Statement of Needs

The number one cause of injury among older adults is falling.[1] Falls often result in injuries that lead to emergency room visits or require the services of health care professionals.[1] According to the CDC, falls are the leading cause of nonfatal injuries, and hospital admissions for trauma in the 65+ populations.[1] Some of the most common injuries from falls are lacerations, head trauma along with TBI's, and fractures of the hip, spine, forearm, pelvis, and ankle.[1] These injuries often result in hospital admissions that frequently turn into extended long-term stays at skilled nursing care facilities.[1]

Falls also cause a loss of confidence and fear of falling that limits normal activity, which decreases social activities and overall health, while increasing the risk of depression.[1] Thus, falls have several outcomes that are not conducive to the general wellbeing of older adults and they lead to an increased expenditure of healthcare dollars.[1] In 2010, there were 2.3 million nonfatal injuries from falls, with an estimated cost of 30 million health care dollars spent.[1] These numbers are staggering, but what is even more staggering is to consider the number of deaths associated with falling. In 2010, about 21,700 older adults died from unintentional fall injuries.[1] Furthermore, WHO reports that the world's population of 60 and over has doubled over the past 30 years and they predict it will eclipse 2 billion by the year 2050.[2]

With the elderly population's estimated growth, we can expect to see an increase in falls, fall related injuries, institutionalism, poorer outcomes and quality of life, and an overall increase in the cost of healthcare.[1-11] Therefore the need to identify interventions that reduce the rate of falls, the risk of falling, and their associated injuries is paramount in decreasing overall costs, poorer outcomes as well as quality of life. Exercise is the number one recommended intervention according to the CDC at reducing the risk of falls.[1] The exercises emphasized are strength, balance, flexibility, and endurance.[1] However, there has been an increasing trend at the effectiveness of a variety of group classes, as well as multifactorial approaches. Many of the group classes focus on the common exercises, but Tai Chi has also become a popular choice. Multifactorial programs have been reported to be superior to single intervention approaches.[4] They often vary, but commonly include the common exercises, medicine reviews, fall prevention education, and home safety assessments.[5-7]

Randolph County, NC has experienced a growth rate of 8.6% from 2000-2010, and this rate is expected to continue to increase over the next decade. From 1980-2010, Randolph County gained 51,058 residents. Currently, 17.7% of its population is 62 and over, which is above average for NC. There are several registered Silver Sneaker gyms, including the YMCA, that cater to older adults fitness in Randolph County. However, there are no programs that specifically address fall education, fall prevention exercises, and the fear of falling. Therefore, establishing a program that addresses fall education and fall prevention exercises that can decrease fear of falling will help elderly in Randolph County become more active members of the community and improve their quality of life.

Background

A review of literature for fall prevention interventions directed at community dwelling older adults >60 has demonstrated that the rate of falls, fall risks, and their associated injuries can be decreased by using a multitude of interventions. However, exercising seems to be the best intervention when it comes to decreasing the risk of falls. Exercise interventions that consist of progressive balance, strength, and aerobic training will have the largest impact on fall reductions.[4-10] Other interventions that have been tested are tai chi, yoga, dance, step-training, education on preventing falls, medicine reviews, and home safety assessments. Many of these studies show that these interventions have better outcomes compared to no intervention, but there seems to be a growing trend that multi-factorial interventions work the best. However, there is no definitive evidence that suggests standard group exercise or multifactorial approaches are more effective at reducing falls risk in the community dwelling older adult, than the other.[5-7] Tai Chi has been reported to have better results in seniors that are more active, open to new things, and has better coordination and learning skills.[3,11,12] This review suggests that better outcomes that include number of falls, secondary measures, fear of falling, and depression are associated with programs of higher frequencies and longer durations.[10,11] To develop an effective program, one of the biggest factors to consider is attendance.[6] Transportation, location and access are essential components to attendance. Social interaction also seems to play a key role in patient adherence.[12] Secondary measures that should be included are TUG, FES, 30sec sit-to-stand, gait speed, and QOL/depression scales.[3-12] Utilizing exercises that are functional will lead to better carry-over.[8-10] Multi-component interventions that include education on several topics of general healthy living have been shown to promote better lifestyle changes, as well as decrease falls risk.[3] The circuit training that Nitz employs, could be used for more advanced patients.[8] Lastly, individualization of exercise programs will promote better adherence as well as gains.[4]

The trans theoretical model is a model that can address the psychosocial aspects of falling. Incorporating this model into a fall prevention program will equip the PT to be able to assess the stage of change the patient is in. The PT will then be able to approach the participant according to their stage and it will assist the PT in helping get the participant more involved in their care. By the participant taking more control over their situation, it will help promote confidence, which should improve the psychosocial outcomes associated with falls.

Mission Statement:

To help older adults live their life to the fullest.

Potential mottos

Falls don't have to be surprises

Don't let a fall keep you from the ball (aka social event)

Objectives for LWB:

1. Use standardized fall screening measures at local community senior events, senior centers, or public events to identify seniors at increased risk of falling.
2. To increase awareness and understanding of fall risks, fall related complications, and the numerous interventions that have been proven to decrease falls risk, through a series of presentations that educate seniors on various topics surrounding health, wellness, and falls.
3. Provide individual evaluations, through personal interviews, in order to develop an intervention plan that is personalized to senior's lifestyle that will increase likelihood of long-term participation and adherence.
4. Improve senior's confidence and QOL, in order to promote greater participation and active lifestyle, through education, exercise, and encouragement.
5. To improve strength, balance, reaction, and endurance in seniors, through exercise interventions that are individualized according to preference and lifestyle.

Proposed Intervention

"Life Without Boundaries" will incorporate fall screening, personal interview, individualized intervention plan, education, and routine measures to help older adults live their life to the fullest by preventing and mitigating the effects of falls. The interventions will be individualized according to preferred location and type of exercise, and PT recommended intervention based off of fall screen results. There will be tiers of interventions based on senior's functional level.

Site Parameters

The proposed site of "Life Without Boundaries" is Randolph County Senior Center, located in downtown Asheboro, which is centrally located in Randolph County. Downtown Asheboro is a lively and active community, frequently holding public events that are designed for the elderly, which should promote greater participation. The senior center also offers transportation to and from senior center for elderly that do not drive. The center is equipped with a large general-purpose room, as well as many classrooms.

Affiliate sites will include Randolph-Asheboro YMCA, Randolph Hospital, 3 Deep River Rehab clinics, and other local centers/gyms that will be recruited. These sites will offer space and equipment needed to set-up group exercise classes or one-on-one exercise sessions that will cover the need for tiered interventions. These sites also allow seniors to pick a location they prefer as well as allow them more accessibility that will hopefully lead to better adherence.

Local healthcare professionals from hospital and outpatient clinics will provide one-on-one exercise sessions. Select group of PT's will provide fall screens and personal interview twice a month for

scheduled seniors. PT's will also promote "Life Without Boundaries" program at public/senior events. Healthcare professionals and PTs will present these presentations.

Screen

There will be two screens offered, depending on event location. The brief screen will be designed for public events and focus is on identifying fall risks. Brevity of the screen is important when promoting program at public events, so as to not deter seniors if it were a lengthy screen. This screen will consist of TUG, 30-second chair stand, 10-meter walk test, and functional reach test. These measures are estimated to take less than 10 minutes total. Senior will be given opportunity to make a follow-up appointment, and/or referred to affiliate sites for group classes. The complete screen (assessment) is designed for the seniors that make appointments with PTs at the senior center directly, or through follow-up from a brief screen at public event. The complete screen will also include fall risks measures, as well as Falls Efficacy Scale, SF-36, 2 or 6 minute walk test, and Tinetti Performance Oriented Mobility Assessment. The PT will also evaluate ROM/flexibility, strength, and screen for other conditions that might need to be addressed, that could be the cause of poor test scores.

Rationale of Tests:

TUG, 30-second chair stand, 10MWT, and functional reach test are all reliable, valid, short, widely used, has normative data reported and are sensitive to predicting falls risk.[14] The FES is able to determine the level of concern a senior has while performing certain tasks, and it will assess fear of falling.[13] This is important to know, because fear of falling often limits participation in normal life.[3] The SF-36 is a general QOL measure that will help determine stage of TTM, as well as to record improvement when senior is re-assessed.[14] 6-minute walk test is used to assess endurance, and this will be helpful when considering the recommendation for the exercise intervention.[14] The Tinetti POMA is made up of a balance and gait portion that breaks down certain tasks, and gait patterns that indicates risk of falling.[14]

Personal Interview

The interview is designed to allow for PT to gain a better understanding of patient's lifestyle, so that recommendations for intervention are inclusive of patient's preferences, goals, or needs. The interview also serves the purpose to determine at what stage of the TTM the senior is in. PT will first inform patient that they may chose to skip interview or specific questions. There will be a predetermined list of questions the PT can follow to identify pertinent information related to preferences, goals, and needs.

Individualized Intervention Plan

Once the complete screen and interview are completed, the PT will consider the information and results collected and discuss appropriate interventions. Patient will provide input on preferred intervention, as well as on recommended intervention. Options that will be available to the senior will include beginner group exercise class, advanced group exercise class, tai chi, individual training session with certified Senior Fitness Trainer, or a PT episode of care. Not all classes will be offered at every location, which might affect regular attendance if the site of their preferred class is too far. Patients that chose PT will be transitioned to other interventions when they have met goals, and feel like they are ready. Patients may also transition back to PT if they're unable to participate in other interventions due to an adverse event. Patients may also chose to transition to other classes depending on their tier advancement as well as if they want to try a new class.

Depending on when seniors begin the program, a re-evaluation will be taken every 5-6 months. This will include the complete screen, personal interview, and the previous intervention plan will be reassessed. If a patient experiences a change in health condition at any point, then they will be able to be re-evaluated with a scheduled appointment. At their discretion, a trainer or PT may suggest a re-evaluation to the senior if they observe a change in status that warrants concern.

Education

All seniors are encouraged to attend the educational intervention and it will be scheduled bi-monthly at the local senior center. It will run as a series of topics that repeat after all topics have been presented. The topics will include, but are not limited too, common fall risks, common complications associated with falling, interventions that are proven to decrease risk, medicines that commonly are associated with falling, home safety, how to live a healthy lifestyle, diabetes and exercise, arthritis and exercise, COPD and exercise, importance of nutrition, strategies of falling that minimize risk of injury, and what to do once a fall has occurred. During time allotted for presentation, there could be demonstrations and practice of strategies that are being discussed (ie how to fall to minimize risk of fall-related injury). As stated above, various healthcare professionals will present on their respective area of expertise.

Exercise Interventions Provided-

The intervention options that are available are designed to accommodate all fitness levels. Seniors may be transition from one to another depending on changes in status based off of re-evaluations, or due to senior's preference.

- PT episode of care will be recommended to high-risk fallers that need personalized one-on-one attention to improve the cause of being high risk. Exercises will be based on risk areas that are determined to be a priority.

- Certified Senior Fitness Trainer will be recommended to seniors that prefer or need supervision/guarding during exercise, as well as to those seniors that need specific areas of risks addressed but are not high risk. Exercises will be based on risk areas that are determined to be a priority.
- Beginner group exercise class will be recommended for seniors that don't need one-on-one supervision/guarding but are deconditioned, moderate fall risk, and needs to start with low-level activity. This class will include exercises that work on strength, balance, flexibility and endurance. The exercises used during class, will focus on fall risk areas that were identified based on the individuals. Depending on location, chairs and/or rails will be used to assure safety. Certified trainers will lead class, or PT if time permits. Intensity will be low-level, but will focus on progression. The frequency will be offered at minimal 2x/wk, but recommended 3x/wk with 1-hour sessions. The duration of intervention will run in seasons of 3 months, but will promote continued participation.
- Advanced group exercise class will be recommended for the more active senior that is classified as low risk, and wants to maintain low risk. This class will also focus on strength, balance, flexibility, and endurance only at a higher intensity level. The frequency will still be 1hr sessions at least 2x/wk, but preferred 3x/wk. The duration will also run in seasons of 3 months, and continued participation is encouraged. A certified Senior Fitness Instructor will lead classes.
- Specialty classes will be recommended for seniors that are moderate-low risk for falling and prefer to try alternatives to standard group exercise. Specialty classes will be lead by instructors trained in the respective area, which include Tai chi, Yoga, dance, and step-class. These classes will be limited to the normal schedule the gym/YMCA offers them.

Outcomes

Outcomes will be based on the two screens that are offered. The complete screen will be assessed with the re-evaluation every 5-6 months, and the brief screen will be assessed in between re-evaluations approximately 3 months. The outcome measures will be reassessed and compared to previous results.

Outcome Objectives:

1. For high-risk fallers, Tinetti POMA will improve to a score of greater than 19 after 1 year of participation in program.
2. For moderate risk fallers, Tinetti POMA will improve to a score of greater than 24, after 1 year of participation in program.
3. Seniors will report 10-20 point difference in FES in one year's time, to improve confidence and most likely social participation.

4. For seniors that initially ambulate less than 1.0m/s, they will be able to achieve 1.0m/s within a year, to decrease risk of falling.
5. Seniors will improve and maintain TUG time at or below the norms in their respective age ranges of 8sec for 60's, 10sec for 70's, and 11sec for 80's; within 1 year to decrease falls risk.
6. Seniors will be able to achieve and maintain at or above their age range norms for the 30-sec chair stand test with12-14 for 60's, 11-12 for 70's, 8-10 for 80's, and 4-7 for 90's; within 1 year to improve LE strength and decrease risk of falling.
7. Seniors will be able to improve their functional reach to >7 inches, within one year to improve balance and confidence.
8. Seniors will be able to improve 6 min walk distance to 350' within 1 year to improve endurance, and community ambulation.
9. For seniors with impaired ROM and flexibility, they will demonstrate compliance with the stretching portion of HEP, and demonstrate improved/maintained ranges based on previous goniometer documentation, within 1 year to improve overall mechanics and decrease risk of falling.
10. Seniors will complete SF-36 twice a year, to identify potential areas that need to be addressed, so the senior has an increased likelihood of an improved QOL.
11. Seniors will demonstrate learning of education topics by achieving at least 90% on their quizzes, within one year so that they will be able to identify factors that will reduce falls risk, and help them live a more productive life.

Assessments

Participants will keep a log of falls, near falls, and injuries resulting from falls that will be reported on a monthly basis. Trainers and PT's may remind individuals when it's time to report. This data will be used to identify patients that might not be responding well to current intervention, as well as to encourage those that have a reduction in falls or near falls. The definition of "falls" will stand as, unexpectedly coming to rest on a lower surface. The definition of "near falls" is the use of another object to keep from coming to rest on a lower surface.

Another tool to be used to evaluate "LWB" will be 3 quizzes (5-10 questions each) that focus on educational topics. The quiz will be given before and after presentations and this will serve as feedback for how effective the education component of the program is and will also allow for adjusting material content or style of presentation. A follow-up quiz will be given at 6 months and 1 year into program to record long-term effects.

A feedback questionnaire will also be used to determine the participant's perspectives of our program as well as allow comments or suggestions for improvement. This questionnaire will ask patient's

opinions on personnel, program components, accessibility of program, and their satisfaction level based on a 1-10 point scale. There will also be a comment box on each question to allow for more specific comments. These questionnaires will be given when individuals transition from one intervention to another, or during re-evaluations.

Limitations

Accessibility and adherence will be some of the largest limitations, thus offering more locations for classes should improve accessibility and adherence. Transportation could also be a factor for participants that are no longer able to drive, and could affect attendance. Many studies in the review of literature cited attendance as a large contributor to outcomes that are not as significant as hypothesized. These three limitations will all have some impact on outcomes, which might affect the dynamics of group classes.

Another potential limitation involves the gyms, clinics, and center's participation/cooperation. For this program to be effective there will need to be good communication and cooperation between the personnel at each site. This could decrease the effectiveness of providing quality care, which could ultimately cause participants to stop coming.

Relevance

Life without Boundaries relies on a network of healthcare professionals, gym staff, and centers to provide a comprehensive course of care that decreases the chance of seniors falling through the cracks. With proper execution of this program, seniors will benefit from increased opportunities to decrease falls risk and improve community participation, which will ultimately let them live a life without boundaries.

With the recent change in healthcare, prevention will be focused on more so to help keep costs down. In fact, this program has the potential to lower insurance rates if it is able to decrease the amount of health care costs due to injurious falls that can lead to hospitalization and institutionalism. Up until now, healthcare has been more of a reactive intervention, but this program will help it become a preventative one.

References

1. Center for Disease Control and Prevention. Falls Among Older Adults: An Overview. CDC. http://www.cdc.gov/HomeandRecreationalSafety/Falls/adultfalls.html. Updated September 13, 2013. Accessed November 16, 2013.
2. World Health Organization. Are you Ready? What you Need to know about ageing. WHO. http://www.who.int/world-health-day/2012/toolkit/background/en/. Accessed November 1, 2013.
3. Wolf SL, Sattin RW, Kutner M, O'Grady M, Greenspan AI, Gregor RJ. Intense tai chi exercise training and fall occurrences in older, transitionally frail adults: A randomized, controlled trial. *J Am Geriatr Soc*. 2003;51(12):1693-1701.
4. Franco MR, Pereira LS, Ferreira PH. Exercise interventions for preventing falls in older people living in the community. *Br J Sports Med*. 2013. doi: 10.1136/bjsports-2012-092065.
5. Steinberg M, Cartwright C, Peel N, Williams G. A sustainable programme to prevent falls and near falls in community dwelling older people: Results of a randomised trial. *J Epidemiol Community Health*. 2000;54(3):227-232.
6. Freiberger E, Haberle L, Spirduso WW, Zijlstra GA. Long-term effects of three multicomponent exercise interventions on physical performance and fall-related psychological outcomes in community-dwelling older adults: A randomized controlled trial. *J Am Geriatr Soc*. 2012;60(3):437-446. doi: 10.1111/j.1532-5415.2011.03859.x; 10.1111/j.1532-5415.2011.03859.x.
7. Shumway-Cook A, Silver IF, LeMier M, York S, Cummings P, Koepsell TD. Effectiveness of a community-based multifactorial intervention on falls and fall risk factors in community-living older adults: a randomized, controlled trial. J Gerontol A Biol Sci Med Sci. 2007 Dec;62(12):1420-7.
8. Nitz JC, Choy NL. The efficacy of a specific balance-strategy training programme for preventing falls among older people: A pilot randomised controlled trial. Age Ageing. 2004;33(1):52-58.
9. Barnett A, Smith B, Lord SR, Williams M, Baumand A. Community-based group exercise improves balance and reduces falls in at-risk older people: A randomised controlled trial. Age Ageing. 2003;32(4):407-414.
10. Halvarsson A, Olsson E, Faren E, Pettersson A, Stahle A. Effects of new, individually adjusted, progressive balance group training for elderly people with fear of falling and tend to fall: A randomized controlled trial. Clin Rehabil. 2011;25(11):1021-1031. doi: 10.1177/0269215511411937.

11. Taylor D, Hale L, Schluter P, et al. Effectiveness of tai chi as a community-based falls prevention intervention: A randomized controlled trial. *J Am Geriatr Soc*. 2012;60(5):841-848. doi: 10.1111/j.1532-5415.2012.03928.x; 10.1111/j.1532-5415.2012.03928.x.

12. Li F, Harmer P, Fisher KJ, et al. Tai chi and fall reductions in older adults: A randomized controlled trial. J Gerontol A Biol Sci Med Sci. 2005;60(2):187-194.

13. Greenburg SA. Assessment of Fear of Falling in Older Adults: The Falls Efficacy Scale-International. New York University College of Nursing. consultgerirn.org/uploads/File/trythis/try_this_29.pdf. Published 2011. Accessed November 20, 2013.

14. Rehab Measures Database. TUG, 6 min walk test, 10meter walk test, Functional Reach Test, 30-sec chair stand, SF-36, Tinetti. http://www.rehabmeasures.org/default.aspx. Accessed December 5, 2013.