

FOX BETTER LIVING FALL RISK REDUCTION & EXERCISE PROGRAM

AN EVIDENCE-BASED APPROACH TO REDUCING INCIDENCE
OF FALLS IN ASSISTED LIVING FACILITY RESIDENTS

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INTRODUCTION

Falls are a major health problem in the elderly community, increasing the risk of mortality, morbidity, disability, and frailty.¹ Medical costs associated with falls continue to escalate. The financial toll for older adult falls is expected to increase as the population ages, and may reach \$54.9 billion by 2020 (adjusted to 2007 dollars).² In a study of people age 72 and older, the average health care cost of a fall injury totaled \$19,440, which included hospital, nursing home, emergency room, and home health care, but not doctors' services.³ The purpose of this pilot program was to evaluate the effectiveness of a comprehensive fall risk assessment routine and exercise programming to reduce the incidence of falls in assisted living facility residents.

Preventing falls and maintaining older adults as valuable members of their communities is rapidly becoming a national priority.⁴ Frequently, older people are not aware of their risks of falling, and neither recognize risk factors nor report these issues to their physicians. Consequently opportunities for prevention of falling are often overlooked with risks becoming evident only after injury and disability have already occurred.⁵ We hypothesized that a proactive program of assessments to identify fall risks, combined with the provision of appropriate medical, lifestyle and caregiver interventions, as well as group exercise classes, would reduce the incidence of falls in assisted living facilities

Those who are physically inactive lose muscle mass and strength more quickly than active individuals who participate in strength training.⁶ After the age of 60, power decreased even more rapidly at a rate of 3% to 5% annually, affecting the ability to move and react quickly.⁷ Diminished power and strength affect function and can be a leading cause of nursing home admission and falls, further reinforcing sedentary habits.^{6,11}

It has been estimated that approximately 25% to 35% of community living older adults (65 years of age or older) experience one or more falls each year.^{8,9} The greater the number of risk factors an older adult has, the higher their risk of falling.⁴ It has been estimated that falls can be reduced by 30% - 40% by performing a multi-factorial fall risk screen and then referring individuals for tailored treatment.¹⁰ The best practice guidelines of The American Geriatric Society require routine screens of all older individuals. Fox recommends fall risk assessments be performed every 90 days on all elderly individuals. Physicians, nurses, and physical, occupational and speech therapy professionals play an important role in identifying risk factors for falls and providing appropriate interventions to decrease the incidence of falls.

PROGRAM DESCRIPTION

An informational meeting was held prior to initiation of the program that was attended by facility executive directors, directors of nursing, marketing, wellness, and activities. An in-depth understanding by ALF staff is critical to the success of the program. These meetings were also attended by Fox Rehabilitation facility clinicians, the Fox Regional Director, Regional Marketing Director, Director of the Fall Risk Program, and the Exercise Physiologist that is the Fall Risk Reduction and Exercise Program Coordinator. The purpose of these meetings was to discuss all aspects of the program, including goals of program, roles and responsibilities of each facility staff member and Fox staff member. In addition, letters introducing the Fox Better Living Fall Risk Reduction and Exercise Program were delivered to all assisted living facility residents, their families and physicians several weeks prior to program implementation.

All residents were given the opportunity to opt out of the program. Fall risk assessments were performed by an exercise physiologist trained in geriatrics, who serves as the Fox Better Living Fall Risk Reduction and Exercise Program Coordinator. As per the AGS guidelines, the fall risk assessments were offered to all residents, regardless of past medical history, current medical or cognitive status. Approximately 240 residents consented to the fall risk assessment. Ages ranged from 55 – 100 years.

Approximately 240 assisted living facility residents in 3 facilities were assessed for their risk of falling. The four highest risk factors in predicting falls were assessed using evidence-based, functional outcome measures. Based on the results of the fall risk assessment, residents were categorized as either a high or low risk of falling. Recommendations were made to high risk residents, which included: referral to occupational, physical and speech therapy, referral to physician, medication review, assessment of environmental hazards, changes in toileting schedule, caregiver education, and ordering durable medical equipment. Recommendations were made to low risk residents which included: participation in a group exercise program designed to improve leg strength, mobility, and balance.

Exercises need to be performed at an appropriate frequency, duration, and intensity to achieve physiological improvement in muscle strength. Group exercise sessions performed 2x per week for 90 minutes each session, including warm-up and cool-down, can be an effective prescription. Appropriate intensity, repetitions and frequency need to be adhered to. Optimal body mechanics and proper techniques need to be facilitated in order to achieve desired effects with any exercise program. As such, Fox employs exercise physiologists who possess appropriate knowledge of human biology, physiology and exercise science to coordinate this program.

The program was implemented in November, 2009 at 3 assisted living facilities. Baseline data for monthly falls was collected for the 10 months prior to program implementation, from January through October, 2009. A fall was defined as an unintentional loss of balance resulting in movement to the ground. Fall statistics were gathered from in-depth review of facility Incident Reports, and confirmed for accuracy with Facility Incident/Analysis and Tracking Reports as provided by the facilities to Fox.

RESULTS

Month (2009)	Facility #1	Facility #2	Facility #3
Jan	34	21	20
Feb	24	6	6
Mar	35	16	11
Apr	27	12	23
May	34	11	11
Jun	17	15	11
Jul	33	39	18
Aug	21	27	8
Sep	26	18	8
Oct	14	19	13
Monthly Average	26.5	18.4	12.9
Median	26, 27	16, 18	11
Mode	34	n/a	11
Range	14 - 35	6 - 39	6 - 23
% of census	31	21	15

Table 1. Monthly Falls Prior to Initiation of Program

Month ('09 - '10)	Facility #1	Facility #2	Facility #3
Nov	20	19	11
Dec	8	10	6
Jan	13	15	16
Feb	13	16	6
Mar	13	16	11
Apr	25	24	20
Average	15.3	16.6	11.7
% Change	42.2% Reduction	10.0% Reduction	9.0% Reduction
Median	13	16	11
Mode	13	16	6, 11
Range	8 - 25	10 - 24	6 - 21
% of census	18	19.5	13.7

Table 2. Monthly Falls After Initiation of Program, with Percentage Reduction

Each facility had a mean census of 85 residents. Facility #1 had a consistently high incidence of falls prior to initiation of the program due to multiple residents falling several times each month. Total falls each month amounted to 31% of Facility #1 census, compared to 21% of Facility #2 and 15% of Facility #3.

30 Second Sit>Stand (Reps)		
Participant	Wk #1	Wk #12
1	12	11
2	7	6
3	10	10
4	0	4
5	12	15
6	13	13
7	12	13
8	10	17
9	10	12
10	16	17
11	12	15
Average	10.4	12.1
% Change	16.3% improvement	
Median	12	12.1
Mode	12	12, 13, 15
Range	0 – 16	4 - 17

Table 3. 30-Second Sit>Stand Scores
Pre-And Post-Participation in 12-Week
Exercise Class

Timed Up and Go (Seconds)		
Participant	Wk #1	Wk #12
1	20	18
2	6	7
3	19	10.5
4	14	11.6
5	8	10.5
6	10	8
7	7	7
8	10	10.5
9	13	16
10	12	13
11	14	13
Average	12.1	11.4
% Change	6% improvement	
Median	12	10.5
Mode	14	10.5
Range	6 - 20	7 - 18

Table 4. Timed Up and Go Scores
Pre-and Post-Participation in 12-Week
Exercise Class

Functional Reach (inches)		
Participant	Wk #1	Wk #12
1	7	11.25
2	8	12
3	10	13
4	9	13
5	10	11.5
6	8	9
7	9	11
8	9	12.5
9	9	9
10	13	13
11	14	13
Average	9.6	11.7
% Change	22% improvement	
Median	9	12
Mode	9	13
Range	7 - 14	9 - 13

Table 5. Functional Reach Scores
Pre-and Post-Participation in 12-Week
Exercise Class

Facility #1 had a 42.2% reduction in falls since initiation of the program. The high reduction of falls was in part the result of implementing a proper fall reduction program, which included occupational and physical therapy intervention, behavioral management, and caregiver training. Facility #2 had a 10% reduction in falls, and Facility #3 had a 9% reduction in falls. No other fall risk reduction programs were implemented since November 2009 at any facility to otherwise account for this system-wide reduction in falls.

Approximately 90% of residents living at these facilities were determined to be at a high risk of falling. 10% of the residents were determined to be at a low risk of falling, and were appropriate for the exercise class. 25 residents were selected for the exercise class and consented to participate. 15 of those residents began the 12-week session. The other 10 residents decided not to participate for various reasons, including caring for dependent spouse, scheduling conflicts with social and recreational activities, and frequent medical appointments. Of the 15 residents who began the 12-week session, 11 completed all 12 weeks (24 sessions). The remaining 4 residents were all unable to complete the sessions for other medical reasons, though none due to falls.

The 30 Second Sit to Stand (a measure of leg strength) improved 16.3%; the Timed Up and Go (a measure of mobility) improved 6%; and the Functional Reach (a measure of balance) improved 22%.

Different raters gathered data for pre- and post- exercise class Functional Outcome Measure scores to ensure a high level of objectivity.

Functional Outcome Measure scores were taken after 6 weeks of exercise class participation to ensure efficacy of the exercises. At this time, the 30-Second Sit>Stand scores improved 22%, the Timed Up and Go scores improved 16%, and the Functional Reach scores improved 3%. Adjustments were made to the exercise class at this time to further increase improvements in balance, as well as leg strength and mobility. These adjustments include allotting time during each exercise session for the exercise physiologist to provide individual exercise guidance for each participant. In this way, higher dynamic activities were provided, including dynamic balance on uneven surfaces, reaching activities, and interval gait training.

Initially, the exercise classes had firm start and end dates, so that all participants were at the same point in the 24 session program. As a result, residents that proved able to participate in the exercise classes at a later date (i.e. new residents to the facility, residents that were ill or injured at original assessment date, or residents that gained strength during occupational or physical therapy) were informed they had to wait until the beginning of the next 12-week session. The entry procedure has been modified, and classes are now on-going, such that residents may enter at any point and participate for 24 sessions in a 12 week period.

DISCUSSION

The amount of fall reduction will vary between facilities. Factors that contribute to the level of fall reduction include morbidity and functional level of residents admitted to the facility, facility staff level of training, collaborative approach of facility administrative and nursing staff, and family support of residents.

This summary report has several limitations. A larger N value of exercise class participants will enable a more accurate determination of the efficacy of the exercise classes. Also, residents have only been followed for 6 months, so at this time it is not possible to determine the lasting effects. However, all residents will continue to be assessed quarterly for their fall risk and appropriate recommendations made.

Attendance and participation goals for the exercise classes are a minimum of 10 residents per class. As more high-risk residents are provided with appropriate intervention, the number of exercise class participants is anticipated to increase over time, as many of these residents will then matriculate into the exercise class.

Prior to initiating the program at each facility, statistical analysis will be performed. From this data, anticipated fall reduction thresholds will be determined by Fox. Assisted living facilities will be required to provide appropriate levels of assistance and cooperation to ensure total success. This includes complete collaboration of nursing and rehabilitation staff, coordination of exercise class days and times with facility activity directors, and proper space allotment within facility to provide assessments and exercise classes.

CONCLUSIONS

Although 25 – 35% of community dwelling older adults experience one or more falls each year, falls should not be considered a normal part of the aging process. Falls happen for many different reasons, and there is always a reason for a fall. Comprehensive fall risk assessments which include an investigation of history of falls, the medical, physiological, cognitive and environmental factors which contributed to a fall, and implementation of an appropriate fall prevention plan for each resident will decrease incidence of falls in the assisted living facility environment.

We conclude that implementation of the Fox Better Living Fall Risk Reduction and Exercise Program will reduce the incidence of falls at assisted living facilities, and improve the leg strength, mobility and balance in residents that participate in its group exercise program.

Proper introduction of the program to all facility residents, their families and physicians is critical to assure a high level of participation in the assessments. A 100% level of participation from residents is achievable, with proper education of the purpose and procedure of the program, as well as encouragement by the facility staff, physicians and family members.

Functional abilities often change rapidly in the older person due to various reasons, including medical, cognitive, emotional, and environmental disturbances. As such, proactive identification of deficiencies of the highest risk factors that frequently contribute to a fall is of utmost importance. Open and frequent dialogue between the rehabilitation, physician, nursing staff and family on the best ways to prevent falls in each resident is also critical to fall reduction.

A group exercise class that has been designed by physical and occupational therapists that specialize in the geriatric population and led by an exercise physiologist can be an effective way to improve leg strength, mobility and balance. In this way, elderly people that are not able to receive rehabilitation services due to the current limitations in Medicare guidelines will not become at a high risk of falling in the future. As a community outreach service, the program is also offered to surrounding community residents, such that community-dwelling older adults can schedule an appointment at an assisted living facility in order to have their fall risk assessed, and participate in the exercise class, if appropriate.

The Fox Better Living Fall Risk Reduction and Exercise Program offers a cost-effective way to reduce the incidence of falls in the assisted living facility older population, and increase leg strength, mobility and balance of exercise class participants. As this is a valuable professional service, Fox Rehabilitation seeks to be compensated in the amount of \$400 per month per facility. Based on a census of 100 residents, this expense would be equivalent to an investment of \$48 per resident per year on the part of each facility. This translates to a cost of 13 cents per day per resident. Some residents pay in excess of \$4,800 per month to reside in an assisted living facility, and as such, preventing one fall annually that results in a resident moving out of the facility due to injury or death would defray the cost of this program.

Procedure	Cost (\$)
Hip X-ray	39.57
Hip MRI	718.20
Pelvic Cat Scan	319.03
Femoral ORIF	1,223.37
Total Hip Replacement	1,484.30

Table 6. Medical Costs Associated with a Fall¹²

This \$400 fee is less than the cost of one hip MRI, approximately 1/3 the cost of a hip Open Reduction Internal Fixation and 1/4 the cost of a Total Hip Replacement. Though the assisted living facility is not incurring the cost of the above mentioned medical procedures, as stewards of the elderly, Fox believes it is our shared responsibility to lower the burden of healthcare costs whenever appropriate.

Statistical data collection will be on-going, and quarterly summary reports will be distributed to all participating assisted living facilities. Adjustments to the program will also be on-going, as Fox's commitment is to provide the highest value and most efficacious fall risk reduction and exercise program possible.

FOR QUESTIONS OR COMMENTS, CONTACT

1. Tim Fox, PT, DPT, GCS, CCI

Dr. Tim Fox is a practicing Physical Therapist and the Executive Director of Fox Rehabilitation, Geriatric Therapy at Home. Tim graduated from Thomas Jefferson University, Philadelphia, PA in 1995 with a Master of Science in Physical Therapy. He received his Board Certification as a Geriatric Clinical Specialist (GCS) in 2008 from the American Board of Physical Therapy Specialties and went on to complete his Doctor of Physical Therapy (DPT) in 2009 from Thomas Jefferson University. Tim also is an APTA Credentialed Clinical Instructor (CCI). Dr. Fox's interest in the unique needs of the elderly allowed him to identify a gap and significant limitation in how the elderly access and receive necessary Physical and Occupational Therapies. Tim realized that there is a large portion of the elderly population that are in need of accessible, evidence based therapy interventions that are highly effective in improving levels of function, safety, quality of life and well being. Tim's practice also prides itself on its ability to manage and educate patients with cognitive impairments and their caregivers. Tim believes (and therefore a philosophy of Fox) that via the utilization of best practice guidelines, the latest evidence and insisting on high clinical and interpersonal standards from his colleagues, the elderly should perform at their most optimal functional level, regardless of past and current medical conditions. Today, Fox employs over 300 clinicians who make over 6,000 house calls per week to the elderly community in over five states. Tim can be reached at Tim.Fox@foxrehab.org

2. Glenn Sloves, PT, MSPT

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3. Paul Della Vecchia, PT, MSPT

Paul Della Vecchia is a physical therapist and Executive Director of Clinical Operations at Fox Rehabilitation. He received his undergraduate degree in Exercise Science at Old Dominion University in Virginia, and a Masters of Science in Physical Therapy from Thomas Jefferson University in Philadelphia, Pennsylvania. Paul has been at Fox Rehab for over 10 years and currently oversees all clinical operations at the practice, including professional development and quality assurance. He is an active member in the APTA and belongs to the HPA and Geriatric Sections, with a special interest in Medicare and federal health care policy. Paul can be reached at Paul.DellaVecchia@foxrehab.org

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