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Multi-factorial and Physical Activity Programs for Fall Prevention

Prepared by Debra Rose, PhD, Laurence Rubenstein, MD, MPH, Anna Q. Nguyen, OTD, OTR/L, Caroline Cicero, MSW, MPL & Bernard Steinman, MS

Approximately one third of community-dwelling individuals age 65 and over will experience a fall annually. The need for providing fall prevention services is gaining importance in the policy, social service, recreation and parks, health care, and research arenas.

In order to meet increasing demand, the number of evidence-based fall risk reduction/prevention programs has grown substantially in the U.S. and abroad, offering service providers with an array of program choices to fit a diverse set of needs and available resources.

This program review is intended to assist service providers with selecting the intervention program that best suits the needs of their clients, within the constraints of available resources.

Ten fall risk reduction/prevention programs are described in this program review. Programs were selected according to the following criteria: a) a clear focus on fall risk reduction, b) the availability of replication materials, and c) published evidence of program efficacy and/or extensive field testing.

Please visit www.stopfalls.org for a full list of program-related references.

Program Descriptions

EnhanceFitness - Formerly Lifetime Fitness Program. Developed and tested in 1994 by researchers at the University of Washington (UW) in collaboration with Senior Services (Northshore Senior Center), and Group Health Cooperative (GHC). Potential instructors must complete a two-day instructor certification course. Additional information about the program and instructor training courses is available at: *www.projectenhance.org*

FallProof! - Developed by Debra Rose, PhD at California State University Fullerton's Center for Successful Aging. A full description of the program is provided in "Fallproof: A comprehensive balance and mobility training program." [5] published by Human Kinetics. Potential instructors must first complete an instructor training program. Program replication materials are made available to instructors who complete training program. Information is available at *hhd.fullerton.edu/csa*

Falls Management Exercise (FaME) - Developed by researchers at Imperial College School of Medicine in London. National program in UK - program-specific training provided to already accredited instructors.

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Fall Risk Reduction/ Fall Prevention	Enhance Fitness	FallProof!
1. Goals	• Improve physical and psychological function • Prevent functional decline • Lower fall risk	• Reduce risk factors for falls (e.g., balance, gait, strength) • Improve balance-related self-confidence
2. Components and Intensity	• Physical activity ***	• Fall risk education / behavior change **** • Physical activity **** • Fall risk assessment and medical management *** • Home modification **
3. Program Description (e.g., class meeting, facilitator, follow-up)	• Multimodal, group-structured (20-25 participants) exercise program consisting of low-impact aerobics, flexibility, resistance training, balance • Conducted 1hr X 3x/wk in community and retirement facilities • Certified fitness instructors • Fitness testing at regular intervals (4 mths after initiation), 3 optional balance and endurance tests	• Group-structured exercise program with primary focus on balance and mobility training conducted 1 hr X 2x/wk (minimum 8-12 wks) in community and retirement facilities [5] • Supplementary behavior skills training program (Six 45 min sessions every 2 wks) and progressive home exercise program (3 levels; on non-class days) • Performance testing at regular intervals. • Health care professionals or exercise specialists with additional training in balance and mobility
4. Target Audience	• Older adults at all risk levels	• Older adults at moderate-to-high risk for falls based on established program criteria.
5. Outcomes/ Evidence	• Increased strength, balance, and mobility [1-3] • Decreased fall risk factors, although no documented change in fall rates [4]	• Increased balance, mobility, strength, and balance-related self-confidence [6-8]

Falls Management Exercise (FaME)	A Matter of Balance[11]	OsteoFit
• Prevent injuries and falls • Improve long-term adherence to exercise	• Reduce fear of falling • Increase activity levels	• Improve balance • Strengthen key muscle groups • Ameliorate quality of life • Reduce risk of falls and fractures
• Physical activity **** • Fall risk assessment and medical management ***	• Fall risk education / behavior change *** • Physical activity ** • Home modification *	• Fall risk education / behavior change *** • Physical activity ***
• Individualized and tailored home and group exercise program • Group class 1hr X 1x/wk with specific focus on balance, gait, endurance, strength, flexibility [9] • 20-40 min X 4x/wk home exercise program (Otago exercises and lower body strength) • Duration of program - 36 wks • Taught by qualified exercise-for-the-older person instructors (National program in United Kingdom) with additional FaME program training	• Series of group discussions on problem-solving & skill building, assertiveness, physical activity, managing fear of falling, educational videotapes [12] • 2 hrs X 2x/wk X 4 wks 12 participants max per group • Trained Lay Leaders (coaches) trained by Master Trainer • Other Staff: visiting therapist • Optional Pre-/ Post-program Survey; Program Satisfaction Evaluation	• Group-based education and exercise program designed to improve strength, posture, balance, and agility. • Class is 1 hr X 2x/wk for minimum of 6 wks. There are 2 levels. • Discussion on living with osteoporosis, warm up, strength, balance, agility, relaxation, visualization, hip & trunk stabilization, resistance training with elastic bands • Certified Osteofit instructors • Outcome testing at baseline and 20 wks
• Older adults at high risk for falls and/or previous fall history	• Older adults who have restricted activities due to fear of falls or concerns about and/or a history of falls	• Older women with osteoporosis and osteopenia
• Reduction in fall incidence rates[10]	• Increased levels of intended activity, improved mobility control (6 wks), social function and mobility range (12 mths)[13]	• Significant improvements in dynamic balance, knee strength [14]

 # = please visit www.stopfalls.org for a full list of program-related references

hr(s) = hour(s); min(s) = minute(s); mth(s) = month(s); wk(s) = week(s)

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Fall Risk Reduction/ Fall Prevention	Otago Exercise Programme
1. Goals	• Improve balance, strength, and endurance. • Reduce falls and fall-related injuries
2. Components and Intensity	• Physical activity **** • Fall risk assessment and medical management ***
3. Program Description (e.g., class meeting, facilitator, follow-up)	• Individualized and progressive home-exercise program performed 5x/wk (twice daily for 15-20 min) • Focus on improving leg strength, dynamic balance, and endurance • Supplemented with walking program 30 mins – 2x/wk • 4 home visits during first 2 mths to teach and progress exercises followed by booster visits every 6 mths with phone follow-up every mth • Led by physiotherapists or health professionals trained by suitably qualified physiotherapist
4. Target Audience	• Frail older adults (> 80 years) able to ambulate in home
5. Outcomes/ Evidence	• Reduction infrequency of falls and moderate injuries in participants over 80 years; No reduction in falls among younger older adult participants[15] • Small gains in balance & strength • Program is cost effective[16-18]

Strategies and Action for Independent Living (SAIL)	Stepping On	Tai Chi: Moving For Better Balance
• Reduce falls & related injuries	• Reduce falls • Improve fall self-efficacy • Encourage behavioral change	• Improve muscle strength and balance • Reduce falls
• Home modification *** • Fall risk assessment and medical management ** • Physical activity * • Fall risk education *	• Fall risk education / behavior change **** • Home modification **** • Fall risk assessment and medical management *** • Physical activity *	• Physical activity ****
• Individualized action plan and referral based on risk factors identified in 83-item Fall Prevention Checklist & Action Plan (C & A) • Regular in-home visits and monitoring of client actions taken to reduce identified fall risks over 6-mth intervention • Trained community health care workers • Follow-up: C & A; Falls Surveillance Report Form	• Small group classes conducted by health care professional (e.g., OT) focusing on fall risk education & risk reduction through behavior change strategies [23] • 2 hrs X 1x/wk X 7 weeks. Follow-up home visit to monitor compliance with recommendations • 1.5 hr booster session post program (3 mths) • Health care professionals (e.g., PT & OT) Follow-up In-home visit by health care professional post-program	• Group-based 8-form sequence Tai Chi classes conducted in local community centers. Also appropriate for home use [25] • Conducted 1 hr X 2x/wk for 12 weeks • Classes include warm-up (5-10 mins), 40-45 min of 8-form tai chi sequence, 5 min cool-down • Taught by Tai chi instructors with experience teaching traditional short 24-form Yang style • Additional home practice encouraged (video/DVD and user's guidebook provided)
• Frail older adults eligible for home support services • Ambulatory with or without assistive device	• Community-residing older adults with previous fall history or self-identification of fall risk	• Older adults who are physically mobile and without severe mental deficits
• Reduction in falls and fall-related injuries between 6-mth pre-intervention and post-intervention (6 mths) – quasi-experimental trial [19]	• Reduced falls • Improved self-efficacy related to mobility but not for home-based ADLs • Greater use of protective behavioral practices • Program particularly effective for men [24]	• Improved balance, gait, and strength, perceived health status and IADLs [26-27] • RCT using 24-form sequence shown to reduce fall incidence [28]

 # = please visit www.stopfalls.org for a full list of program-related references

ADLs = activities of daily living; hr(s) = hour(s); IADLs = instrumental activities of daily living; min(s) = minute(s); mth(s) = month(s); OT = occupational therapist; PT = physical therapist; RCT = randomized controlled trial; wk(s) = week(s)

Program Descriptions...continued

FaME…continued - Replication materials are not publicly available; for published articles, visit: *www.laterlifetraining.co.uk* or contact Dawn Skelton at *dawn.skelton@gcal.ac.uk*

A Matter of Balance - Cognitive restructuring program developed by a consortium of researchers at the Roybal Center at Boston University in 1998.[13] Recently adapted (volunteer lay leader model) by the Partnership for Healthy Aging in conjunction with Maine Medical Center, Southern Maine Agency on Aging, and University of Southern Maine School of Social Work. Program replication materials based on the original version of the program are available at: www.bu.edu/hdr/products/balance/index.html. Replication manuals for the adapted program are available at: *www.mainehealth.org/mh_body.cfm?id=3498*

Strategies and Action for Independent Living (SAIL) - Developed by Vicki Scott, PhD and colleagues at the British Columbia Injury Research & Prevention Unit and the Office for Injury Prevention. Replication materials are currently not available; for published articles visit: *www.injuryresearch.bc.ca*

Stepping On: Building Confidence and Reducing Falls - Developed by professional geriatrics practitioners and researchers at the University of Sydney, Australia. Replication manuals are available by searching at: *www.therapybookshop.com*

Osteofit - Developed at the British Columbia Women's Hospital and Health Center with ongoing consultation provided by researchers at the UBC Bone Health Research Centre. Potential instructors must complete Osteofit Instructor Training Program. Program and Instructor Training Information is available at: *www.osteofit.org*

Otago Exercise Programme - Home-based exercise program developed by the Falls Prevention Research Group at the University of Otago Medical School. Program description and materials are available at: *www.acc.co.nz/injury-prevention/home-safety/older-adults/otago-exercise-programme/index.htm*

Tai Chi: Moving for Better Balance - Developed by Fuzhong Li, PhD and colleagues at the Oregon Research Institute. The current program is adapted from original 24-form Yang style program evaluated in a randomized controlled trial in 2005. Instructor manual and video clips of 8-form sequence available at:
healthyaging.ori.org/taichidis/taichidis.html

This review is based on a careful analysis of published outcomes and/or available program materials. We acknowledge that this is a work in progress and may not accurately represent the current status of the included programs. In addition, several worthy programs may not have been included due to lack of information related to one or more of the three inclusion criteria.

We invite feedback and/or clarification from developers of the included programs as well as other programs who would like to have their program included in future versions of this brief.

Fall Prevention Program Matrix – Rating Scale

This rating scale was created to provide an overview of the intensity for each of the program components. In some cases, programs may not fall entirely within a star (*) rating, but may fit 2 of the 3 categories of the rating. As other programs are included in future versions of this brief, the descriptions of each star rating will be updated to reflect the components of existing programs.

Definitions

Lay leader = individual not employed by the program; volunteer; little or no formal training; may have experience facilitating groups or working in the health care field

Peer professional = individual employed by the program, including but not limited to outreach staff, community health care professionals

Health care professional = individual employed by program or contracted to deliver one or more aspects of program and who have specialized training in one or more components of fall risk reduction programming

Fall Risk Assessment and Medical Management

Review of participant's health history related to falls, with focus on known risk factors for falls (e.g., comorbidities, medications, balance, gait, fall history).

Rating	Content	Moderator	Follow-Up
*	Self-administered fall risk checklist	No referral	No follow-up
**	Self-administered fall risk checklist	Referral to primary care physician by program staff	No or minimal follow-up (e.g., confirmation via phone call or in-person) by program staff
***	Fall risk screening by trained professional	Referral to primary care physician by program staff	Minimal follow-up (e.g., confirmation via phone call or in-person) by program staff
****	Fall risk screening by trained professional	Referral to primary care physician or specialist by program staff	Follow-up medical risk assessment to evaluate change by trained professional

Physical Activity

Single or multimodal physical activity program intended to reduce fall risk factors and/or falls through increasing aerobic endurance, balance, flexibility, and/or strength.

Rating	Content	Moderator	Follow-Up
*	Encouragement to become physically active with examples provided, or referral to community program	No formal personnel	No or minimal follow-up
**	1x/wk structured program that is individual or group based	Trained lay leader	No or limited follow-up (e.g., satisfaction rating, compliance); follow-up phone call
***	2-3x/wk structured single or multimodal exercise class (e.g., aerobic, balance, resistance) focused on general fitness	Trained exercise instructor	Evaluation of progress (e.g., aerobic endurance, balance, strength); may also include fall incidence rate monitoring; follow-up phone call
****	2-3x/wk structured multimodal exercise class with content clearly focused on fall prevention	Trained exercise instructor or health care professional	Evaluation of progress (e.g., aerobic endurance, strength, balance); may also include additional fall risk factor (e.g., incidence monitoring)

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Home Modification

Assessment of participant's awareness of extrinsic and behavioral fall risks related to the home environment, referral to home modification agency, and follow-up on installation and proper usage of home modifications.

Rating	Content	Moderator	Follow-Up
*	Self-administered home assessment	No referral	No follow-up
**	Self-administered home assessment	List of recommendations provided for modification, provision of resource guide, or list of home modification agencies by program staff	No or minimal follow-up (single phone/ in-person contact)
***	In-home assessment by trained professional (e.g., social worker, home modification agency staff)	List of recommendations provided for modification or referral to home modification agency by program staff	Follow-up phone call or in-person by program staff
****	In-home assessment by trained rehabilitation professionals (e.g., OT, PT), focusing on person-environment interaction	Referral to home modification agency by program staff	At least one follow-up home visit by trained rehabilitation professional

Fall Risk Education and/or Behavior Change

Education content designed to inform participants about fall prevention-related topics (e.g., shoe selection, falls in the community). Behavior change content introduces concepts intended to alter or maintain behaviors (e.g., self analysis, keeping records, rewarding positive behavior).

Rating	Content	Moderator	Follow-Up
*	Dissemination of written fall risk education materials only	No moderator	No follow-up
**	Regularly scheduled fall risk education discussion groups	Lay leader moderator	No or limited follow-up
***	Series of educational discussion meetings aimed at changing fall risk behaviors. May or may not include home assignments	Lay leader or peer professional moderator	Knowledge based post-test; follow-up phone call/contact
****	Systematic program aimed at changing fall risk behavior (e.g., tailored messages and services, regular group discussions.	Health care professional or trained moderator	Evaluation of behavior change outcome measures