls-related activity restriction and falls self-efficacy. These findings are consistent with others who have explored the effects of MOB and Stepping On (Ory, Smith, Wafe, Mounce, Wilson, & Parrish, 2010; Towne et al., 2014; Zijlstra et al., 2009). In addition to confirming the effect of reduced fall-related activity restriction and increased falls self-efficacy following MOB and Stepping On, this study demonstrates program effectiveness among racial minorities when administered in community settings.

While there were minor differences in reach and effectiveness by racial minority status, there were significant differences in organizational and individual-level factors that could inform future program enrollment efforts. Racial minority participants were significantly more likely to attend MOB compared to Stepping On, however the programs were shown to be equally effective by minority status. There were also regional differences, with racial minority participants more likely to enroll in programs in the South compared to other parts of the county. Racial minority participants were significantly less likely to attend programs in federal, non-profit, and healthcare implementation sites, and were significantly more likely to attend programs in residential facilities, senior centers, and facilities categorized as 'other' (i.e., tribal centers). These results suggest that the program and implementation site type do not determine the program effectiveness, however older adult racial minority participants may be more likely to participate when there is easier access. Other studies of evidence-based falls prevention programs have found similar results (Kohn, Belza, Petrescu-Prahova, Miyawaki, & Hohman, 2014; Smith, Ory, Belza, & Altpeter, 2012; Yancey, Ory, & Davis, 2006). What has been successful in enrolling more racial minority populations is bringing the programs to where individuals of minority backgrounds activity congregate. A better understanding of regional

difference and implementation site variations in relation to participant characteristics can maximize future program planning.

Referral source may have contributed to increased enrollment, attendance, and program effectiveness by racial minority participants. Health care referral was a significant contributing factor determining program effectiveness in all final logistic regression models. Participants who received a referral were significantly more likely to report reduction in fall-risk factors compared to participants who did not receive a health care referral. The current study found that over 20% of racial minority participants were referred to the program by a health care professional. Even with the availability of the Centers for Disease Control and Prevention's *Stopping Elders Accidents, Deaths, and Injuries* (STEADI) toolkit (Lohman, Crow, DiMilia, Nicklett, Bruce & Batsis, 2017; Stevens & Phelan, 2013), which provides health care professionals with a step by step guide to falls risk screening, assessment and program referral, referrals remain low (Coe, St John, Hariprasad, Shankar, MacCulloch, Bettano, & Zotter, 2017; Kielich, Mackenzie, Lovarini, & Clemson, 2017; Smith et al., 2015). Health care providers are potential resource for participant recruitment and program sustainability. Results from the current study suggest that partnering with health care providers may increase the reach of programs to racial minority populations.

Few research studies have examined referral to evidence-based falls prevention programs (Snooks, Anthony, Chatters, Dale, Fothergill, Gaze, et al., 2017; Zozula, Carpenter, Lipsey, & Stark, 2016) and none focused on racial minority participants. Previous studies have largely focused on exercise prescription as a way to reduce fall risk, either at home or in a group setting (Day, Trotter, Hill, Haines, & Thompson, 2014; Shubert, 2011). However, not all community-dwelling older adults are prepared for exercise and this may result in an increase in fall risk, especially if high levels of fear of falling are reported (Sherrington et al., 2015). Many programs

that primarily focus on exercise have higher rates of attrition and lower completion when higher levels of fear of falling are reported (Kendrick et al., 2014; Kumar et al., 2016). MOB and Stepping On are education-based fall prevention interventions that slowly incorporate balance and strength exercises, making them less physical rigorous than other, more movement-based programs (e.g., Tai Chi Quan: Moving for Better Balance, Otago Exercise Programme). The attitudes, beliefs, and receptiveness of community-dwelling older adults around health care referrals to MOB and Stepping On are unknown. It is possible that referrals to programs like MOB and Stepping On will be better received by older adults compared to exercise-based programs. Future studies should explore these attitudes, as well as the association between health care professional referral and evidence-based falls prevention program attendance, completion, and effectiveness.

The percentage of racial minority participants attending the programs (10%) was well below the national average of 22% for adults aged 65 or older (US Census Bureau, 2016). The current study demonstrated that racial minority and non-minority older adults improved at similar rates, however data was only available for those who enrolled. There was a large difference in sample size between racial minority and non-minority participants accessing the programs. Future studies need to examine ways to increase recruitment and retention among racial minority older adults in evidence-based falls prevention programs.

The results of the current study have direct policy implications. Evidence-based falls prevention programs are able to reach diverse populations of community-dwelling older adults across the country (Towne et al., 2015). Additionally, these programs remain effective outside of the controlled research environment and have the ability to address important health disparities. Even with the growing cost to treat falls and fall-related injuries (Florence et al., 2018),

evidence-based falls prevention programs remain largely underfunded in the current national budget, and the Older American's Act (1987) provides limited reimbursement. Programs such as MOB and Stepping On have the potential to reduce health care care costs by reducing key fall risk factors (fear of falling, falls-related activity restriction) and preventing falls (Howland, Shankar, Peterson, & Taylor, 2015). Policymakers need to be made aware of these programs and the positive impact the programs have on the lives of their constituents.

Limitations

The results of the current study must be interpreted based on the limitations. The study was a secondary data analysis and there was no data on recruitment protocols or strategies by grantee organizations implementing the evidence-based falls prevention program. Therefore, the current study was only able to examine older adults who registered for the programs and there is no information on the total number of older adults eligible for the programs who did not attend or enroll. The data examined was designed for administrative purposes and there was a large portion of post-program outcome data missing. It is unknown if the programs were effective for participants who did not attend the final session. Missing data were examined and the demographic proportions did not change significantly however the results cannot be generalized to those who did not complete the post-program survey. Finally, only two evidence-based falls prevention programs were examined and results may not generalize to other falls prevention programs.

Conclusion

The results from the current study showed MOB and Stepping On to be two highly effective and well attended evidence-based falls prevention programs, irrespective of racial minority status. Both racial minority and non-minority participants demonstrated significant improvement in fall risk factors. Participants who received a health care referral to attend the program were significantly more likely to reduce fear of falling, reduce fall related-activity restriction, and improve falls self-efficacy. Racial minority participants received a large percentage of referrals compared to the full sample and were more likely to attend programs offered in residential facilities and senior centers. More research is needed to explore the relationship between program location, health care referral, racial minority status, and evidence-based falls prevention programs.

Chapter 4

Concluding Statements: Next Steps for Evidence-based Falls Prevention

The results of the current dissertation research demonstrated high reach and effectiveness of two evidence-based falls prevention programs among underrepresented populations of community-dwelling older adults. Older adults with a disability and racial minorities reported high rates of program attendance and completion of MOB and Stepping On when compared to participants who did not report a disability and non-racial minority participants. Similarly, participants benefitted from these programs by reducing fear of falling and activity restriction caused by concerns about falls, which are two common falls risk factors in older adults, however there were group differences in effect when comparing older adults with a disability to older adults without a disability. Older adults with a disability reported higher fear of falling and activity restriction post-program, which warrants further investigation. Participants also a demonstrated increased falls self-efficacy around fall prevention activities, empowering them to take action to prevent future falls, yet older adults with a disability reported lower falls self-efficacy post-program compared to older adults without a disability. It is possible these fall prevention programs need to be adapted to better meet the needs of all participants. These results can help inform future implementation of MOB and Stepping On to positively impact populations at a high risk for falls, however there are many more questions that need to be answered.

Health care referral was a significant factor contributing to program effectiveness, suggesting that those who received a referral from a health care professional were more likely to report positive change in falls risk factors compared to those who did not receive a referral. It is

unknown what is driving health care referrals to evidence-based falls prevention programs. Future research is needed to explore the geographic differences in health care referral rates. It is possible that health care providers in certain areas of the country are more likely to refer to programs compared to other regions. It is also possible that the type of health insurance of participants influences the rate of referrals. For example, older adults enrolled in certain Medicare Advantage plans or other capitated insurance programs may be more likely to receive a referral compared to those in traditional Medicare. Older adults with private, supplemental insurance may also be more likely to receive referrals compared to those without supplemental insurance. The type of health care organization or provider practice patterns may also change the number of referrals. Organizations that offer incentives or training to providers regarding referrals to evidence-based programs may have a larger number of participants enrolled compared to organizations that do not provide incentives or training for referrals. It will be important to explore these and other potential factors given the significant contribution of health care referral to the overall effectiveness of the evidence-based falls prevention program evaluated.

Study 1 demonstrated program effectiveness among older adults with a disability compared to older adults without a disability, however the disability type (i.e., physical, mental, emotional) was not specified. It remains unclear if there are differences in program reach and effectiveness by disability type. There is a need to understand which types of disabilities contribute to falls prevention program attendance, completion, and effectiveness. For example, older adults with cognitive impairment have an increased risk of falling compared to older adults without cognitive impairment (Amboni, Barone, & Hausdorff, 2013; Delbraere et al., 2012). As cognition declines, the risk of falling increases (Mirelman et al., 2012; Montero-Odasso,

Verghese, Beauchet, & Hausdorff, 2012). Similar to older adults who are not ambulatory, older adults with cognitive impairment are often excluded from research studies on falls prevention programs. It is not known whether older adults with cognitive impairments can benefit from the programs in their current form. It is possible that the programs need to be modified to meet the needs of older adults with cognitive impairments.

Study 2 found high program effectiveness across the different racial identities, however participants who identified as Asian, Black, Hispanic, and Other were less likely to report low activity restriction outcomes following the program compared to White participants. There is limited information on the reach of falls prevention programs among racial minorities (Reyes-Ortiz, Al, Loera, Ray, & Markides, 2004). The National Falls Prevention Action Plan was developed to guide the implementation and dissemination of evidence-based falls prevention programs across the country, with an emphasis on reaching underrepresented populations. Despite these efforts, there remains a lack of diversity across participants in the National Falls Prevention Database. Only 10% of the sample identify as a race other than White, which is below the national average of 22% of racial minority older adults (ACL, 2018). Both MOB and Stepping On are available in multiple languages, but it is unclear whether the program translations are able to convey the same information. Modifications may be needed to better meet the needs of racial minority older adults. There is a lack of information on the racial distribution of the program sessions and it is unclear if program administrators offer Spanish-speaking classes or if Hispanics participate in the programs mixed with other ethnic groups.

More information is needed on the transition between different health promotion activities once older adults have completed an evidence-based fall prevention program. Programs like MOB and Stepping On are designed for older adults who have high levels of fear of falling

and low balance confidence. Participants learn exercises to increase lower extremity strength and are encouraged to continue practicing the exercises at home. While fear of falling is a prominent falls risk factor, lower extremity weakness and slow gait speed can have a great impact on fall risk (Cho, Smith, Shubert, Jiang, Ahn, & Ory, 2015; Muir, Berg, Chesworth, Klar, & Speechley, 2010; Toebes, Hoozemans, Furrer, Dekker, & van Dieen, 2015). There is a lack of information on whether older adults continue into other evidence-based falls programs once they complete MOB or Stepping On, such as Tai Chi for Arthritis or Stay Active and Independent for Life (SAIL). These programs are more physically demanding than MOB and Stepping On and do not have a specified end date; rather participants are encouraged to attend on an ongoing basis, which may influence the type of older adult that chooses to attend the program. It is possible that once older adults are able to address one limiting factor (e.g., fear of falling), they are better equipped and prepared to address other factors (e.g., lower extremity weakness or chronic pain).

One large limitation to the current research was selection bias and the lack of randomization. Information was available only for older adults who enrolled in the programs. There was a lack of information on those who did not enroll, as well as a lack of information on recruitment and retention strategies by the grantee organizations. Older adults who self-select into evidence-based fall prevention programs may be different than those who do not self-select into programs and different than the general population of older adults. This limits the generalizability of the results to older adults enrolled in the program.

The next steps for research on these evidence-based fall prevention programs will involve: examining program effects by different disability types (e.g., older adults with cognitive impairment), examining the recruitment and enrollment strategies by different grantee organizations to increase the representativeness of the participants to match that of the U.S. older

adults population, and evaluating the continuum of care across evidence-based programs. Different data collection forms will be needed to gain information on disability types and to prospectively follow participants throughout the course of the program and the months following. This information will help program administrators to understand which populations of older adults are likely to benefit from which programs and how older adults transition between the different programs offered. Researchers can compared fall rates between those who participate in more than one program, those who participate in only one program, and those who enroll in a program but do not complete. It is possible that participants who continue to enroll in programs following MOB and Stepping On are more likely to sustain the results and suffer fewer falls than older adults who only attend MOB or Stepping On sessions.

MOB and Stepping On represent two evidence-based falls prevention programs that are effective and well attended by community-dwelling older adults, however differences in effects by groups of older adults remain. These programs are able to reach populations of older adults who are at an increased risk of falls compared to the general population of older adults, yet these groups remain underrepresented in the National Falls Prevention Database. There is a need to untangle the different types of disability with regards to participation in falls prevention programs. It is known that older adults with cognitive impairment are at an increased risk for falls, yet there is limited information on the accessibility of programs for this vulnerable population. There is also a need to identify program components that meet the needs of older adults who identify as a racial minority. It is unclear how the racial distributions of program attendees contribute to outcomes among racial minority older adults. Finally, there is a need to explore how older adults transition between evidence-based health promotion programs. This information can help the recruitment and retention of underrepresented populations of older

adults. It is vitally important to ensure that community-dwelling older adults at the greatest risk of falling are able to enroll in and benefit from these federally supported evidence-based falls prevention programs.

Bibliography

Administration on Community Living [Internet] (2017). Definition of Evidence-Based Programs [cited[January 11, 2018]]. Available from [https://www.acl.gov/programs/health-wellness/disease-prevention].

Allegrante, J. P., Hanson, D. W., Sleet, D. A., & Marks, R. (2012). Ecological approaches to the prevention of unintentional injuries. *Italian Journal of Public Health*, *7*(2).

Allison, L. K., Painter, J. A., Emory, A., Whitehurst, P., & Raby, A. (2013). Participation restriction, not fear of falling, predicts actual balance and mobility abilities in rural community-dwelling older adults. *Journal of geriatric physical therapy*, *36*(1), 13-23.

Amboni, M., Barone, P., & Hausdorff, J. M. (2013). Cognitive contributions to gait and falls: evidence and implications. *Movement Disorders*, *28*(11), 1520-1533.

Ambrose, A. F., Paul, G., & Hausdorff, J. M. (2013). Risk factors for falls among older adults: a review of the literature. *Maturitas*, *75*(1), 51-61.

Ambrose, A. F., Cruz, L., & Paul, G. (2015). Falls and fractures: a systematic approach to screening and prevention. *Maturitas*, *82*(1), 85-93.

Arfken, C. L., Lach, H. W., Birge, S. J., & Miller, J. P. (1994). The prevalence and correlates of fear of falling in elderly persons living in the community. *American journal of public health*, *84*(4), 565-570.

Baba, C. T., Oliveira, I. M., Silva, A. E. F., Vieira, L. M., Cerri, N. C., Florindo, A. A., & Gomes, G. A. O. (2017). Evaluating the impact of a walking program in a disadvantaged area: using the RE-AIM framework by mixed methods. *BMC public health*, *17*(1), 709.

Batra, A., Coxe, S., Page, T. F., Melchior, M., & Palmer, R. C. (2016). Evaluating the factors associated with the completion of a community-based group exercise program among older women. *Journal of aging and physical activity*, *24*(4), 649-658.

Bergland, A. (2012). Fall risk factors in community-dwelling elderly people. *Norsk epidemiologi*, *22*(2).

Black, J. C., Wheeler, N., Tovar, M., & Webster-Smith, D. (2015). Understanding the challenges to providing disabilities services and rehabilitation in rural Alaska: where do we go from here?. *Journal of social work in disability & rehabilitation*, *14*(3-4), 222-232.

Boelens, C., Hekman, E. E., & Verkerke, G. J. (2013). Risk factors for falls of older citizens. *Technology and Health care*, *21*(5), 521-533.

Burnette, C. E., Roh, S., Lee, K. H., Lee, Y. S., Newland, L. A., & Jun, J. S. (2017). A comparison of risk and protective factors related to depressive symptoms among American Indian and Caucasian Older Adults. *Health & Social Work*, *42*(1), e15-e23.

Burns, E. R., Stevens, J. A., & Lee, R. (2016). The direct costs of fatal and non-fatal falls among older adults—United States. *Journal of safety research*, *58*, 99-103.

Carande-Kulis, V., Stevens, J. A., Florence, C. S., Beattie, B. L., & Arias, I. (2015). A cost–benefit analysis of three older adult fall prevention interventions. *Journal of safety research*, *52*, 65-70.

Cesari, M., Landi, F., Torre, S., Onder, G., Lattanzio, F., & Bernabei, R. (2002). Prevalence and risk factors for falls in an older community-dwelling population. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, *57*(11), M722-M726.

Child, S., Goodwin, V., Garside, R., Jones-Hughes, T., Boddy, K., & Stein, K. (2012). Factors influencing the implementation of fall-prevention programmes: a systematic review and synthesis of qualitative studies. *Implementation science*, *7*(1), 91.

Chippendale, T., & Boltz, M. (2014). The neighborhood environment: Perceived fall risk, resources, and strategies for fall prevention. *The Gerontologist*, *55*(4), 575-583.

Cho, J., Smith, M. L., Ahn, S., Kim, K., Appiah, B., & Ory, M. G. (2014). Effects of an evidence-based falls risk-reduction program on physical activity and falls efficacy among oldest-old adults. *Frontiers in public health*, *3*, 182.

Cho, J., Smith, M. L., Shubert, T. E., Jiang, L., Ahn, S., & Ory, M. G. (2015). Gait speed among older participants enrolled in an evidence-based fall risk reduction program: a subgroup analysis. *Frontiers in public health*, *3*.

Clemson, L., Cumming, R. G., Kendig, H., Swann, M., Heard, R., & Taylor, K. (2004). The effectiveness of a community-based program for reducing the incidence of falls in the elderly: A randomized trial. *Journal of the American Geriatrics Society*, *52*(9), 1487-1494.

Coe, L. J., John, J. A. S., Hariprasad, S., Shankar, K. N., MacCulloch, P. A., Bettano, A. L., & Zotter, J. (2017). An integrated approach to falls prevention: a model for linking clinical and community interventions through the Massachusetts Prevention and Wellness Trust Fund. *Frontiers in public health*, *5*.

Cumming, R. G., Salkeld, G., Thomas, M., & Szonyi, G. (2000). Prospective study of the impact of fear of falling on activities of daily living, SF-36 scores, and nursing home admission. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, *55*(5), M299-M305.

da Costa, E. M., Pepersack, T., Godin, I., Bantuelle, M., Petit, B., & Levêque, A. (2012). Fear of falling and associated activity restriction in older people. results of a cross-sectional study conducted in a Belgian town. *Archives of public health*, *70*(1), 1.

Dattalo, M., Wise, M., Ford Ii, J. H., Abramson, B., & Mahoney, J. (2017). Essential resources for implementation and sustainability of evidence-based health promotion programs: a mixed methods multi-site case study. *Journal of community health*, *42*(2), 358-368.

Dauenhauer, J. A., Glose, S., & Watt, C. (2015). Design, delivery, and outcomes from an interprofessional fall prevention course. *Gerontology & geriatrics education*, *36*(3), 278-301.

Day, L., Finch, C. F., Hill, K. D., Haines, T. P., Clemson, L., Thomas, M., & Thompson, C. (2010). A protocol for evidence-based targeting and evaluation of statewide strategies for preventing falls among community-dwelling older people in Victoria, Australia. *Injury prevention*, ip-2010.

Deandrea, S., Lucenteforte, E., Bravi, F., Foschi, R., La Vecchia, C., & Negri, E. (2010). Review article: risk factors for falls in community-dwelling older people: a systematic review and meta-analysis". *Epidemiology*, 658-668.

Delbaere, K., Crombez, G., Vanderstraeten, G., Willems, T., & Cambier, D. (2004). Fear-related avoidance of activities, falls and physical frailty. A prospective community-based cohort study. *Age and ageing*, *33*(4), 368-373.

Delbaere, K., Kochan, N. A., Close, J. C., Menant, J. C., Sturnieks, D. L., Brodaty, H., ... & Lord, S. R. (2012). Mild cognitive impairment as a predictor of falls in community-dwelling older people. *The American Journal of Geriatric Psychiatry*, 20(10), 845-853.

Denkinger, M. D., Lukas, A., Nikolaus, T., & Hauer, K. (2015). Factors associated with fear of falling and associated activity restriction in community-dwelling older adults: a systematic review. *The American Journal of Geriatric Psychiatry*, *23*(1), 72-86.

Disability [Def. 1]. (2018, August, 1). *In Merriam Webster Online*, Retrieved July 30, 2018, from http://www.merriam-webster.com/dictionary/disability.

Donoghue, O. A., Cronin, H., Savva, G. M., O'Regan, C., & Kenny, R. A. (2013). Effects of fear of falling and activity restriction on normal and dual task walking in community dwelling older adults. *Gait & posture*, *38*(1), 120-124.

Drum, C. E., Peterson, J. J., Culley, C., Krahn, G., Heller, T., Kimpton, T., ... & White, G. W. (2009). Guidelines and criteria for the implementation of community-based health promotion programs for individuals with disabilities. *American Journal of Health Promotion*, *24*(2), 93-101.

Finlayson, M. L., & Peterson, E. W. (2010). Falls, aging, and disability. *Physical medicine and rehabilitation clinics of North America*, *21*(2), 357-373.

Ford, J. H., Abramson, B., Wise, M., Dattalo, M., & Mahoney, J. E. (2017). Bringing healthy aging to scale: a randomized trial of a quality improvement intervention to increase adoption of evidence-based health promotion programs by community partners. *Journal of Public Health Management and Practice*, *23*(5), e17-e24.

Fukukawa, Y., Kozakai, R., Niino, N., Nishita, Y., Ando, F., & Shimokata, H. (2008). Social support as a moderator in a fall prevention program for older adults. *Journal of gerontological nursing*, *34*(5), 19-25.

Ghimire, E., Colligan, E. M., Howell, B., Perlroth, D., Marrufo, G., Rusev, E., & Packard, M. (2015). Effects of a community-based fall management program on Medicare cost savings. *American journal of preventive medicine*, *49*(6), e109-e116.

Gill, T. M., Williams, C. S., Robison, J. T., & Tinetti, M. E. (1999). A population-based study of environmental hazards in the homes of older persons. *American Journal of Public Health*, *89*(4), 553-556.

Gillespie, L. D., Robertson, M. C., Gillespie, W. J., Sherrington, C., Gates, S., Clemson, L. M., & Lamb, S. E. (2012). Interventions for preventing falls in older people living in the community. *The Cochrane Library*.

Glasgow, R. E., Vogt, T. M., & Boles, S. M. (1999). Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *American journal of public health*, *89*(9), 1322-1327.

Glasgow, R. E., Klesges, L. M., Dzewaltowski, D. A., Estabrooks, P. A., & Vogt, T. M. (2006). Evaluating the impact of health promotion programs: using the RE-AIM framework to form summary measures for decision making involving complex issues. *Health education research*, *21*(5), 688-694.

Goins, R. T., Tincher, A., & Spencer, S. M. (2003). Awareness and use of home and community-based long-term care by rural American Indian and white elderly with co-morbid diabetes. *Home health care services quarterly*, *22*(3), 65-81.

Goins, R. T., & Pilkerton, C. S. (2010). Comorbidity among older American Indians: the native elder care study. *Journal of cross-cultural gerontology*, *25*(4), 343-354.

Greenberg, S. A., Sullivan-Marx, E., Sommers, M. L. S., Chittams, J., & Cacchione, P. Z. (2016). Measuring fear of falling among high-risk, urban, community-dwelling older adults. *Geriatric nursing*, *37*(6), 489-495.

Guirguis-Blake, J. M., Michael, Y. L., Perdue, L. A., Coppola, E. L., & Beil, T. L. (2018). Interventions to prevent falls in older adults: updated evidence report and systematic review for the US Preventive Services Task Force. *Jama*, *319*(16), 1705-1716.

Guse, C. E., Peterson, D. J., Christiansen, A. L., Mahoney, J., Laud, P., & Layde, P. M. (2015). Translating a fall prevention intervention into practice: a randomized community trial. *American Journal of Public Health*, 105(7), 1475-1481.

Hammel, J., Magasi, S., Heinemann, A., Gray, D. B., Stark, S., Kisala, P., ... & Hahn, E. A. (2015). Environmental barriers and supports to everyday participation: a qualitative insider perspective from people with disabilities. *Archives of physical medicine and rehabilitation*, *96*(4), 578-588.

Howland, J., Shankar, K. N., Peterson, E. W., & Taylor, A. A. (2015). Savings in acute care costs if all older adults treated for fall-related injuries completed matter of balance. *Injury epidemiology*, *2*(1), 25.

Kelsey, J. L., Procter-Gray, E., Hannan, M. T., & Li, W. (2012). Heterogeneity of falls among older adults: implications for public health prevention. *American journal of public health*, *102*(11), 2149-2156.

Kempen, G. I., van Haastregt, J. C., McKee, K. J., Delbaere, K., & Zijlstra, G. R. (2009). Socio-demographic, health-related and psychosocial correlates of fear of falling and avoidance

of activity in community-living older persons who avoid activity due to fear of falling. *BMC Public Health*, *9*(1), 170.

Kielich, K., Mackenzie, L., Lovarini, M., & Clemson, L. (2017). Urban Australian general practitioners' perceptions of falls risk screening, falls risk assessment, and referral practices for falls prevention: an exploratory cross-sectional survey study. *Australian Health Review*, *41*(1), 111-119.

Kohn, M. J., Belza, B., Petrescu-Prahova, M., Miyawaki, C. E., & Hohman, K. H. (2015). Participant variation by delivery site type in an evidence-based physical activity program. *Journal of aging and physical activity*, *23*(3), 401-408.

Korda, H., Erdem, E., Woodcock, C., Kloc, M., Pedersen, S., & Jenkins, S. (2015). Racial and ethnic minority participants in chronic disease self-management programs: findings from the communities putting prevention to work initiative. *Ethnicity & disease*, *23*(4), 508-517.

Lach, H.W. (2005). Incidence and risk factors for developing fear of falling in older adults. Public Health Nursing, 22, 45–52.

Lachman, M. E., Howland, J., Tennstedt, S., Jette, A., Assmann, S., & Peterson, E. W. (1998). Fear of falling and activity restriction: the survey of activities and fear of falling in the elderly (SAFE). *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *53*(1), P43-P50.

Lin, S. I., Chang, K. C., Lee, H. C., Yang, Y. C., & Tsauo, J. Y. (2015). Problems and fall risk determinants of quality of life in older adults with increased risk of falling. *Geriatrics & gerontology international*, *15*(5), 579-587.

Lohman, M. C., Crow, R. S., DiMilia, P. R., Nicklett, E. J., Bruce, M. L., & Batsis, J. A. (2017). Operationalisation and validation of the Stopping Elderly Accidents, Deaths, and Injuries (STEADI) fall risk algorithm in a nationally representative sample. *J Epidemiol Community Health*, *71*(12), 1191-1197.

Lord, S. R., Menz, H. B., & Sherrington, C. (2006). Home environment risk factors for falls in older people and the efficacy of home modifications. *Age and ageing*, *35*(suppl_2), ii55-ii59.

Lord, S. R., Smith, S. T., & Menant, J. C. (2010). Vision and falls in older people: risk factors and intervention strategies. *Clinics in geriatric medicine*, *26*(4), 569-581.

Mahoney, J. E. (2015). "Stepping On": stepping over the chasm from research to practice. *Frontiers in public health*, *3*, 148.

Mahoney, J. E., Gobel, V. L., Shea, T., Janczewski, J., Cech, S., & Clemson, L. (2016). Improving fidelity of translation of the stepping on falls prevention program through root cause analysis. *Frontiers in public health*, *4*.

Mänty, M., Heinonen, A., Viljanen, A., Pajala, S., Koskenvuo, M., Kaprio, J., & Rantanen, T. (2010). Self-reported preclinical mobility limitation and fall history as predictors of future falls in older women: prospective cohort study. *Osteoporosis international*, *21*(4), 689-693.

Masud, T., & Morris, R. O. (2001). Epidemiology, of falls. *Age and Ageing*, 30, 3-7.

Matsuda, P. N., Verrall, A. M., Finlayson, M. L., Molton, I. R., & Jensen, M. P. (2015). Falls among adults aging with disability. *Archives of Physical Medicine and Rehabilitation*, 96(3), 464-471.

McGuire, A. B., Bonfils, K. A., Kukla, M., Myers, L., & Salyers, M. P. (2013). Measuring participation in an evidence-based practice: Illness management and recovery group attendance. *Psychiatry research*, *210*(3), 684-689.

McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health education quarterly*, *15*(4), 351-377.

McMahon, S., Talley, K. M., & Wyman, J. F. (2011). Older people's perspectives on fall risk and fall prevention programs: a literature review. *International journal of older people nursing*, *6*(4), 289-298.

Mielenz, T. J., Durbin, L. L., Hertzberg, F., Nobile-Hernandez, D., & Jia, H. (2016). Predictors of and health-and fall-related program outcomes resulting from complete and adequate doses of a fall risk reduction program. *Translational behavioral medicine*, 1-11.

Mirelman, A., Herman, T., Brozgol, M., Dorfman, M., Sprecher, E., Schweiger, A., ... & Hausdorff, J. M. (2012). Executive function and falls in older adults: new findings from a five-year prospective study link fall risk to cognition. *PloS one*, *7*(6), e40297.

Montero-Odasso, M., Verghese, J., Beauchet, O., & Hausdorff, J. M. (2012). Gait and cognition: a complementary approach to understanding brain function and the risk of falling. *Journal of the American Geriatrics Society*, *60*(11), 2127-2136.

Muir, S. W., Berg, K., Chesworth, B. M., Klar, N., & Speechley, M. (2010). Modifiable risk factors identify people who transition from non-fallers to fallers in community-dwelling older adults: a prospective study. *Physiotherapy Canada*, *62*(4), 358-367.

Murphy, S. L., Dubin, J. A., & Gill, T. M. (2003). The development of fear of falling among community-living older women: predisposing factors and subsequent fall events. *The*

Journals of Gerontology Series A: Biological Sciences and Medical Sciences, *58*(10), M943-M947.

National Council on Aging [Internet] (2015). Falls Free®: 2015 National falls prevention action plan. [cited[January 11, 2018]]. Available from [https://www.ncoa.org/resources/2015-falls-free-national-falls-prevention-action-plan/].

Nicklett, E. J., & Taylor, R. J. (2014). Racial/Ethnic Predictors of Falls Among Older Adults The Health and Retirement Study. *Journal of Aging and Health*, 0898264314541698

Northridge, M. E., Nevitt, M. C., Kelsey, J. L., & Link, B. (1995). Home hazards and falls in the elderly: the role of health and functional status. *American journal of public health*, *85*(4), 509-515.

Okoro, C. A., Denny, C. H., McGuire, L. C., Balluz, L. S., Goins, R. T., & Mokdad, A. H. (2007). Disability among older American Indians and Alaska Natives: disparities in prevalence, health-risk behaviors, obesity, and chronic conditions. *Ethnicity and Disease*, *17*(4), 686.

Okoro, C. A., Dhingra, S. S., & Li, C. (2014). A triple play: psychological distress, physical comorbidities, and access and use of health services among US adults with disabilities. *Journal of health care for the poor and underserved*, *25*(2), 814-836.

O Loughlin, J., Maximova, K., Tan, Y., & Gray-Donald, K. (2007). Lifestyle risk factors for chronic disease across family origin among adults in multiethnic, low-income, urban neighborhoods. *Ethnicity and Disease*, *17*(4), 657.

Ory, M. G., Altpeter, M., Belza, B., Helduser, J., Zhang, C., & Smith, M. L. (2015). Perceived utility of the RE-AIM framework for health promotion/disease prevention initiatives for

older adults: a case study from the US evidence-based disease prevention initiative. *Frontiers in public health*, *3*, 143.

Ory, M. G., Smith, M. L., Wade, A., Mounce, C., Wilson, A., & Parrish, R. (2010). Implementing and disseminating an evidence-based program to prevent falls in older adults, Texas, 2007-2009. *Prevention and Chronic Disease*, 7(6), A130.

Ory, M. G., Smith, M. L., Jiang, L., Lee, R., Chen, S., Wilson, A. D., ... & Parker, E. M. (2015). Fall prevention in community settings: results from implementing Stepping On in three states. *Frontiers in public health*, *3*, 232.

Osho, O., Owoeye, O., & Armijo-Olivo, S. (2017). Adherence and attrition in fall prevention exercise programs for community-dwelling older adults: a systematic review and meta-analysis. *Journal of aging and physical activity*, 1-34.

Page, T. F., Batra, A., & Palmer, R. (2012). Cost analysis of a community-based fall prevention program being delivered in South Florida. *Family & community health*, *35*(3), 264-270.

Pariera, K. L., Murphy, S. T., Meng, J., & McLaughlin, M. L. (2017). Exploring willingness to participate in clinical trials by ethnicity. *Journal of racial and ethnic health disparities*, *4*(4), 763-769.

Peel, N. M. (2011). Epidemiology of falls in older age. *Canadian Journal on Aging/La Revue canadienne du vieillissement*, 30(01), 7-19.

Quandt, S. A., Stafford, J. M., Bell, R. A., Smith, S. L., Snively, B. M., & Arcury, T. A. (2006). Predictors of falls in a multiethnic population of older rural adults with diabetes. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, *61*(4), 394-398.

Reichard, A., Stolzle, H., & Fox, M. H. (2011). Health disparities among adults with physical disabilities or cognitive limitations compared to individuals with no disabilities in the United States. *Disability and health journal*, *4*(2), 59-67.

Renfro, M., Maring, J., Bainbridge, D., & Blair, M. (2016). Fall risk among older adult high-risk populations: a review of current screening and assessment tools. *Current geriatrics reports*, *5*(3), 160-171.

Reyes-Ortiz, C. A., Al, S. S., Loera, J., Ray, L. A., & Markides, K. (2004). Risk factors for falling in older Mexican Americans. *Ethnicity & disease*, *14*(3), 417-422.

Rimmer, J. H., Riley, B., Wang, E., Rauworth, A., & Jurkowski, J. (2004). Physical activity participation among persons with disabilities: barriers and facilitators. *American journal of preventive medicine*, *26*(5), 419-425.

Rimmer, J. H., Vanderbom, K. A., & Graham, I. D. (2016). A new framework and practice center for adapting, translating, and scaling evidence-based health/wellness programs for people with disabilities. *Journal of Neurologic Physical Therapy*, *40*(2), 107-114.

Rowland, M., Peterson-Besse, J., Dobbertin, K., Walsh, E. S., Horner-Johnson, W., on Disability, T. E. P., & Disparities, H. (2014). Health outcome disparities among subgroups of people with disabilities: A scoping review. *Disability and health journal*, *7*(2), 136-150.

Rubenstein, L. Z. (2006). Falls in older people: epidemiology, risk factors and strategies for prevention. *Age and ageing*, *35*(suppl_2), ii37-ii41.

Rucker, D., Rowe, B. H., Johnson, J.A., Steiner, I. P., Russell, A. S., Hanley, D.A., et al. (2006). Educational intervention to reduce falls and fear of falling in patients after fragility fracture: Results of a controlled pilot study. Preventive Medicine, 42, 316–319.

Scheffer, A. C., Schuurmans, M. J., Van Dijk, N., Van Der Hooft, T., & De Rooij, S. E. (2008). Fear of falling: measurement strategy, prevalence, risk factors and consequences among older persons. *Age and ageing*, *37*(1), 19-24.

Schepens, S., Sen, A., Painter, J. A., & Murphy, S. L. (2012). Relationship between fall-related efficacy and activity engagement in community-dwelling older adults: a meta-analytic review. *American Journal of Occupational Therapy*, *66*(2), 137-148.

Schlotthauer, A. E., Mahoney, J. E., Christiansen, A. L., Gobel, V. L., Layde, P., Lecey, V., ... & Clemson, L. (2017). Research on the Translation and implementation of stepping On in Three Wisconsin communities. *Frontiers in public health*, *5*, 128.

Sherrington, C., Whitney, J. C., Lord, S. R., Herbert, R. D., Cumming, R. G., & Close, J. C. (2008). Effective exercise for the prevention of falls: a systematic review and meta-analysis. *Journal of the American Geriatrics Society*, *56*(12), 2234-2243.

Shier, V., Trieu, E., & Ganz, D. A. (2016). Implementing exercise programs to prevent falls: systematic descriptive review. *Injury epidemiology*, *3*(1), 16.

Smith, M. L., Jiang, L., & Ory, M. G. (2012). Falls efficacy among older adults enrolled in an evidence-based program to reduce fall-related risk: sustainability of individual benefits over time. *Family & community health*, *35*(3), 256-263.

Smith, M. L., Ory, M. G., Ahn, S., Bazzarre, T. L., & Resnick, B. (2011). Older adults' participation in a community-based falls prevention exercise program: relationships between the EASY tool, program attendance, and health outcomes. *The Gerontologist*, *51*(6), 809-821.

Smith, M. L., Ory, M. G., Belza, B., & Altpeter, M. (2012). Personal and delivery site characteristics associated with intervention dosage in an evidence-based fall risk reduction program for older adults. *Translational behavioral medicine*, *2*(2), 188-198.

Smith, P. J., Blumenthal, J. A., Hoffman, B. M., Cooper, H., Strauman, T. A., Welsh-Bohmer, K., ... & Sherwood, A. (2010). Aerobic exercise and neurocognitive performance: a meta-analytic review of randomized controlled trials. *Psychosomatic medicine*, *72*(3), 239.

Snooks, H. A., Anthony, R., Chatters, R., Dale, J., Fothergill, R. T., Gaze, S., ... & Lyons, R. A. (2017). Paramedic assessment of older adults after falls, including community care referral pathway: cluster randomized trial. *Annals of emergency medicine*, *70*(4), 495-505.

Speechley, M. (2011). Unintentional falls in older adults: a methodological historical review. *Canadian Journal on Aging/La Revue canadienne du vieillissement*, *30*(1), 21-32.

Sterling, D. A., O'connor, J. A., & Bonadies, J. (2001). Geriatric falls: injury severity is high and disproportionate to mechanism. *Journal of Trauma and Acute Care Surgery*, *50*(1), 116-119.

Stevens, J. A., Baldwin, G. T., Ballesteros, M. F., Noonan, R. K., & Sleet, D. A. (2010). An older adult falls research agenda from a public health perspective. *Clinics in geriatric medicine*, *26*(4), 767-779.

Stevens, J. A., Corso, P. S., Finkelstein, E. A., & Miller, T. R. (2006). The costs of fatal and non-fatal falls among older adults. *Injury prevention*, *12*(5), 290-295.

Stineman, M. G., Strumpf, N., Kurichi, J. E., Charles, J., Grisso, J. A., & Jayadevappa, R. (2011). Attempts to reach the oldest and frailest: recruitment, adherence, and retention of urban

elderly persons to a falls reduction exercise program. *The Gerontologist*, *51*(suppl_1), S59-S72.

Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. *American journal of health promotion*, *10*(4), 282-298.

Sun, D. Q., Huang, J., Varadhan, R., & Agrawal, Y. (2016). Race and fall risk: data from the National Health and Aging Trends Study (NHATS). *Age and ageing*, *45*(1), 120-127.

Tangen, G. G., Engedal, K., Bergland, A., Moger, T. A., & Mengshoel, A. M. (2014). Relationships between balance and cognition in patients with subjective cognitive impairment, mild cognitive impairment, and Alzheimer disease. *Physical Therapy*, *94*(8), 1123-1134.

Tennstedt S, Howland J, Lachman M, et al. A randomized, controlled trial of a group intervention to reduce fear of falling and associated activity restriction in older adults. J Gerontol B Psychol Sci Soc Sci 1998;53(6):384–92.

Tiernan, C., Lysack, C., Neufeld, S., Goldberg, A., & Lichtenberg, P. A. (2014). Falls efficacy and self-rated health in older African American adults. *Archives of gerontology and geriatrics*, *58*(1), 88-94.

Tinetti, M. E., Speechley, M., & Ginter, S. F. (1988). Risk factors for falls among elderly persons living in the community. *New England journal of medicine*, *319*(26), 1701-1707.

Tinetti, M. E., Baker, D. I., McAvay, G., Claus, E. B., Garrett, P., Gottschalk, M., ... & Horwitz, R. I. (1994). A multifactorial intervention to reduce the risk of falling among elderly people living in the community. *New England journal of medicine*, *331*(13), 821-827.

Toebes, M. J., Hoozemans, M. J., Furrer, R., Dekker, J., & van Dieën, J. H. (2015). Associations between measures of gait stability, leg strength and fear of falling. *Gait & posture*, *41*(1), 76-80.

Tromp, A. M., Pluijm, S. M. F., Smit, J. H., Deeg, D. J. H., Bouter, L. M., & Lips, P. T. A. M. (2001). Fall-risk screening test: a prospective study on predictors for falls in community-dwelling elderly. *Journal of clinical epidemiology*, *54*(8), 837-844.

Turcotte, P. L., Carrier, A., Desrosiers, J., & Levasseur, M. (2015). Are health promotion and prevention interventions integrated into occupational therapy practice with older adults having disabilities? Insights from six community health settings in Quebec, Canada. *Australian occupational therapy journal*, *62*(1), 56-67.

White, G. W., Gonda, C., Peterson, J. J., Drum, C. E., & RRTC Expert Panel on Health Promotion Interventions. (2011). Secondary analysis of a scoping review of health promotion interventions for persons with disabilities: Do health promotion interventions for people with mobility impairments address secondary condition reduction and increased community participation?. *Disability and Health Journal*, *4*(2), 129-139.

Williams, A. S., & Moore, S. M. (2011). Universal design of research: Inclusion of persons with disabilities in mainstream biomedical studies. *Science translational medicine*, *3*(82), 82cm12-82cm12.

Wu, S., Keeler, E. B., Rubenstein, L. Z., Maglione, M. A., & Shekelle, P. G. (2010). A cost-effectiveness analysis of a proposed national falls prevention program. *Clinics in geriatric medicine*, *26*(4), 751-766.

Yardley, L., Beyer, N., Hauer, K., Kempen, G., Piot-Ziegler, C., & Todd, C. (2005). Development and initial validation of the Falls Efficacy Scale-International (FES-I). *Age and ageing*, *34*(6), 614-619.

Young, W. R., & Williams, A. M. (2015). How fear of falling can increase fall-risk in older adults: Applying psychological theory to practical observations. *Gait & posture*, *41*(1), 7-12.

Zijlstra, G. A., Van Haastregt, J., Van Rossum, E., Van Eijk, J. T. M., Yardley, L., & Kempen, G. I. (2007). Interventions to reduce fear of falling in community-living older people: a systematic review. *Journal of the American Geriatrics Society*, *55*(4), 603-615.

Zozula, A., Carpenter, C. R., Lipsey, K., & Stark, S. (2016). Prehospital emergency services screening and referral to reduce falls in community-dwelling older adults: a systematic review. *Emerg Med J*, emermed-2015.

Appendix

Baseline Participant Data Collection Form

Post-Program Data Collection Form

Host Organization Data Collection Form

Instruction for Participants on Data Collection

Participant Attendance Log

Chronic Condition Coding Scheme

OMB Control No. 0985-0039
Exp. Date 01/31/2018

[Program Name] Participant Information Form

Today's date: ____/ ____/_____
M M D D Y Y Y Y

Participant I.D. (first two letters of your first name, first two letters of your last name, last two numbers of your birth year): __ __ __ __ __ __

---

1. Did your doctor, nurse, physical therapist or other health care provider suggest that you take this program?
   O Yes O No

2. How old are you today? ____years

3. Do you live alone? O Yes O No

4. Are you: O Male or O Female?

5. Are you of Hispanic, Latino, or Spanish origin? O Yes O No

6. What is your race? **Check all that apply**.
   O American Indian or Alaska Native
   O Asian
   O Black or African American
   O Native Hawaiian or other Pacific Islander

O White

7. What is the highest grade or level of school that you have completed?
   O Less than high school
   O Some high school
   O High school graduate or GED
   O Some college or vocational school
   O College graduate or higher

8. Has a health care provider ever told you that you have any of the following chronic conditions (i.e., one that has lasted for three months or more)? (**Please check all that apply**.)

☐	Arthritis or other bone/joint disease	☐	Heart disease or blood circulation problem
☐	Breathing/lung disease	☐	Glaucoma/ other chronic eye problem
☐	Depression	☐	Other chronic condition: _____
☐	Diabetes	☐	None (No chronic conditions)

Please turn this paper over and fill out the other side.

Participant Information Form (continued)

9. Are you limited in any way in any activities because of physical, mental, or emotional problems?
   O Yes O No

10. In general, would you say that your health is:
    O Excellent O Very good O Good O Fair O Poor

The next few questions ask about falls. By a fall, we mean when a person unintentionally comes to rest on the ground or another lower level.

11. In the past 3 months, how many times have you fallen? O none O ___times
    a. If you fell in the past 3 months, how many of these falls caused an injury? *(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.)*

       _____ number of falls causing an injury

12. How fearful are you of falling?
    O Not at all O A little O Somewhat O A lot

13. Please mark the circle that tells us how sure you are that you can do the following activities.

How sure are you that:	Very sure	Sure	Somewhat sure	Not at all sure
a. I can find a way to get up if I fall	O	O	O	O
b. I can find a way to reduce falls	O	O	O	O
c. I can protect myself if I fall	O	O	O	O
d. I can increase my physical strength	O	O	O	O
e. I can become more steady on my feet	O	O	O	O

14. During the last 4 weeks, to what extent has your concern about falling interfered with your normal social activities with family, friends, neighbors or groups?

O Extremely O Quite a bit O Moderately O Slightly O Not at all

Post-Program Participant Data Collection Form

OMB Control No. 0985-0039
Exp. Date 01/31/2018

[Program Name] Participant Post Program Survey

Today's date: _____/ _____/_____
M M D D Y Y Y Y

Participant I.D. (first two letters of your first name, first two letters of last name, last two numbers of your birth year): __ __ __ __ __ __

---

1. In general, would you say that your health is:
   O Excellent O Very good O Good O Fair O Poor

The next few questions ask about falls. By a fall, we mean when a person unintentionally comes to rest on the ground or another lower level.

2. Since this program began, how many times have you fallen? O none O _____times
   a. If you fell since this program began, how many of these falls caused an injury? *(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.)*
      _____number of falls causing an injury

3. How fearful are you of falling?
   O Not at all O A little O Somewhat O A lot

4. Has this program reduced your fear of falling? O Yes O No

5. Please mark the circle that tells us how sure you are that you can do the following activities.

How sure are you that:	Very sure	Sure	Somewhat sure	Not at all sure
a. I can find a way to get up if I fall	O	O	O	O
b. I can find a way to reduce falls	O	O	O	O
c. I can protect myself if I fall	O	O	O	O
d. I can increase my physical strength	O	O	O	O
e. I can become more steady on my feet	O	O	O	O

Please turn this paper over and fill out the other side.

Participant Post Program Survey (continued)

6. During the last 4 weeks, to what extent has your concern about falling interfered with your normal social activities with family, friends, neighbors or groups?
   O Extremely O Quite a bit O Moderately O Slightly O Not at all

7. Please tell us your thoughts about this program. **Check one circle for each question**.

As a result of this program:	Strongly Agree	Agree	Disagree	Strongly Disagree
a. I feel more comfortable talking to my health care provider about my medications and other possible risks for falling	O	O	O	O
b. I feel more comfortable talking to my family and friends about falling	O	O	O	O
c. I feel more comfortable increasing my activity	O	O	O	O
d. I plan to continue exercising	O	O	O	O
e. I feel more satisfied with my life	O	O	O	O
f. I would recommend this program to a friend or relative	O	O	O	O

8. Since this program began, what have you done to reduce your chance of a fall?
   Check all that apply.
   - O Talked to a family member or friend about how I can reduce my risk of falling
   - O Talked to a health care provider about how I can reduce my risk of falling

- o Had my vision checked
- o Had my medications reviewed by a health care provider or pharmacist
- o Participated in another fall prevention program in my community
- o Did exercises I learned in this program at home
- o Made changes in my home to reduce my risk of falling (for example, secured rugs or improved lighting)

OMB Control No. 0985-0039
Exp. Date 01/31/2018

Host Organization Information Form

1. Site Name:_____

   Street Address: _____

   City: _____ State: _____ Zip code:_____

2. Type of site (select the type that best describes your site):

O State Unit on Aging	O Multi-purpose social services organization
O Municipal Government	
O Area Agency on Aging	O Recreational Organization
O State Health Department	O Residential Facility
O County Health Department	O Senior Center
O Educational Institution	O Other Community Center
O Faith-based Organization	O Tribal Center
O Health Care Organization	O Workplace
O Library	O Other (please specify):

3. Which falls prevention program(s) are you licensed to offer? [Note to Grantee: adapt this to fit local programming]

O A Matter of Balance	O YMCA Moving for Better Balance program
O Stepping On	O Tai Chi: Moving for Better Balance
O Stay Active and Independent for Life	O Other—list name:

4. Contact Person's Name and Information:

First and Last Name: _____

Daytime phone number: _____

Email address: _____

Optional:

Title or role with organization:_____

Role with the falls prevention program(s):_____

Date trained in the falls prevention program: _____

Instruction for Participants on Data Collection

Falls Prevention Program Group Leader / Coach Script

Read / paraphrase the following points to participants prior to their completion of the Participant Information Form.

- This workshop is made possible by a grant from the U.S. Administration for Community Living (ACL) [and support from X funding agencies/sponsors].
- We would like to give you a two-page form today and then at the last class, we will again ask you to complete a brief-post-survey.
- Before we can share your information with ACL and its database contractor, the National Council on Aging [and X funding agencies or sponsors], we want to explain how your information will be used and protected.
- Completing the forms is entirely voluntary. You can skip certain questions or choose not to complete the form at all. If you decide not to complete the form you can still participate in this program.
- However, please know that your information is very valuable to us. We use it to learn who is being reached by this program and to improve our services for others like yourselves. It also helps our funding agencies show that they are spending their money wisely.
- At the top of the form, we ask for the first two letters of your first and last name, and the last two years of the year you were born. We will use this information to match against the Attendance Log to track how many times you attend a class and to the post-survey. We do not share your information with anyone else.
- We follow very strict rules to protect all of your information and to keep it private. We will maintain these paper forms securely following standard practices for protecting private data. After a trained person enters your information into a secure online database, we will destroy the paper forms.
- Please take time now to read the form.
- You may ask us to explain any questions that you find confusing.

Participant Attendance Log

OMB Control No. 0985-0039
Exp. Date 01/31/2018

[Program Name] Attendance Log

Start Date: _ _/_ _/_ _ _ _ End Date: _ _/_ _/ _ _ _ _

Sessions Attended*

Participant ID									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**TOTAL**

**Adapt this section to include the number of possible sessions. Use additional pages if needed*

Chronic Conditions Coding Scheme

Chronic Condition by System	Chronic Conditions Indicated on Data Collection Form
Cardiovascular_Condition	HighBloodPressure, ValveReplacement, Stent, AtrialFibrillation, Hypertension, HighCholesterol, CongestiveHeartFailure, PeripheralArterialDisease, HeartDisease, Anemia, Angina, HeartMurmur, Arrhythmia, Pacemaker, BloodClot, CardiovascularDisease, IrregularHeartBeat, LowBloodPressure, BrainHemorrhage, BloodDisease, RaynaudsDisease, OrthostaticHypotension, CalcificUremicArteriolopathy
Sensory_Condition	HearingImpairment, VisionImpairment, VestibularImpairment, Glaucoma, MacularDegeneration, BalanceDisorder, Vertigo, MenieresDisease, Syncope, Cataracts, MiddleEarImpairment,
Musculoskeletal_Condition	ShoulderReplacement, BulgingDisc, Fracture, HipReplacement, KneeReplacement, DegenerativeDiscDisease, HerniatedDisc, Sciatica, SpinalStenosis, Osteoporosis, Scoliosis, AbdominalHernia, Osteopenia, Bursitis, Arthritis, SpinalFusion, LowerExtremityWeakness, Amputation, BoneSpur, DuPuytrensSyndrome, Osteoarthritis, CarpalTunnel, TMJ, MobilityImpairment, DropFoot, Hernia, SpinalHernia, HiatalHernia, PlantarFasciitis, JointReplacement, Myelofibrosis, BoneDisease, MusculoskeletalCondition, Spondylolisthesis, ChronicPain,
Cancer_AllTypes	Cancer, Amyloidosis,
Rheumatic_Condition	Fibromyalgia, Lupus, Fatigue, Gout, RheumatoidArthritis, Polymyalgia, Polymyalgia, StillsDisease
Mental_Cognition_Condition	Dementia, AttentionDeficitDisorder, AttentionDeficitHyperactivityDisorder, Anxiety, Depression, AlzheimersDisease, CognitiveImpairment, MentalIllness, OCD, Schizophrenia, Bipolar, Aspergers, PTSD,
Respiratory_Condition	SleepApnea, COPD, Asthma, LungDisease, Apnea, Bronchitis, Emphysema, Hypoxemia

Brain_NervousSystem_Condition	Stroke, TIA, Neuropathy, ParkinsonsDisease, SpinalCordDisease, Tremors, EssentialTremor, MultipleSclerosis, Seizures, MyastheniaGravis, PostPolioSyndrome, Aphasia, Ataxia TBI, AutonomicDysfunction, BellsPalsy, HunterSyndrome, CerebralPalsy, Epilepsy, Paralysis, Narcolepsy, Neuralgia, Migraine, Meningitis, CharcotMarieTooth, NervousSystemDisorder, Shingles, BrainDamage, Dystonia, EhlersDanlosSyndrome, RestlessLegSyndrome, MultipleSystemAtrophy, SpasticParaplegia, HuntingtonsDisease, Hydrocephalus, MuscularDystrophy, MeigeSyndrome, MortonsNeuroma, Neurofibromatosis, Palsy, ReflexSympatheticDystrophy, SpinalCordInjury, SpinaBifida, SpinocerebellarAtaxia, Apraxia, Adrenomyeloneuropathy, Axonopathy, MixedConnectiveTissueDisease
Digestive_Condition	Achalasia, AcidReflux, LiverDisease, Gerd, IBS, CeliacDisease, Diverticulitis, CrohnsDisease, Hepatitis, BarrettsEsophagus, Colitis, Gastritis, Constipation, GIDisorder, SubglotticStenosis, UlcerativeColitis
Endocrine_Metabolic_Immune_Condition	Hypoglycemia, AddisonsDisease, Hypothyroid, GravesDisease, AIDS, Allergies, GuillianBarre, Alopecia, Diabetes, ThyroidDisease, AutoImmuneDisease, PreDiabetes, LymesDisease, Obesity, Sarcoidosis, InclusionBodyMyositis, ImmuneSystemDisease, PancreasDisease, SinusCondition, MetabolicSyndrome, Overweight, SjogrensSyndrome, Inflammation
Urinary_Condition	KidneyDisease, Incontinence, UTI, KidneyStones, BladderCondition, PelvicProlapse
Other_Condition	Tumor, Encephalitis, Concussion, Insomnia, FragileX, BurningTongueSyndrome, Meningioma, Hypokalemia, GeneticDisease, SleepDisorder, OtherCondition, Scleroderma, Lymphedema, SkinDisease, Edema,
NoCode	NoCode