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A NARRATIVE REVIEW OF FACTORS THAT CONTRIBUTE TO SUSTAINABILITY
OF COMMUNITY-BASED FALL PREVENTION PROGRAMS

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by
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2019

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OF COMMUNITY-BASED FALL PREVENTION PROGRAMS

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Falls are a significant problem for the geriatric population globally. As the population ages and elderly people continue to live longer with co-morbidities, they will continue to be at risk for falls. While several community-based fall prevention programs exist, they face challenges with sustainability. This paper is a narrative review of factors that contribute to the sustainability of community-based fall prevention programs as well as barriers to sustainability. In total eight papers were included in this review. Findings from this review indicated that the following factors were keys to sustainability of community-based fall prevention programs: funding, external partnerships, external capacity/organization, program flexibility, community advertising and political support/policy change. The barriers that were identified in the research included funding/financial cost, frequently changing staff, lack of clear leadership and lack of a mandate that addresses fall prevention. Findings from this review demonstrate that future research is necessary to further understand and implement best practices for sustaining community-based fall prevention programs for the geriatric population.

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A NARRATIVE REVIEW OF FACTORS THAT CONTRIBUTE TO SUSTAINABILITY OF COMMUNITY-BASED FALL PREVENTION PROGRAMS

Background

Falls are a global public health problem. According to the Global Report on Falls Prevention published by the World Health Organization (WHO), a fall can be defined as “inadvertently coming to rest on the ground, floor or other lower level, excluding intentional change in position to rest in furniture, wall or other objects.”¹ According to data analyzed by the Centers for Disease Control and Prevention (CDC) from the Behavioral Risk Factor Surveillance System (BRFSS), which uses data from all 50 states, the District of Columbia, Guam, Puerto Rico and the U.S. Virgin Islands, in 2014, it was estimated that 28.7% of older adults reported having experienced a fall. This accounted for 29 million falls in the population surveyed.² In other developed nations, including the United Kingdom and New Zealand, 28-35% of adults older than 65 experience a fall annually.¹

There are several factors that contribute to the likelihood of someone falling. The biological factors that can impact the risk of falling include age and sex.¹ According to the BRFSS, 30.3% of women reported falls and 26.5% of men reported falls. The likelihood of a fall also increases with age. Twenty-seven percent of U.S. adults aged 65-74, 29.8% of adults aged 75-84 and 36.5% of adults older than 85 reported a fall in 2104.²

In addition to age, other demographic factors that impact risk of falls are race and socioeconomic status. In the U.S., Caucasians are 33-60% more likely to fall than African

Americans.¹ Evidence is limited on the impact of socioeconomic status on falls. However, factors that contribute to lower socioeconomic status including decreased access to health services, low income, decreased education and decreased living conditions are associated with increased rates of chronic disease, which may increase risk of falls in people with lower socioeconomic status.¹

Falls can be fatal. Data from 2012 from the Centers for Disease Control and Prevention's Web-Based Injury Statistics Query and Reporting System showed that 24,190 adults older than 65 years old died from a fall. The cost of a fatal fall in 2012 was \$25,487, totaling \$616.5 million dollars in costs associated with fatal falls. There were 3.2 million non-fatal fall injuries in the U.S. in 2012, estimated to cost \$30.3 billion dollars, an average of \$9,463 per fall.³ While some individuals may survive a fall, there are other impacts outside of the financial cost of the fall. According the World Health Organization (WHO), 17 million Disability-Adjusted Life Years (DALYs) are lost each year due to falls.⁴ In addition to DALYs lost, there are several other consequences of falls which include injury, decreased independence, depression, loss of autonomy, isolation and immobilization.¹

Attempting to combat the problem of falls in the geriatric population, several evidence-based fall prevention programs already exist. Among the most widely used fall prevention programs in the U.S. are Stepping On, Matter of Balance, Otago, Tai Chi: Moving for Better Balance and Stopping Elderly Accidents Deaths and Injuries (STEADI). Stepping on,

Tai Chi: Moving for Better Balance and Matter of Balance are community-based fall prevention programs. Stepping On is a program that was developed in Australia and is designed for community dwelling older adults, who are at a risk of falling or fearful of falling. Stepping On meets once a week for two hours for seven weeks and is led by a trained leader who typically follows up at participants homes after the course is over.⁵ Matter of Balance is a cognitive behavioral program led by health providers. Matter of Balance is eight weeks long. Similar to Stepping On, Matter of Balance is designed for community dwelling older adults to reduce fear of falling.⁶ Otago differs from both Stepping On and Matter of Balance as it is designed for more frail adults, who are confined to their home. It is a series of exercises that are done under the supervision of a physical therapist or physical therapy assistant. The program is run over four weeks, with eight sessions in total. Tai Chi: Moving for Better Balance consists of adults 65 and older performing eight tai chi forms or exercises over a course of 24 months, meeting twice a week for an hour each time.⁵ STEADI is a toolkit that was developed by the CDC and consists of guidelines, materials and an algorithm for assessment and intervention for fall risk in the older adult population.⁶

Evidence has demonstrated cost benefit for the three community-based fall prevention programs listed above, Stepping On, Tai Chi: Moving for Better Balance and Matter of Balance (Table 1). All programs have costs associated with implementation, but all demonstrated a cost benefit return on investment. Stepping On demonstrated at 64% return on investment for each dollar spent, Tai Chi demonstrated a 509% return on investment for each dollar

spent and Matter of Balance demonstrated at 144% return on investment.^{6,7} The cost per participant of each of these program is relatively low, ranging from \$104.02 for Tai Chi to \$189.00 for Matter of Balance to \$211.38 for Stepping On (see Table 1).^{6,7}

Table 1: Cost Per Participant and Return on Investment of Community-Based Fall Prevention Programs.^{6,7}

	Stepping On	Tai Chi	Matter of Balance
Cost Per Participant	\$211.38	\$104.02	\$189.00
Return on Investment	64%	509%	144%

Given the high incidence of falls and high cost associated with falls combined with the projected aging of the population, the magnitude of this problem is significant. Evidence-based fall prevention programs have demonstrated cost benefit and significant return on investment; however, these programs struggle with sustainability. We need to use the information that already exists to build a foundation of sustainability for community-based fall prevention programs to further disseminate these evidence-based programs across the U.S..

Public Health Significance

As described above, falls in the population of those over 65 years old are a huge problem both in the U.S. and across the globe. Falls are expensive and have substantial effects after the actual fall, which can cause other mobility related complications and limit quality of

life in this population as well. Evidence-based community-based fall prevention programs including Stepping on, Tai Chi: Moving for Better Balance and Matter of Balance have demonstrated cost benefit; however, these programs face struggles with sustainability.^{6,7} Given the evidence on the effectiveness of these programs, there is an opportunity to learn what makes these programs successful long term in the community setting. Evidence on sustainability of these programs is limited, and there have been no reviews to date that synthesize the existing evidence base. This paper will serve as a literature review of the factors that are keys to the sustainability of these programs as well as suggestions for the future. Given the magnitude of falls in the geriatric population, fall prevention is a responsibility of the public health community as it is a component for health promotion for the geriatric community. With the current gaps in the literature, it is crucial to build an evidence base for dissemination and sustainability.

Study Aims

There are several evidence-based fall prevention programs, with five common programs being Stepping On, Matter of Balance, Otago, Tai Chi: Moving for Better Balance and STEADI. Stepping On, Tai Chi: Moving for Better Balance and Matter of Balance are all community-based fall prevention programs. However, funding is limited for these programs, and further research is needed to identify promising approaches for sustaining these programs. In contributing to the evidence base on community based fall prevention programs, this study aimed to identify the facilitating factors and barriers related to the sustainability of community-based fall prevention such and recommendations for the future.

Methods

Search Procedure and Identification of Studies

Studies were identified through a search of electronic databases including PubMed and EBSCOhost. The key search terms used included “Sustainability”, “Maintenance”, “Community”, “Geriatric”, “Fall Prevention”, “Implementation”, “Dissemination” and “Barriers”.

Inclusion/Exclusion Criteria

Articles were limited to those published from 2008-2018. Duplicates of articles were excluded. Articles written in a language other than English were excluded. Due to the limited research in the U.S. on this subject, articles from other developed countries were included. Study designs that were included were randomized control trials, cohort studies, case control studies, and case reports. Only peer-reviewed articles were included; other publications, such as commentaries, dissertations, conference abstracts, and op-eds, were excluded.

Study Design

This study is a narrative review of the current peer-reviewed literature that addresses the sustainability of community-based fall prevention programs as well as barriers to the on-going sustainability and maintenance of these programs.

Data Analysis

To identify articles that meet these criteria, the MPH candidate (SK) screened all retrieved abstracts. Those that clearly did not meet eligibility criteria based on the abstract alone were excluded. SK then retrieved the full article for all other abstracts and reviewed for eligibility. All eligible articles were analyzed by MPH candidate (SK) and relevant data were extracted. Data extracted were categorized into factors that contribute to sustainability and those that hinder it. Findings were then presented in an evidence table (see Table 2) and summarized.

Protection of Human Subjects

This review is based on the peer-reviewed and published evidence, and therefore no human subjects were used in the research for this thesis project. This thesis was declared exempt from review by the Committee for the Protection of Human Subjects at the UTHealth School of Public Health.

Results:

Figure 1:

Flow Diagram of study selection, A Narrative Review of Factors that Contribute to Sustainability of Community-Based Fall Prevention Programs, 2008-2018:

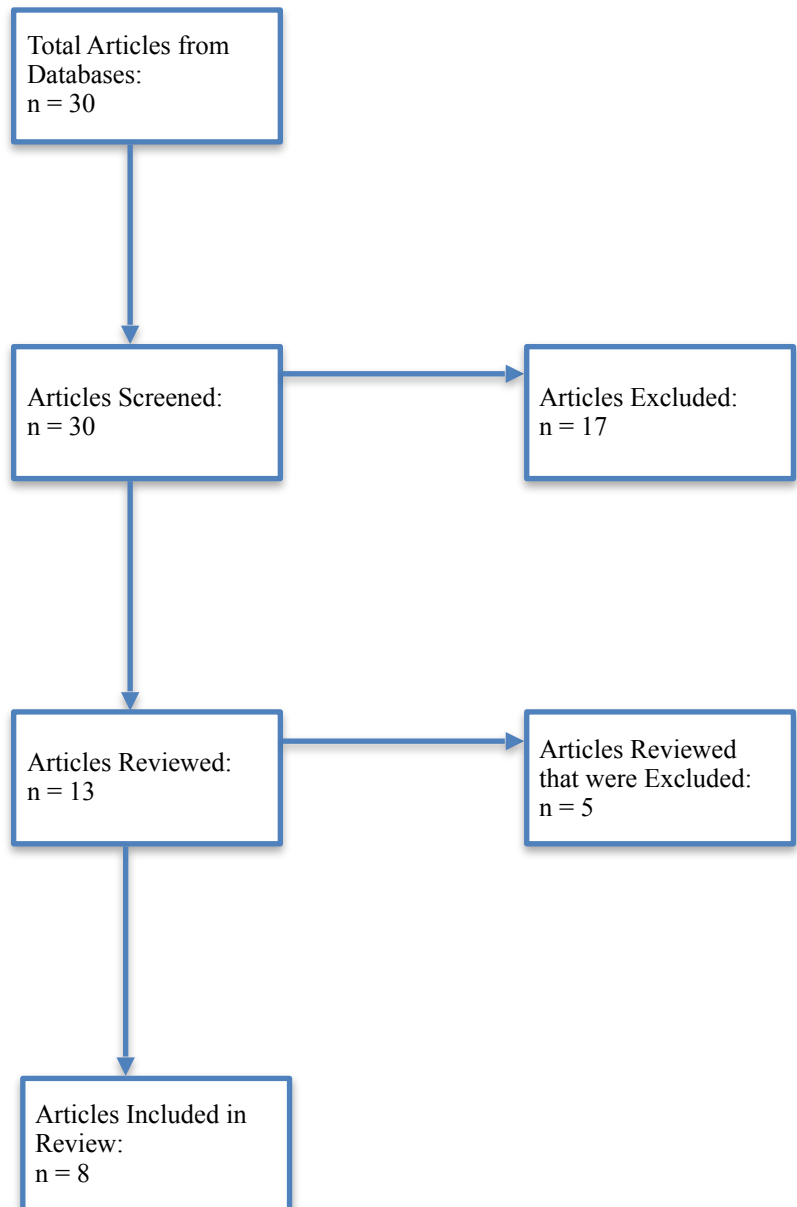


Figure 1 presents a flow diagram of study selection for this review. Initially 30 articles were identified through the search engines after duplicates were excluded. All 30 articles were screened and 17 were then excluded. Reasons for exclusion included not specific to community-based fall prevention and did not address sustainability and/or maintenance. The remaining 13 articles were reviewed and an additional five were excluded as they did not meet criteria for this paper, specifically they referenced community dwelling older adults in inpatient hospital settings. Eight articles met inclusion criteria and were included in this paper. Of the eight studies that were included, five were case studies, one was a single group with pre and post test assessments, one was a qualitative study and one was a quasi experimental study. Of the eight studies that were included in this review, six specified the fall prevention program used. One study used four programs which were Tai Chi: Moving for Better Balance, Stepping On, Otago Exercise Program and STEADI. One other study only used Tai Chi: Moving for Better Balance and one study only used Stepping On. One study used the Increasing Stability Through Evaluation and Practice (InSTEP) program. One study only used Matter of Balance One study used National Falls Prevention Guidelines for Australian Hospitals and Residential Aged Care Facilities and the ‘Queensland Stay on Your Feet®’ Community Guidelines.

Factors Contributing to Sustainability

Various factors were identified in this review that contribute to the sustainability of fall prevention programs (Table 2). Three articles stated that funding is a key factor for sus-

tainability.^{5,8,9} Another key to sustainability included external partnerships, as demonstrated by five of the studies.^{5,8,10-12} These partnerships included community coalitions, physicians and other clinicians as referral sources as well as academic institutions. Another reoccurring theme throughout the data analysis was organizational capacity and stability.^{5,11,13} This refers to continuity at a physical location for these programs as well as continuity with program leaders and staff. Additionally, two articles referred to program flexibility to meet the needs of specific populations in specific communities as contributing factors to sustainability.^{5,10} Another key factor is community advertising and promotion of such programs to increase and sustain participation.¹³ This includes keeping local medical providers, including primary care physicians as well as physical and occupational therapists, informed of program offerings as they serve as a good referral base.¹⁴ One article cited that offering physical therapists and occupational therapist continuing education credit to become instructors of community-based fall prevention programs could be a key to sustainability.¹⁴ Furthermore, two articles stated that political support/policy change were keys to sustainability

Barriers to Sustainability

Five articles stated that securing funding and the financial cost of community-based fall prevention programs is a barrier indicating the importance of financial backing for these programs.^{5,8,10-12} Frequently changing staff and no clear leadership for program management were cited as a barrier to sustainability for three of the studies indicating that a stable location and program management are keys to sustainability.^{8,9,11} Additionally, one article addressed

the lack of a mandate for community-based fall prevention programs as a barrier for sustainability.^{5,8,9} Table 2 summarizes the evidence.

Table 2: Evidence Table, Review of Factors that Contribute to Sustainability of Community-Based Fall Prevention Programs.

Study	Sample	Study Type	Program(s) Used	Key Factors that Contribute to Sustainability	Barriers to Sustainability	Comments
Kramer, Vivrette & Rubenstein (2011)	Community and Senior Centers in CA that participated in pilot of Increasing Stability Through Evaluation and Practice (InSTEP) program n=6	Qualitative Study	InSTEP	Not Ranked: 1. Facilitate administrative buy-in 2. Modify program to be site specific 3. Must meet needs of target population 4. Buy-in from center staff who are willing to take on multiple roles 5. Marketing strategies to facilitate cost sharing for training in a geographic area 6. Partner with academic institutions	Ranked in order: 1. Financial Cost (financial cost of program and administrative costs) 2. Liability/Risk 3. Lack of qualified instructors 4. Lack of attendance to exercise classes	InSTEP was developed by the Fall Prevention Center for Excellence (FPCE) which is California based.
Peel, Travers, Bell, & Smith (2010)	Fall Safety Officers (FSOs) n=6	Case Study	National Falls Prevention Guidelines for Australian Hospitals and Residential Aged Care Facilities and the 'Queensland Stay on Your Feet®' Community Guidelines	Key factors as identified by FSOs: 1. Require fall prevention performance to be integrated into the role of a district executive 2. Adequate funding	Not Ranked: 1. Time limited nature of program 2. Lack of engagement of medical staff 3. Lack of continued funding for a dedicated staff member 4. Lack of mandate to address falls	FSOs were implemented for a 1 year study in Queensland, Australia to implement a fall prevention approach across the care continuum.
Li et al. (2013)	Independently living elders aged 65 or older n=379	Single group pre and post test assessments	Tai Chi: Moving for Better Balance	Key factors identified by researchers (not ranked): 1. Physician awareness about program and referrals to program 2. Offer continuing education to physical and occupational therapists to become instructors of program	Not Ranked: 1. Keeping providers informed of evidence-based programs in the community	Study implemented Tai Ji Quan (derivative of Tai Chi: Moving for Better Balance) in the community
Ullmann, Williams, & Plass (2012)	Predominantly African American and underserved elders in South Carolina n=325	Quasi-experimental study with pre and post assessments and no control group	A Matter of Balance	Not Ranked: 1. 3 Tiered organization system with state leadership 2. Structure of the area agencies on aging 3. Participants recruited through area agencies 4. Local groups' ability to provide facilities to host program.	Barriers for program participation (not ranked): 1. Decreased knowledge of occurrence of program 2. Decreased knowledge of benefits of participation 3. Lack of access to program Barriers for program leaders (not ranked): 1. Lack of knowledge of evidence-based programs 2. Lack of knowledge of program fidelity and importance 3. Lack of knowledge/skills for data collection	Study conducted as part of a grant from the Administration on Aging with partnerships with the Aging Network, the Lieutenant Governor's Office on Aging, the South Carolina Department of Health and Environmental Control and the University of South Carolina School of Public Health. A Matter of Balance (Volunteer lay model) with pre and post score for self-reported falls management scale and timed up and go test (TUG).

Study	Sample	Study Type	Program(s) Used	Key Factors that Contribute to Sustainability	Barriers to Sustainability	Comments
Dattalo, Wise, Ford, Abramson, & Mahoney (2017)	Rural Wisconsin Counties n=8, 57 sources of data	Qualitative Multi-site Case Study	Stepping On	Not Ranked: 1. External partnerships 2. Agency leadership commitment 3. Ongoing source of workshop leaders 4. Health promotion coordination tasks assigned to specific staff 5. Organizational stability 6. Change team management	Not Ranked: 1. Necessity of funding 2. Changing volunteers/staff at community organizations that offer programs	Examined organizational readiness & implementation strategies for health promotion programs including Stepping On and the Chronic Disease Self-Management Program (CDSMP) which is not specific to fall prevention.
Hanson & Salmoni (2011)	Stakeholders n=45	Qualitative Case Study		Stakeholders actions to promote stability (not ranked): Functional Actions: 1. Partnerships 2. Networking 3. Increased capacity 4. Alternative funding or use 5. Change in procedure or policy Other Actions: 1. Providing general support 2. Personal donation 3. Maintaining the initiative and interest	Not Ranked: 1. Human Resources 2. Financial Resources 3. Lack of clear leadership and coordination 4. Fragmentation and decentralization 5. Buy-in 6. Heavy reliance on volunteers 7. Physician involvement	
Smith et al. (2018)	State Departments of Health in CO, OR, & NY n=3	Descriptive case report	Tai Chi: moving for better balance, Stepping On, Otago Exercise Program and STEADI	The capacity to implement and sustain programs (Ranked): 1. Program Evaluation 2. Partnerships 3. Organizational Capacity 4. Program Adaption 5. Communications 6. Strategic Planning 7. Political Support 8. Funding and Stability	Cessation of funding	Also documented organizations that offered evidence-based fall prevention programs before and after funding was received in the states of CO, OR & NY. Recorded the perceived usefulness of collecting sustainability indicators before and after funding.
Schneider et al. (2016)	State Fall Prevention Coalition Leads who were identified through the National Council on Aging (NCOA) Falls Free® Initiative n=42	Case Study		Importance of coalition activities based off survey data that greater than 50% of respondents ranked as "Very Important" for sustainability (ranked): 1. Growing partnerships 2. Disseminating evidence-based programs 3. Obtaining falls data and conducting surveillance at the local regional and state level 4. Bridging gaps between healthcare organizations and communities	Ranked: 1. Obtaining external funding 2. Obtaining funding from coalition members 3. Lack of capacity for coalition members to support work	Key theme throughout article is using evidence to advocate for policy change to facilitate sustainability.

Discussion

The goal of this review paper was to examine the literature to identify facilitating factors and barriers for sustainability of community-based fall prevention programs. With sustainability, often times the facilitators for sustainability are very closely related to the barriers.

ers. In this study, three articles cite funding as a facilitator to sustainability while five articles state lack of funding or financial issues as a barrier to sustainability. While some of those articles addressed funding as both a facilitator and barrier, a total of six out of the eight articles used in this study addressed funding in some capacity.^{5,8-12} Given the importance of funding for sustainability of these vital public health programs, political support for allocation of funds and a mandate to address falls are also extremely important moving forward. Funding would allow programs to have a staff and a clear leader, a barrier that was addressed by several articles in the study.^{8,9,11}

However, funding is not guaranteed, and policy change can be a very slow process. Therefore, community-based fall prevention programs must find creative ways to keep costs low. A key finding from this review was the importance of community partnerships to sustain fall prevention programming. This can be done by developing partnerships with educational institutions, specifically those that offer physical therapy, occupational therapy and public health programs. Assisting with the organization and implementation of community-based fall prevention programs could fulfill the service learning and/or practicum requirements of these programs. Partnerships with educational institutions also strengthens the organizational capacity of community-based fall prevention programs. Additionally, as suggested by Li et al, offering continuing education credits to physical and occupational therapists who become “champions” of community-based fall prevention programs is another way to strengthen the sustainability of such programs and improve ties to clinicians.

Evidence based community-based fall prevention programs such as Stepping On, Tai-Chi: Moving for Better Balance and Matter of Balance have demonstrated success when it comes to fall risk reduction; however, due to the nature of the programs being evidenced based, they may not be flexible. Evidence based health promotion interventions lose effectiveness and credibility if they are not performed as instructed. Adaptability of an evidence-based program was cited as a contributing factor to sustainability of community-based fall prevention programs. More evidence is needed on how to adapt evidence based community-based fall prevention programs to meet the needs of different populations as well as different organizations who will facilitate the program while still maintaining the core elements of each program to achieve maximal results. ¹⁴

Evidence-based community-based fall prevention programs such as Stepping On, Tai Chi: Moving for Better Balance and Matter of Balance have all demonstrated a reduction in risk of falling for the geriatric population. However, as they are evidence based, they are typically not very flexible as discussed previously. Moving forward, future research should focus on how to train those who implement and facilitate these programs to systematically identify and/or adapt community-based fall prevention programs to meet the needs of different communities with different populations and resources. Health promotion frameworks such as Intervention Mapping may provide useful tools to assist health promotion practitioners in adapting evidence-based community-based fall prevention programs to fit the needs of their specific populations.¹⁵

Limitations

The limitations to this review include this type of review as a narrative review. At this time the evidence on this topic is not comprehensive enough for a more traditional systematic review. Given the nature of this review as narrative review with several studies designed included, a quality assessment of studies included was not carried out. Future steps with this research will include the exploration of an appropriate quality assessment tool along with common measures of assessment for both qualitative and quantitative studies.” Additionally using, “Community-Based Fall Prevention Program” generated several different programs as discussed previously. Again, there is not evidence at this time on specific programs so this review was expanded to include all community-based fall prevention programs. Another limitations is that the sample size of n=8 is relatively small.

Future Directions

Evidence is key for policy change. Community-based fall prevention advocates, implementers and researchers should collect data on the benefits of the programs as related to improved safety and decreased costs associated with injury and hospitalization as result of falls. Data that demonstrates cost effectiveness and return on investment can drive policy change for allocation of funds to community-based fall prevention programs as well as a mandate for communities to provide this resource to its population. The combination of academic partnerships to reduce costs and increase stability and organization along with data collection that can drive policy change to increase funding are vitally important for sustaining community-based fall prevention programs in the future. Such programs are go-

ing to become more and more important as the population ages. Development of a tool to measure sustainability across geographic regions and different programs would allow for a larger data base.

Conclusion

Falls are a global public health program. Community-based fall prevention programs are aimed at those who are at an increased risk for falls with goals of improving safety and balance to decrease risk of falls and therefore the economic burden of this public health problem on our healthcare system. However, community-based fall prevention programs face barriers when it comes to sustainability. This study identified several factors that can facilitate sustainability of these crucial programs, including external partnerships in the community, organizational capacity and stability of programs, program flexibility and a dedicated funding source. Moving forward in public health with relation to community-based fall prevention programs, the evidence described in this paper can provide insights on factors that may enhance sustainability of fall prevention programs for organizations that want to offer community-based fall prevention programs as well as for those public health practitioners who want to develop their own programs but strive to be able to maintain these programs long term.

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