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Functional fitness and physical activity participation are essential to promote successful aging and quality of life in older adults. The Functional Fitness at Home program is a virtual program that uses physical function assessments and behavior change strategies to facilitate older adults' physical activity engagement and functional fitness.

Eleven older adults completed a physical activity questionnaire (Rapid Assessment of Physical Activity) and eight self-administered functional performance assessments (Chair Rise, One Leg Balance, Standing Marching, Timed Up and Go, Overhead Reach, Behind Back Reach, Sit and Reach, and Handgrip Strength) before and after completing an eight-week, website-guided exercise program. The website provided education in exercise principles (frequency, intensity, time, type, and progression) for older adults and behavior change strategies (such as goal setting, self-monitoring, and motivation). The program instructor maintained weekly remote contact with the participants.

Significant improvements were seen in the Chair Rise, One Leg Balance- Left and Right, Standing Marching, and Handgrip Strength. Significant improvements were seen in participants' physical activity engagement (aerobic conditioning, muscle strengthening, flexibility, and balance training). There was a significant reduction in participants' sitting more than two hours at a time as well as the percentage of the day they spent sitting. The Post-Program Survey indicated 10 out of 11 participants felt that the program increased their functional fitness. Ten of the participants said the program was beneficial. This study's findings suggest that the Functional Fitness at Home program has the potential to be an effective strategy to improve physical activity participation and functional fitness in older adults.

EFFECTS OF THE FUNCTIONAL FITNESS AT HOME PROGRAM ON PHYSICAL ACTIVITY AND FUNCTIONAL FITNESS IN OLDER ADULTS

by

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Approved by

Dr. Pam K. Brown
Committee Chair

DEDICATION

This is dedicated to my husband Jason, who made a lot of sacrifices so that I could realize my dream of earning a doctoral degree. He made me dinner, did laundry, cleaned the house, and spent time alone so that I could do schoolwork. He was my subject for numerous demonstration videos. He printed participant manuals and mailed incentive packages. He helped me type forms into Qualtrics. He answered many of my technology questions. His support was invaluable and greatly appreciated. Thank you, Jason!

APPROVAL PAGE

This dissertation written by Lisa Kokx has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

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CHAPTER I: PROJECT OVERVIEW

Functional Fitness is having the ability to perform daily activities safely, independently, and without difficulty (Rikli & Jones, 1999). Functional fitness is essential to successful aging. Unfortunately, a significant number of older adults have difficulty performing functional tasks like self-care and mobility (CDC, 2018). Much of the functional decline experienced is preventable through regular physical activity (Avers & Wong, 2020). Physically active older adults are at a decreased risk of mortality, disability, and functional limitation with improved aging trajectories and higher quality of life (Cunningham et al., 2020).

Background and Rationale

Functional decline in aging is often caused by natural age-related changes that are compounded by physically inactive and highly sedentary lifestyles (CDC, 2019b, Olaya et al., 2018). This leads to damaging consequences including decreased muscle and bone mass and an increased risk for falls, frailty, and dependence (Dogra et al., 2017).

The United States Department of Health and Human Services recommends a minimum of 150 minutes per week of moderate-intensity exercise and muscle-strengthening exercises at least two days per week for older adults (Office of Disease Prevention and Health Promotion, 2018). Expert consensus recommends regular resistance training, aerobic exercise, and balance training for older adults (Izquierdo et al., 2021). Only 14% of individuals age 65 years and older meet the American federal physical activity guidelines (Federal Interagency Forum Aging-Related Statistic, 2020). Additionally, older adults are more sedentary than any other age group (Dogra et al., 2017). These statistics are unfortunate because regular exercise is the single most health-promoting activity for older adults (McPhee et al., 2016). Because unsuccessful aging is associated with suffering, loss of function, disability, and increased healthcare costs (CDC,

2019a), there is a critical need to identify strategies to help older adults be more physically active.

Physical Activity

Older adults who are physically active experience a better quality of life (Cunningham et al., 2020). Regular physical activity is recommended for older adults to prevent and decrease the risk of developing functional limitations (Office of Disease Prevention and Health Promotion, 2018). Meeting the federal activity guidelines is associated with decreased morbidity, mortality, and functional dependence (Paterson & Warburton, 2010). The World Health Organization also recommends regular physical activity to improve functional capabilities (WHO, 2020). Resistance and aerobic exercise interventions significantly improve performance-based physical function outcomes (Chase et al., 2017). There is strong evidence that regular exercise can increase life expectancy and improve function (Chodzko-Zajko, 2009). Physical activity is the most effective measure to prevent, delay, and reduce disability, loss of functional independence, and health care costs in aging (Tak et al., 2013).

Multicomponent exercise programs (aerobic, resistance, and balance training) improve quality of life and physical performance (handgrip strength, Berg Balance Scale, and Timed Up and Go) (Sadjapong et al., 2020). A recent systematic review and meta-analysis showed that long-term exercise training in older adults is safe and effective in improving physical function (gait speed, sit to stand, Short Performance Physical Battery, and Timed Up and Go) (García-Hermoso et al., 2020). Resistance training is a particularly effective form of exercise for older adults and multimodal exercise interventions significantly decrease fall risk (Di Lorito et al., 2021). There is strong evidence that well-designed exercise programs decrease falls in older adults (Sherrington et al., 2020). Even small amounts of regular exercise can improve functional

fitness in aging adults (Sciamanna et al., 2021). Recent evidence shows that consistent exercise can be a powerful and clinically important intervention to improve physical function in older adults and promote successful aging (Fragala et al., 2019). Yet too many older adults are not engaging in regular exercise, and this increases their risk for functional decline. Functional impairment and frailty are hallmarks of geriatric syndromes and there is a high prevalence of this condition in older adults worldwide (Sanford et al., 2020), (O'Caoimh et al., 2021).

Functional Performance Measures

Physical fitness assessments are beneficial to educate individuals on their current level of fitness, provide data for exercise prescription, and motivate people by establishing attainable goals (American College of Sports Medicine, 2022). Functional performance measures (FPM) are a specific type of fitness assessment that assess functional ability. Many FPM have established validity and reliability and thus can provide an objective, accurate measure of functional capabilities (Avers & Wong, 2020). FPM are considered to be very safe for healthy and clinical populations of older adults (Rikli & Jones, 2001). Functional performance measures evaluate tasks and abilities that are relevant and meaningful for older adults. These include tasks like the ability to ascend stairs or stand up from a chair (Bennell et al., 2011). The Timed Up and Go Test assesses the ability to stand up from a chair, walk quickly, and perform 180 degree turns while walking (Bennell et al., 2011). It can be motivating to hear that regular physical activity helps maintain walking ability, self-care abilities, and independence (McPhee et al., 2016).

Functional Performance Measures can also be used to guide goal setting. Multiple outcome assessments include normative data that can provide objective targets for older adults. For instance, handgrip strength is important for opening jars and carrying heavy items. There are normative values for handgrip strength for men and women over age 65 (Bassey & Harries,

1993). Knowing this, a person can set a goal to improve their handgrip strength to that of people their same age and gender. Knowing what peers are capable of physically performing can guide individuals in setting appropriate and motivating goals. This process was used successfully in a study to reduce sedentary time in older adults (Lewis et al., 2016). Many FPM have prognostic value that indicate a person's risk for adverse health events and future disability (Cesari et al., 2009). For instance, the inability to stand unassisted on one leg for five seconds is a significant predictor of injurious falls (Vellas et al., 1997). Standards for single-leg stance, gait speed, and other functional tasks provide targets for goal setting that align with issues of importance for older adults.

Functional performance measures can be used to guide exercise prescription. The Two-Minute Step Test assesses cardiorespiratory endurance and can be used to guide recommendations for aerobic training (Bohannon & Crouch, 2019). The Timed Up and Go Test is beneficial to identify individuals who may benefit from exercise interventions to decrease their risk for falls (Bischoff et al., 2003). The 30 Second Chair Rise Test yields information about a person's need for lower extremity strengthening (Jones et al., 1999). These measures can be used for goal setting as well.

Behavior Change Strategies

Increasing health literacy of physical activity guidelines is important (Geboers et al., 2014) but may be insufficient to induce consistent exercise participation. Evidence-based behavior change strategies can be beneficial to help individuals initiate and sustain an exercise program. These strategies include increasing self-efficacy, goal setting, and self-monitoring (Artinian et al., 2010) as well as establishing implementation intentions (Darker et al., 2010). Other valuable tactics are focusing on outcomes that are relevant to the individual (McPhee et

al., 2016), using positive reinforcement (Ryan et al., 1997), and social support (Estabrooks et al., 2004). Problem-solving to overcome barriers (Picha & Howell, 2018) and relapse management (Stetson et al., 2005) are also beneficial. Promoting positive affect related to physical activity is important (Wankel, 1993). Self-efficacy is a strong predictor of exercise adherence in older adults (McAuley et al., 2003). There is a need for more research on behavior changes strategies that are specific for older adults (Di Lorito et al., 2021).

Barriers

Despite the effectiveness of physical activity in maintaining health and function in older adults, most do not meet the federal physical activity guidelines (CDC, 2019b). There are many barriers to older adults' ongoing exercise participation (Bethancourt et al., 2014). Authors who use the Socio-Ecological model state that these barriers are multifactorial, including those related to personal factors, the social environment, and the physical environment (Sallis et al., 2006).

The COVID-19 Pandemic has had a negative impact on physical activity engagement in older adults (Visser et al., 2020). Concerningly, scientists say that future pandemics will happen more frequently (Daszak et al., 2020). Fortunately, supervised exercise can safeguard older adults from functional deterioration during pandemic-induced confinement (Courel-Ibáñez et al., 2021).

Older adults experience barriers to performing physical activity outside of the home even in non-pandemic times. Common barriers include expense to drive to or use facilities, inconvenient PA locations, intimidation by the presence of others, bad weather, and unsafe neighborhoods (Bethancourt et al., 2014). Virtual exercise instruction and coaching are strategies that may be beneficial when face-to-face access with an exercise instructor is impossible or undesirable. It has shown success with improving exercise participation in older adults

(Bickmore et al., 2013). It is an evolving technology that is becoming more popular (Kyriazakos et al., 2020). Virtual coaching shows the potential to be an effective method to enhance older adults' wellbeing (Kamali et al., 2020).

Functional Fitness at Home Program

Functional Fitness at Home (Later Life Training, 2020) is a new program designed to help older adults engage in physical activity and improve functional fitness. This program uses physical function assessments to make older adults aware of their physical strengths and weaknesses, to educate about the national physical activity guidelines, and motivate this population to engage in physical activity. It emphasizes the link between physical activity and functional fitness. It also uses health behavior change strategies to help participants initiate and maintain an exercise program. The original Functional Fitness program was conducted in a face-to-face format. Due to the COVID-19 pandemic, the program developers created a virtual, at-home version.

The original and virtual Functional Fitness programs are based on the Capability, Opportunity, Motivation, and Behavior Model (Michie et al., 2011). This theoretical framework states that behavior arises from the interaction of capability (knowledge, self-efficacy), opportunity (social, environmental), and motivation (plans, beliefs). The program seeks to address these areas to improve physical activity participation. The program encourages the use of health behavior change strategies such as raising awareness, increasing self-efficacy, considering individual preferences, goal setting, and problem-solving barriers (de Jong et al., 2018). The program also provides general exercise guidance and referral to activity resources (de Jong et al., 2016). A mixed-method phase I feasibility study was conducted on the original face-to-face version of the Functional Fitness program. The authors concluded that the program was feasible

in a clinical setting but its effectiveness was undetermined (de Jong et al., 2018). No research has been performed on the virtual format.

Purpose and Aims

Regular physical activity can mitigate the functional decline seen in sedentary lifestyles. Identifying effective methods to help older adults be more physically active, (especially during a pandemic), is critical to promote successful aging. The purpose of this study was to evaluate the feasibility of the Functional Fitness at Home program on physical activity participation and functional fitness in older adults.

Aim #1: Evaluate the effects of the Functional Fitness at Home program on physical activity and functional fitness in adults aged 65 and older.

Aim #2: Evaluate participants' perceptions of the Functional Fitness at Home program.

Methods

In this feasibility study, the effectiveness of the program to improve functional fitness and physical activity participation using pre and post-test measures was assessed. There is limited research on the face-to-face version of the Functional Fitness program and no studies on the at-home format. This study tested the intervention in a real-world setting (Bowen et al., 2009), focusing on two areas: efficacy testing to see if the program shows potential for improving physical activity and functional fitness as well as acceptability to see how participants perceived the program. The University of North Carolina Greensboro Institutional Review Board approved the study.

Participants

The inclusion criteria for the study were: 1) age 65 years and older, 2) not currently meeting the Physical Activity Guidelines for Americans, 3) interested in increasing level of physical activity, 4) able to walk independently without an assistive device, 5) access to a computer, phone, and internet and ability to utilize the internet, video calls using Zoom or FaceTime, and phone messaging, 6) assistant (such as family or friend) to help perform functional assessments, 7) written medical clearance by physician. Exclusion criteria: 1) absolute contraindications to exercise, 2) live in a nursing home or skilled nursing facility, 3) cognitive impairment (Telephone Interview for Cognitive Status score of 28 or less) (Seo et al., 2011).

The researcher shared the recruitment flyer and explained the program to potential recruitment sources including a Senior Center Recreation Supervisor, activity directors of three retirement homes, and therapists at a rehabilitation hospital. It was requested that interested individuals contact the researcher via email, who responded with program details, confirmed that individuals met the eligibility criteria, and sent a medical clearance form to the individual's physician. All individuals signed a consent form. Eleven participants (2 male, 9 female) were recruited, with age range 65 to 84, and mean age of 72.6. There were no dropouts. (Participants inactive for 14 consecutive days would have been classified as a dropout.)

Intervention

Participants were sent a printed program manual that explained the relevance of functional fitness and provided instructions for performing the functional assessments. The investigator created a program website that contained exercises, education, form links, the schedule of events, and demonstration videos for the assessments and exercises. (Screenshots from the website can be found in Appendix A.) The website also contained education on the

physical activity guidelines for older adults, FITT principles for older adults, and guidance for progressing exercise (American College of Sports Medicine, 2022).

Participants completed the functional performance assessments at the beginning of week one, the beginning of week five, and the end of week eight. The assessments were the 30 Second Chair Rise, One-Legged Balance, Standing Marching, 8 Foot Timed Up and Go, Sit and Reach, Back Scratch, and Grip Strength. Using a link in the program website, participants completed a Functional Fitness Scoresheet (Appendix B) after completing each round of assessments. Participants completed the physical activity questionnaire (Appendix C), which was accessed by a link in the program website, at the beginning of week one, at the beginning of week five, and the end of week eight.

During weeks two through eight, the participants engaged in a five-day-per-week exercise program. Each exercise session included an aerobic activity (walking), strengthening (squats or handgrip squeezes), balance (360 degree turns or single leg stance), and flexibility exercise (hamstring stretch or shoulder rotation stretches). For example, Monday, Wednesday, and Friday's exercises might be walking, squats, single leg stance, and hamstring stretches. Tuesday and Thursday's exercises were walking, grip squeezes, 360 turns, and shoulder stretches. The exercises were done on alternate days the next week. Each exercise was chosen to improve a specific functional assessment. The program website included exercise instructions with pictures and demonstration videos and exercise alternatives for those who wanted variations. Exercises were progressive throughout the program. The Rating of Perceived Exertion Scale was used to gauge intensity (Borg, 1982). This subjective scale is a measure of how hard a person is working based on physical sensations such as heart rate, breathing rate, perspiration, and fatigue. The modified scale uses a range of zero to 10. For example, the aerobic

activity in week two began at a 15-minute duration at an intensity of 3-4/10 and gradually progressed to 30 minutes at an intensity of 5-6/10 in week eight. Frequency, intensity, time, and type (FITT) were based on the FITT Guidelines for Older Adults (American College of Sports Medicine, 2022).

At the beginning of each week, participants received an email (Appendix D) directing them to a page on the program website, which provided specific instructions for that week's activities. The investigator sent weekly group text messages to provide reminders and encouragement. She urged the participants make contact any time they had questions or concerns. She also sent individual texts weekly to check in with participants and provide support.

Virtual group discussions via Zoom occurred weekly. These sessions incorporated health behavior change strategies including social support, positive reinforcement from peers, problem-solving barriers, and enhancing self-efficacy. Each discussion lasted about 30 minutes. The investigator asked the participants discussion questions (Appendix E) and employed one or more strategies to enhance their self-efficacy (Appendix E) (American College of Sports Medicine, 2022).

The Functional Fitness at Home Program also used additional behavior change strategies. Specifically, participants set goals (weekly short-term goals and long-term goals) and did self-monitoring through daily activity logs (Appendix F). There was an emphasis on the value of functional fitness and the connection between physical activity and functional fitness to enhance intrinsic motivation. The website included links to videos and articles on motivation, the benefits of exercise pertinent to older adults, ideas to make exercise enjoyable (affect regulation), tips for dealing with limited time, illness, and vacations (relapse prevention), and guidance in next steps to encourage continued physical activity after program completion.

Participants received small incentives for participation. They received a hand squeeze exercise ball and resistance band after submitting the initial forms. At midpoint, they received the Clock Yourself app (https://www.clockyourself.com.au/). This app combines mental and physical activities to exercise the brain and body at the same time. Participants were sent $25 VISA gift card after completing the program.

Data Sources

Qualtrics software was used for all data collection. Participants were sent a Qualtrics link by email for the consent form, and they accessed other forms through links in the program website.

The physical activity assessment measure was the Rapid Assessment of Physical Activity (RAPA) (University of Washington Health Promotion Research Center, 2006). It was designed to efficiently assess physical activity in older adults. The RAPA has been found to be valid and reliable with older adults (Topolski et al., 2006). It assesses the amount (lesser or greater than 150 minutes) and intensity (light, moderate, vigorous) of aerobic activity as well as muscle strengthening and flexibility frequency (once per week or more). It classifies aerobic activity on a continuum of sedentary (score = 1) to performing vigorous activity 25 minutes a day, three or more days per week (score = 7). It scores strength and flexibility as performing or not performing at least once per week. The Functional Fitness at Home program creators added additional questions about balance activities and sitting time. The physical activity questionnaire can be found in Appendix C.

The functional fitness measures assess strength, power, balance, aerobic capacity, and flexibility. The 30 Second Chair Rise (Jones et al., 1999) measures leg power. Participants were instructed to sit in a hard chair (such as a dining room chair) with arms crossed and count the

number of times they could stand and sit as quickly as possible in 30 seconds (counting one for each time sitting down). For the One-Legged Balance measure (Lin et al., 2004), participants were directed to stand close to a counter for safety, balancing on one leg without upper extremity support, and recording the longest time they were able to stand on one leg. The measure was repeated on the other leg. Standing Marching (Bohannon & Crouch, 2019) assesses aerobic capacity. In this measure, the participants marched in place, raising one knee above the height of the other knee, counting the number of times the right knee was raised (above the other knee) in two minutes. The 8 Foot Timed Up and Go (Rose et al., 2002) assesses dynamic balance and agility. This test entails measuring an eight-foot distance from the front of a hard chair and marking it with an object. Participants were instructed to sit in the chair, then time how long it took to walk as quickly as possible around the object and return to a sitting position.

The Back Scratch and Sit and Reach tests evaluate flexibility and used a traffic light system for scoring. Green represented an adequate and functional amount of flexibility. Yellow reflected some impaired flexibility and red was significantly impaired. The Back Scratch Test (Rikli & Jones, 2013) has two parts that assess shoulder flexibility and are performed seated or standing. For the Back Scratch Overhead Test, participants were instructed to raise one hand to touch the side of the head (on the same side), progress to touch the back of the neck, and then between the shoulder blades. The individual then selected the score that best represented their flexibility. Red if only able to touch the side of the head, yellow if only able to touch the back of the neck, or green if able to reach shoulder blade level. For the Back Scratch Behind Back Test, the instructions were to reach behind the back to the buttock on the same side. Then, lift higher to touch the lower back. If able, progress to touch the opposite shoulder blade. A red score was selected if only able to reach the buttock, yellow if only able to reach the lower back, and green

if able to reach the shoulder blade. The Functional Fitness Scoresheet (Appendix B) contained charts of the traffic light system to help participants understand the scoring.

The Sit and Reach (Hui & Yuen, 2000) assesses hamstring flexibility. Participants were instructed to sit at the front of a chair with one foot flat on the floor and the other knee straight. They were told to place one hand on top of the other on the extended leg's thigh, keep the back straight, and hinge at the hips to slide the hands down the leg. They were to self-score as red if they could not reach past the knee, yellow if could reach between the knee and toes, and green if able to reach the toes.

Assessing Handgrip Strength (Bobos et al., 2020) involved rating the difficulty of opening new or unopened jars or bottles using the traffic light system. The ratings were red ("I need to use a gadget or get someone to do it for me"), yellow ("Sometimes I need to use a gadget or ask someone") or green ("I am always able to open jars or bottles"). Participants recorded all their scores on the Functional Fitness Scoresheet (Appendix B).

The final data source was a program evaluation. At the program's conclusion, participants' perceptions of the program were collected using a post-program survey (Appendix G) with rated and open-ended questions addressing fitness changes, benefits, and suggestions for improvement.

Analysis

The researcher used SPSS software to calculate descriptive statistics for demographics. Dependent (paired) sample t-tests were used to compare pre- and post-physical function assessments and physical activity scores, and calculated Cohen's d Measure effect sizes. For the post-program survey, descriptive statistics were calculated for the rated statements and the open-ended question responses were summarized.

Results

The results of the pre-post comparisons on the functional fitness measures are presented first, followed by the pre-post comparisons for physical activity. The results for the post-program survey ratings and open-ended responses follow.

Functional Fitness

One of the participant's Chair Rise and two of the participants' Standing Marching scores were implausibly high, indicating that they likely double counted when performing the measures. The investigator initially analyzed the data with scores as reported. Then, cut the scores in half to reflect more credible values and reran the analysis. Significant changes were seen with both methods, but the analysis with halved scores is more likely correct and displayed below. Significant improvements were seen in the Chair Rise, One Leg Balance- Left and Right, Standing Marching, and Handgrip Strength- Left and Right.

Table 1. Functional Fitness

Assessment	Pre *M* + SD	Mid *M* + SD	Post *M* + SD	t	p	d
Chair Rise (# of times)	10.91±2.70	14.5±5.01	16.91±6.17	-4.11	.002*	4.84†
One Leg Balance- Left (sec)	25.73±12.45	32.75±9.81	48.00±17.82	-6.11	<.001*	12.09†
One Leg Balance- Right (sec)	25.64±16.32	29.75±10.57	47.09±15.68	-3.78	.004*	18.84†
Standing Marching (#)	55.64±14.27	62.75±13.95	79.55±13.60	-4.14	.002*	19.18†
Timed Up and Go (sec)	7.86±2.71	7.91±3.15	6.63±1.49	1.87	.091	2.19†
Overhead Reach- Left (red3, yellow2, green1)	1.27±.65	1.00±0	1.18±.41	N/A	N/A	N/A
Overhead Reach- Right (red3, yellow2, green1)	1.09±.30	1.00±0	1.09±.30	N/A	N/A	N/A
Behind Back Reach- L (red3, yellow2, green1)	1.64±.67	1.38±.52	1.55±.69	N/A	N/A	N/A
Behind Back Reach- R (red3, yellow2, green1)	1.55±.52	1.50±.53	1.45±.52	N/A	N/A	N/A

Sit and Reach- Left (red3, yellow2, green1)	1.64±.51	1.63±.52	1.45±.52	N/A	N/A	N/A
Sit and Reach- Right (red3, yellow2, green1)	1.64±.51	1.63±.52	1.36±.51	N/A	N/A	N/A
Handgrip- Left (red3, yellow2, green1)	2.09±.70	1.88±.64	1.73±.47	N/A	N/A	N/A
Handgrip- Right (red3, yellow2, green1)	2.00±.78	1.75±.71	1.55±.52	N/A	N/A	N/A

Note: t compared pre and post, df=10, N=11, *p<.05, †d>0.5, medium effect, >0.8, large effect

Note: For the Chair Rise, One Leg Balance, and Standing Marching, higher scores are better. For all other assessments, lower scores are better.

Physical Activity

Significant improvements were seen in participants' physical activity engagement in all areas, including aerobic conditioning, muscle strengthening, flexibility, and balance training. There was a significant reduction in participants' sitting more than two hours at a time as well as the percentage of the day they spent sitting.

Table 2. Physical Activity (Aerobic and Sitting Percentage)

Physical Activity	Pre *M* + SD	Mid *M* + SD	Post *M* + SD	t	p	d
Aerobic (1=sedentary, 7=vigorous)	3.27±.79	5.5±.93	5.82±.87	-8.15	<.001*	1.04†
Sitting Percentage (0-100%)	36.73±13.41	24.8±7.22	22.18±8.65	6.93	<.001*	6.96†

Note: t compared pre and post, df=10, N=11, *p<.05, †d>0.5, medium effect, >0.8, large effect

Table 3. Physical Activity (Strengthening, Flexibility, Balance, Sitting > 2 Hours) (n=11)

Physical Activity	Pre-Program (# of Participants Performing)	Mid-Program (# of Participants Performing)	Post-Program (# of Participants Performing)
Strengthening	2	8	10
Flexibility	4	8	10
Balance	0	8	10

Sitting > 2 Hours	8	6	2

Post-Program Survey

The Post-Program Survey contained six rated questions and two open-ended questions. Ten of the 11 participants felt that the program increased their functional fitness. Nine said the program improved their aerobic capacity, strength, and balance. Eight reported it increased their flexibility. Ten of the participants said the program was beneficial.

Table 4. Post-Program Survey (n=11)

Question	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
This program helped to increase my functional fitness.	7	3	1	0	0
This program helped to increase my aerobic capacity.	4	5	2	0	0
This program helped to increase my strength.	6	3	2	0	0
This program helped to increase my balance.	6	3	2	0	0
This program helped to increase my flexibility.	5	3	2	1	0
This program was beneficial.	9	1	1	0	0

The first open-ended question of the Post-Program Survey was, “What suggestions do you have to improve the program?” Several participants recommended providing more options of exercises to choose from. For example, one participant requested, “a greater variety of aerobic activity, upper body strength, and balance.” Another repeated recommendation was for more

options for scaling the exercises so they could be made easier or more challenging. An additional suggestion was for the program to be supplemented with in-person exercise groups.

The second question of the survey was, “Do you have any other comments about the program?” The only negative comments were that one individual said the flexibility exercises got boring and another said that the male instructor in an exercise video seemed patronizing. Multiple participants said the program motivated and encouraged them to exercise. Several reported it helped them to work on areas they hadn’t considered before, like balance and handgrip strength. Several people stated it was beneficial in improving their physical abilities, like their strength and endurance. The post-program survey showed that most participants perceived the program as beneficial and effective.

Discussion

The purpose of this study was to evaluate the feasibility of the Functional Fitness at Home program on physical activity participation and functional fitness in older adults. A quantitative study using pre and post-test measures was conducted to assess the effectiveness of the program to improve functional fitness and physical activity.

Functional Fitness

Significant improvements were seen in the Chair Rise, One Leg Balance- Left and Right, Standing Marching, and Handgrip Strength- Left and Right. The Chair Rise assessment measures lower extremity power. This is important for standing from low chairs, climbing stairs, and getting up off the floor. Muscle power is a strong predictor of functional limitations, thus effective interventions to improve this capacity are critical (Alcazar et al., 2018). Preserving muscle power is critical to counteract functional decline in older adults (Izquierdo et al., 2021). The ability to balance on one leg is necessary for stepping onto a curb, walking on uneven

ground, and regaining balance after a trip. A single-leg stance time of fewer than 6.5 seconds indicates an increased risk for falling (Lusardi et al., 2017). On the post-program survey, a participant noted, “The one-legged stand was an exercise suggested to me by my therapist. I had gotten lazy…Doing it these weeks has really helped.”

The Standing Marching assessment measures aerobic capacity, which is a fundamental component of physical fitness and is important for having the stamina to engage in activities of daily living, working, and recreational activities (Office of Disease Prevention and Health Promotion, 2018). Handgrip strength is essential for opening containers and holding heavy items. On the post-program survey, one participant said, “I hadn’t realized I could increase my hand strength to make it easier to open jars!” There is a predictive association between handgrip strength and IADL (instrumental activities of daily living) disability (Gopinath et al., 2017). IADLs include activities such as shopping, meal preparation, and housekeeping. Increasing functional fitness can have profound effects on an older adult’s quality of life, by improving mobility, functional capabilities and independence (Izquierdo et al., 2021).

Physical Activity

This study also evaluated the effect of the Functional Fitness at Home program on participants’ physical activity participation. Significant improvements were seen in participants’ physical activity engagement in aerobic conditioning, muscle strengthening, flexibility, and balance training. One individual said on the post-program survey, “I can walk longer and faster. I can do more squats.” The activity logs showed that 58% of the participants completed the prescribed exercises over the eight weeks. However, multiple participants reported they did the exercises but did not complete the activity logs.

Regular physical activity is essential for healthy aging and older adults who engage in it reap substantial health benefits (Office of Disease Prevention and Health Promotion, 2018). Physically active older adults find it easier to perform activities of daily living, experience less falls, and are more likely to preserve independence as they age (Office of Disease Prevention and Health Promotion, 2018). Higher levels of PA in older adults reduces the risk of all-cause mortality and site-specific cancers and improves cognitive and mental health (WHO, 2020).

On the post-program survey, multiple participants said the program encouraged them to get more physical activity. One individual said, “It definitely motivated me to exercise.” This program is in line with current evidence-based guidance for increasing physical activity, which includes guidance from professionals, support from others, and technology-based approaches (Office of Disease Prevention and Health Promotion, 2018). Additionally, enjoyment may be an important factor for long-term adherence to exercise interventions (Hagberg et al., 2009).

Participants in the Functional Fitness at Home program reported a significant reduction in sitting more than two hours at a time as well as the percentage of the day they spent sitting. Reducing sitting time is important because higher amounts of sedentary behavior are associated with mortality (all-cause, cardiovascular, cancer) and the incidence of cardiovascular disease, cancer, and type 2 diabetes (WHO, 2020).

The results of this study demonstrate that the Functional Fitness at Home program is feasible. The results suggest that the program was effective in improving functional fitness and physical activity participation. It was also perceived as helpful and valuable by the participants.

Limitations

To effectively run the program and as is typical of feasibility studies, it had a small sample size and no control group. The small sample size was beneficial to enable the researcher

to give ample attention and encouragement to each participant. The study relied on participants' self-report. Moderate and vigorous physical activity tends to be overestimated and sedentary behavior underestimated in women over 60 years old (Ogonowska-Slodownik et al., 2021). Additionally, having participants perform their own functional self-assessments may create inaccuracies. This study showed significant and meaningful positive results; however, the very large effect sizes must be interpreted with care.

For future research, a larger sample is recommended with a control group to help minimize confounders and confirm these initial findings. Running the program with multiple cohorts might be an effective strategy to obtain a larger sample size, which would be beneficial to improve statistical power. Additional research to evaluate the accuracy of self-performed functional assessments would be valuable. Using flexibility assessments that are more sensitive to change is recommended. A study that uses a more objective measure of physical activity, such as an accelerometer, would be beneficial.

Conclusion

Physical activity may be the most powerful intervention to prevent unnecessary functional decline and promote successful aging in older adults. Interventions based on health behavior change strategies are beneficial in promoting PA. Physical function assessments can identify functional limitations, provide meaningful goals, inform exercise prescription, and demonstrate progress. Virtual programs are particularly salient during the COVID -19 Pandemic, when availability and confidence in community exercise settings have been limited. Functional Fitness at Home espouses these elements. The results of this study show the program is feasible. This study's findings suggest that Functional Fitness at Home program has the potential to be an effective strategy to improve functional fitness and physical activity engagement in older adults.

CHAPTER II: DISSEMINATION

I will give a 30-minute PowerPoint presentation to the physical and occupational therapists at the hospital where I work. This will be an audience of 24 therapists. My goal is to share how they can use the findings of this study to enhance their clinical practice and provide better care to patients. This section contains a narrative of the presentation. The PowerPoint slides and handout can be found in Appendix H.

PowerPoint Presentation

Slide 1

Good afternoon. I did a research study called the "Effects of the Functional Fitness at Home Program on Physical Activity and Functional Fitness in Older Adults." Today, I'd like to share the results and takeaways of that study with you.

Slide 2

For this study, I ran an eight-week virtual program. Participants completed pre and post functional performance assessments and a physical activity questionnaire. The functional assessments were the 30 Second Chair Rise, One-Legged Balance, Standing Marching, 8 Foot Timed Up and Go, Sit and Reach, Back Scratch, and Handgrip Strength. The physical activity questionnaire was the Rapid Assessment of Physical Activity.

Slide 3

The participants performed an exercise program five days per week, individually at home. The exercises included walking, squats with chair touch, 360 degree turns, supine hamstring stretch, hand towel roll grips, single leg stance with counter support, and shoulder internal and external rotation towel stretches.

Slide 4

I had weekly communication with the participants through emails and text messages. I gave them information on our schedule of activities, exercise guidance, and encouragement. There were weekly group Zoom meetings. The focus of these sessions was to provide social support, exchange ideas, problem-solve barriers, and share successes.

The program also incorporated behavior change strategies, such as goal setting, daily activity logs, increasing intrinsic motivation, and ideas for relapse prevention.

Slide 5

I created a website to support participants throughout the study. The website contains pictures, videos, exercises, and education. I'd like to show you that website now. *(Display website.)* On the home page, I have some information about me. The Introduction page explains what functional fitness is and why it is relevant.

Week One gives written instructions and video demonstrations for performing the functional assessments. It encourages participants to compare their scores to norms for their age and gender. There are also links to goal-setting instructions and forms.

Week Two details the exercise schedule and functional relevance of the exercises. The Exercise tab provides pictures, written instructions, and video demonstrations of the exercises.

Each subsequent page provides that week's exercise schedule and links to daily activity logs. They also provide education on exercise principles, behavior change strategies, and the connection between physical activity and functional fitness. There is also an emphasis on reducing sedentary behavior and sitting time. You can see that the exercises are progressed each week, in either the time, intensity, repetitions, or sets.

I created additional pages to provide further education on goal setting, assessing intensity, and progressing exercises. There is also information on the FITT Guidelines for Older Adults and exercise alternatives. This page describes next steps that participants can take after the program is completed to continue their exercise journey. I'm happy to share the link to this website if you are interested.

Slide 6

The results of the study showed significant improvements in functional fitness scores for the Chair Rise, One-Legged Balance, Standing Marching, and Handgrip Strength. There were significant improvements in physical activity engagement, in the areas of aerobic conditioning, muscle strengthening, flexibility, and balance training. There was a significant reduction in sitting more than two hours at a time and the percentage of day spent sitting. Finally, most of the participants perceived the program as beneficial.

Slide 7

These results suggest that there are several strategies worth applying in our setting. First, we can explain the meaning of functional fitness and why it is important. Describe how functional fitness is the ability to do the everyday tasks that they want and need to do. Give examples, such as walking up steps to enter their home, caring for grandkids, and going out with friends. Ask what type of activities are important to them.

Slide 8

Explain the link between functional fitness and physical activity. Help them to see the connection between exercise and the ability to perform meaningful tasks with ease and confidence. Emphasize the functional purpose of the exercises that you are instructing them to perform. Point out how a specific exercise will help them to be able to do a functional activity

that is significant to them. For example, walking and other aerobic activities improves stamina and endurance for errands, housekeeping, working, and recreational activities. Squats improves strength for getting out of low chairs, climbing stairs, and getting up from the floor. Hand gripping exercises are important to improve grip strength for opening jars and holding heavy items. Working on single leg stance is beneficial for correcting a trip, stepping up curbs, and walking on uneven ground.

Slide 9

I suggest that we use more functional measures in our sessions and explain the relevance of them to our patients. We can share the norms for their age and gender, as well as cut points for fall risk and other outcomes. Show the patient where they fit in relation to those numbers. It will be important to share this information in a way that is motivating, rather than discouraging, especially if they are far from the normative values.

Slide 10

I recommend that we make a stronger effort to incorporate behavior change strategies into our practice. For example, goal setting can be an effective strategy. We ask patients what their goal is for the rehab stay, but it is often general and unrealistic. Help them set function-based goals, like improving sit to stand ability, as well as behavior-based goals, such as engaging in a strength training program. Goals should be created using the SMART format: specific, measurable, achievable, relevant, and time bound. Ask them to write the goal in the hospital-provided notebook. Explain how exercise is an important action step toward meeting this goal. Revisit the goal periodically throughout their stay. Encourage them to continue working if it is not achieved by discharge. Make sure to scale exercises appropriately so patients can be successful. Consider using an activity log to help them start this habit. It can be helpful to point

out other patients who are successfully doing the tasks that they want to be able to do. Finally, give patients tips on how to make exercise more enjoyable. These can be things like listening to music, exercising outside, or being active with friends.

Slide 11

It will help our patients if we give them tools to continue an exercise program after discharge. Educate them on the Physical Activity Guidelines for Older Adults. I encourage you to look at the new International Exercise Recommendations for Older Adults. It recommends high intensity exercise for older adults as well as focusing on power training.

We can also teach patients how to use functional assessments after discharge for goal setting and to monitor their progress. Share ideas on how to make exercise sustainable for their lifestyle. Give them information on free exercise videos for older adults, practical ideas to break up sitting time, and how to get back on track after illness. I plan to work on finding and creating specific resources to share with you in the future.

I think a website like the one I created for my study would be beneficial for our patients after they discharge from the hospital. We could work on a proposal to submit to the Therapy Director. I will set up a meeting time and send an email invite. Please consider attending. I think this could be a valuable resource for our patients.

Slide 12

These recommendations can help us to provide better quality care to our patients and help them to achieve better outcomes, which I know are things that we all want to do. I would like to spend the last few minutes discussing your thoughts about this and any other ideas you may have. Any comments or suggestions? *Encourage discussion.*

CHAPTER III: ACTION PLAN

My first task will be to share a thirty-minute PowerPoint presentation with my physical and occupational therapist colleagues at the hospital where I work. I hope to encourage them to use the findings of this study to enhance their clinical practice. To supplement this presentation, I want to find or create resources to help them better incorporate behavior change strategies into their practice. This includes an infographic with tips to increase patients' self-efficacy, a patient education handout on functional fitness, and a patient worksheet for goal setting. I also plan to create or modify the website used in my study to share these resources with patients after they have discharged from our hospital.

Next, I will submit an article to GeriNotes. This magazine is published by the American Physical Therapy Association (APTA) Geriatrics Academy. This peer-edited, clinical magazine invites submissions from the organizations' members. The publication focuses on physical therapy clinical practice for older adults, and thus would be ideal for sharing my findings.

I plan to disseminate my research through social media. I will post a summary of the study's findings on the Facebook APTA Geriatrics Discussion and GEROS Community groups. I will investigate pertinent blogs and ask if they would be interested in me writing a guest post. Through these avenues, I can share the practical applications of the study with clinicians who work with older adults. I also plan to share the results with the program creators as it may help them with future revisions of the program. We may also be able to work together on future collaborations.

There are two conference opportunities for presenting my research. The APTA North Carolina conference occurs each October. The APTA Combined Section meeting is held in

February annually. I plan to share my findings through a poster presentation at one or both conferences.

I plan to propose a community outreach event at the hospital where I work. It would use the original Functional Fitness at Home program. We would invite older adults from the community to attend a one-time event where I and other physical therapists administer functional assessments. We would provide participants education on the relevance of the assessments and how to use physical activity to improve their functional fitness.

I would like to do another study on the Functional Fitness at Home program. Next time, I would consider using a hybrid approach, where I perform the functional assessments to ensure accuracy. I would also like to use a more objective measure of physical activity, such as an accelerometer.

I will continue to build on the ideas sparked by this study to further help older adults improve their functional fitness and engage in regular physical activity. I will teach future physical therapy students to do the same.

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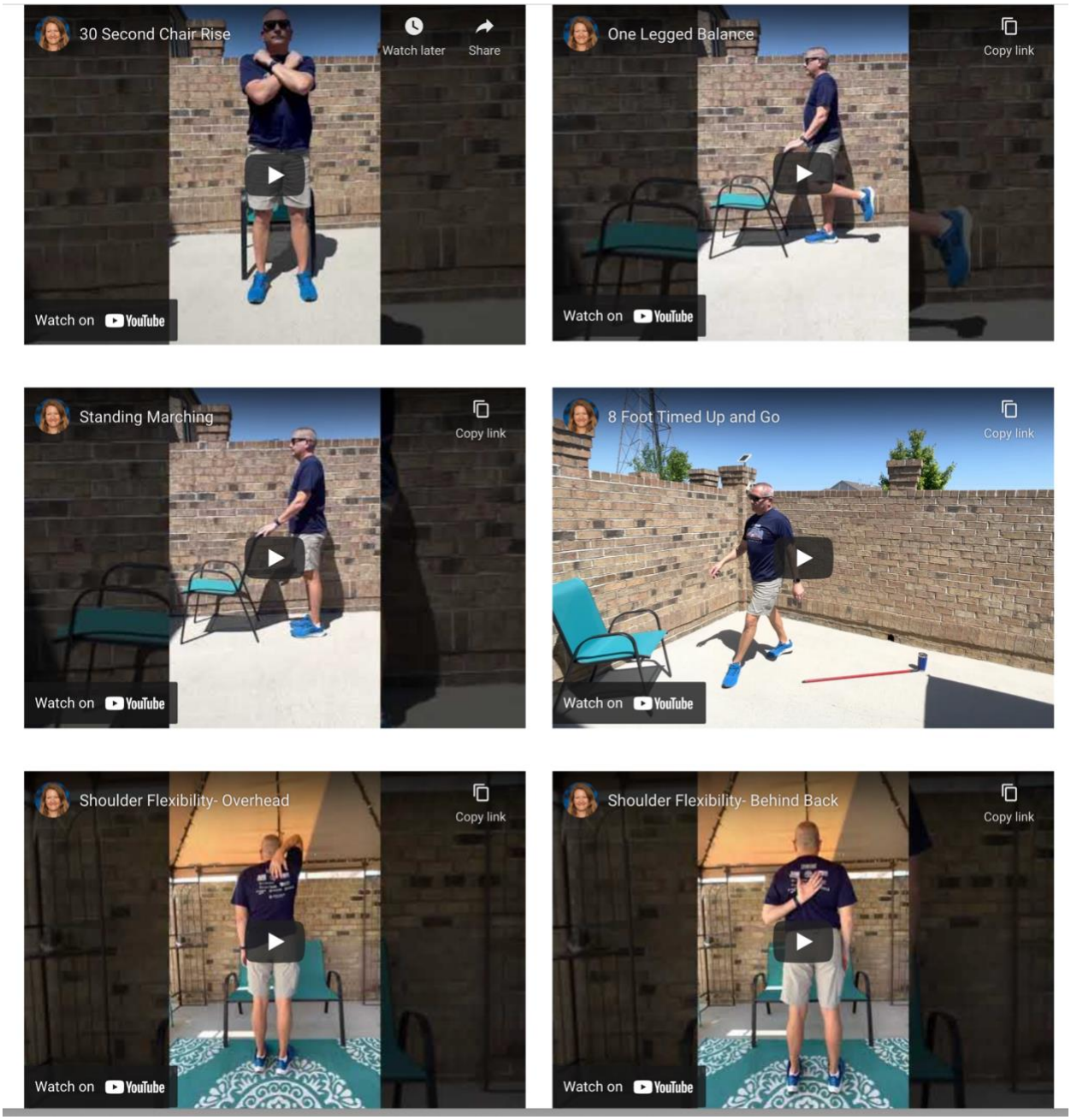
APPENDIX A: PROGRAM WEBSITE SCREENSHOTS

Functional Assessment Demonstration Videos Screenshot



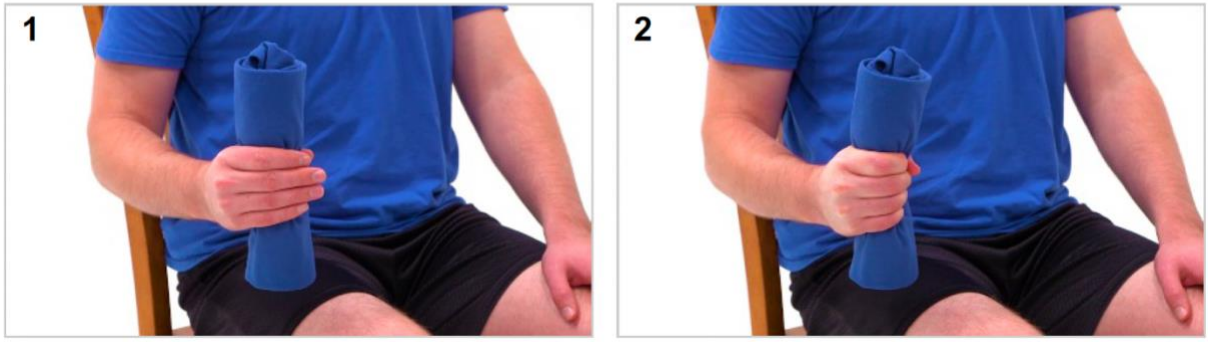
Exercises Screenshot

Squat with Chair Touch

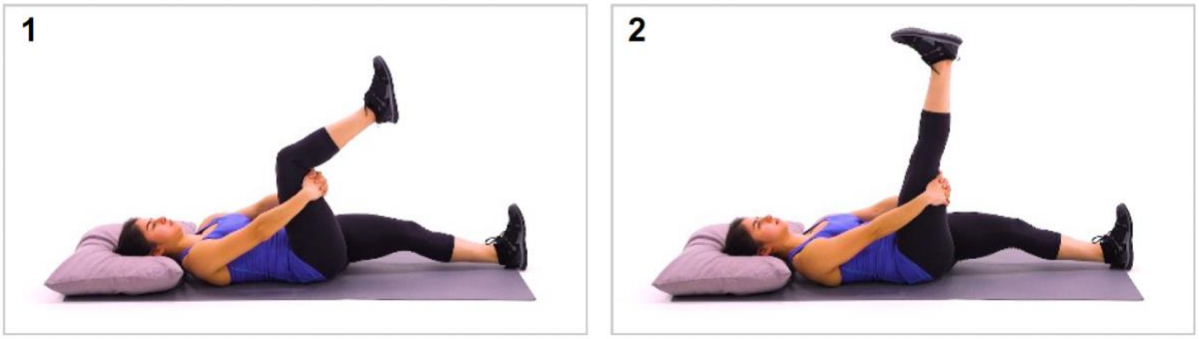
Standing Single Leg Stance with Counter Support

360 Degree Turn in Both Directions

Towel Roll Grip with Forearm in Neutral

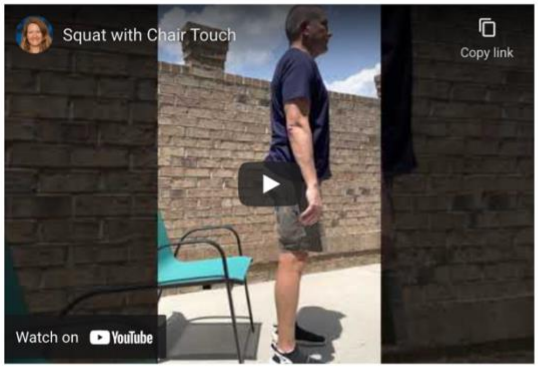


Hooklying Active Hamstring Stretch



Standing Overhead Shoulder External Rotation Stretch with Towel

The purpose of the Squat with Chair Touch exercise is to improve the 30 Sec Chair Rise assessment

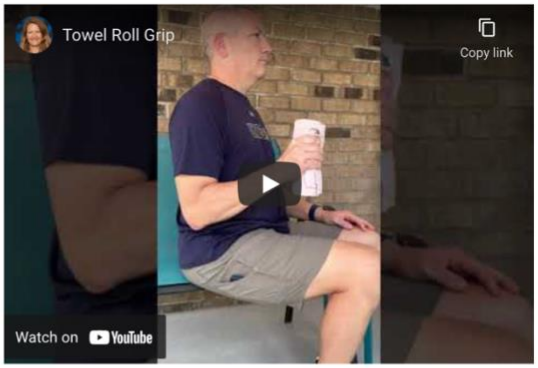


The purpose of the 360 Degree Turn exercise is to improve the 8 Foot Timed Up and Go assessment

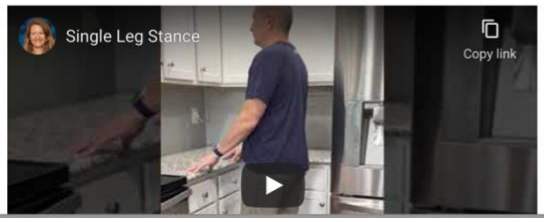
The purpose of the Hamstring Stretch exercise is to improve the Sit and Reach assessment

Don't worry if you can't stretch as much as the guy in the video below. He is very flexible!

The purpose of the Towel Roll Grip exercise is to improve the Handgrip Strength assessment



The purpose of the Single Leg Stance exercise is to improve the One Legged Balance assessment



The purpose of the Shoulder Internal Rotation Stretch exercise is to improve the Back Scratch-Behind Back assessment

Week 2 Exercise Schedule Screenshot

Here is the **exercise schedule** for the week:

Monday

Walk- If you prefer a different aerobic activity, like biking, swimming or running, you can do that instead of walking.
If you haven't been doing any aerobic activity, try starting with 15 minutes. (If you're already doing more than that, continue that amount.)
Note: you can break up your aerobic activity into segments, such 5 minutes at a time.
Aim for an intensity of 3-4/10 (See the scale here)

Squat- 5 reps, intensity 3-4/10 *(Click the button "EXERCISES" above for a description.)*

Single Leg Stance- hold 5-10 sec (or longer if able), 2 reps each leg.
If this exercise is too difficult, try tandem stance. See Alternatives to Single Leg Stance- first video)
(Click the blue text to access the video.)

Hamstring stretch- hold 10 sec, 2 reps each leg

Activity Log
Reminder: Complete the activity log daily to help you stay on track *(Click the blue text to access the form. You can do this on your phone or computer.)*

Tuesday

Walk- 15 minutes, intensity 3-4/10

Towel Roll Grip- 5 reps *(Click the button "EXERCISES" above for a description.)*

360 Turn- 2 reps *(If this exercise makes you dizzy, try an alternative.)* *(Click the blue text to access.)*

Shoulder Internal Rotation- hold 10 sec, 2 reps each arm

Shoulder External Rotation- hold 10 sec, 2 reps each arm

Activity Log

Wednesday

Walk- 15 minutes, intensity 3-4/10

Squat- 5 reps, intensity 3-4/10

Single Leg Stance- hold 5-10 sec (or longer if able), 2 reps each leg

Hamstring stretch- hold 10 sec, 2 reps each leg

Activity Log

Goals Screenshot

Goals provide direction, help with motivation, and give a sense of accomplishment. They are really beneficial for starting and maintaining an exercise program.

Let's set a few goals for our program. We'll use a template called "SMART".
Here's a short article about **how to set SMART goals**. *(Click the blue text to access the article.)*

LONG-TERM GOALS:
Use the SMART format to create one or more long-term goals for this eight week program. Consider setting a goal to improve at least one of your functional assessment scores. You could also create a goal to improve a functional activity like being able to get up from the floor.

Examples:
I will be able to do 15 stands on the 30 Second Chair Rise by the end of the 8 week program.
I'll be able to stand on one leg for 45 seconds by the end of 8 weeks.
By the end of the program, I will be able to get up from the floor without help from another person.
At the end of the program, I'll be able to climb a flight of stairs without getting short of breath.
By the end of the program, I will be able to garden for 30 minutes without needing a break.

Write your long-term goal(s). Writing them down helps so we can revisit them later to check our progress.
(Click the blue text to access the form.)

SHORT-TERM GOALS:
Next, create one or more short-term goals for the next week. These are action-oriented goals designed to get you to your long-term goal. They are done for a shorter period of time, such as a week or even a day.

Examples:
I will do all the program's exercises next week.
I will set out my exercise clothes each evening of the week to prepare for the next day's session.
I will participate in the virtual group discussion next week.
I will not sit for more than two hours at a time next week.
Today, I'll invite a friend to walk with me.
Next week, I'll reward myself for keeping up with the program.
I'll try one new exercise next week.
I have to miss Thursday's exercise due to a work obligation but I'll get back to the plan on Friday.
I'll hold my stretches for 30 seconds next week.
I'll do my exercise sessions at 9:00 am daily.
When watching TV, I'll stand up once during each program.

Write your short-term goal(s).
(Click the blue text to access the form.)

Connection Between Physical Activity and Functional Fitness Screenshot

Here are the main **exercises** we'll do and what they are designed to improve:

Walking and other aerobic activities improve stamina and endurance which is important for doing **errands, housekeeping, working, and recreational activities.**

Squats improve leg strength which is important for **getting out of low chairs, climbing stairs, and getting up off the floor.**

360 Turns improve dynamic balance which is important for **turning while walking, stepping backward to open a door, and walking around obstacles.**

Hamstring stretches improve the flexibility in the back of our thigh muscles. This is important for **putting on socks, cutting toenails, and picking up items from the floor.**

Towel Roll Grips improve grip strength which is important for **opening jars and holding heavy items.**

Single leg stance improves the ability to stand on one leg which is important for **correcting a trip, stepping onto a curb, and walking on uneven ground.**

Internal rotation stretches improve behind the back shoulder flexibility which is important for **reaching the back pocket, dressing, and personal care.**

External rotation stretches improve overhead shoulder flexibility which is important for **washing hair, dressing, and reaching into high cabinets.**

Exercise Progression Screenshot

It's important to progress our exercise so that we can get more benefits. Progressing exercises challenges the body so that it can make positive changes. (If you progress an area but it causes pain, injury, or excessive fatigue, back down for a while and try again another time.) Progressing slowly and in small increments will allow your body time to adjust and help prevent these problems. Follow the adage, "start low and go slow" when deciding where to start an exercise and how to progress.

In general, you can increase any of the FITT components- frequency, intensity, time, or type. Just increase one area at a time.

Here are some ideas to progress each exercise category (only do one at a time):

AEROBIC

Do the activity an extra day in the week (frequency).

Increase the intensity of the activity on the RPE scale. One method is to do an activity at moderate intensity with short (1-2 minutes) bursts of vigorous intensity.

Increase the duration (time) of the activity by 5-10 minutes every 1-2 weeks.

Try a different activity (type).

STRENGTHENING

Do the activity an extra day in the week (frequency). (Only do strengthening exercise for a particular body part every other day. Muscles need at least one day off in between.)

Increase the intensity of the activity on the RPE scale.

Increase the volume (time) by increasing the number of repetitions or sets.

Try a different type of exercise equipment (type).

FLEXIBILITY

Do the activity an extra day in the week (frequency).

Don't increase the intensity of the stretch. Continue to stretch to the point of feeling tightness or slight discomfort. Stretching harder than this can lead to pain and injury.

Hold the stretch a little longer (time). You don't need to hold it longer than 2 minutes.

Do the stretch for 2-3 repetitions (time).

No need to change the type of stretch. Slow movements into sustained positions (static stretches) are best.

BALANCE

Do the activity an extra day in the week (frequency).

Do a balance activity that is more challenging (intensity). Do it near a counter or have someone next to you. Don't do anything too challenging or unsafe.

Do the balance activity for a longer time.

Try a different balance exercise (type).

Next Steps Screenshot

CONGRATULATIONS on completing the program! I commend you for your hard work and dedication!

Did your functional fitness improve? Did your physical activity increase? Did you meet your long-term goals? If so, excellent! If not, don't be discouraged. You may need more time or different strategies. Improving functional fitness can take more time than we would like but it's well worth the effort. I encourage you to continue working on your functional fitness as the benefits are tremendous!

As we've learned, **functional fitness** is the ability to do the everyday tasks we want and need to do. This includes activities such as standing up from a low chair, stair climbing, housework, gardening, working, errands, going out with friends, caring for grandkids, and recreational activities. Functional fitness helps us to do these activities easily and confidently.

I encourage you to keep doing the **four main types of exercise** (aerobic activity, muscle strengthening, balance, and flexibility) to keep improving and maintaining your functional fitness.

I recommend incorporating **variety** in your exercise program. Try different exercises. If you don't like one, try something else. Find what works for you and what you enjoy.

Aim for the **FITT Guidelines** for older adults. This will give you a well-rounded program to include all the components of functional fitness.

As you continue, try to **progress** the exercises as you're able. Increase the minutes, intensity, resistance or repetitions, etc.

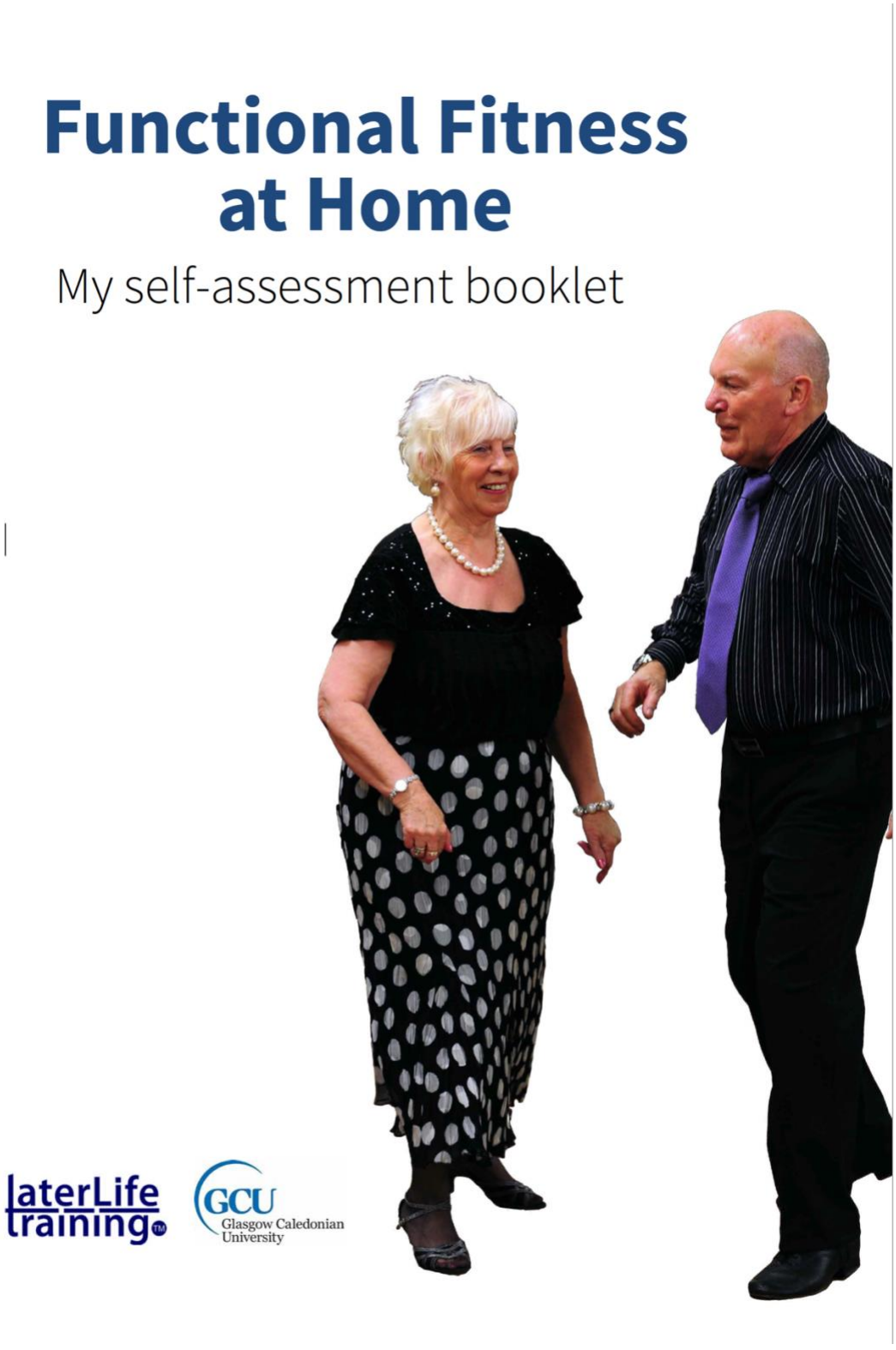
Exercise is most effective when done **consistently and long term**. It needs to become a lifestyle habit in order to continually reap its benefits. Review the tips you've learned in this program to **stay motivated**.

The benefits of functional fitness are immeasurable! Getting and staying functionally fit isn't easy but well worth the effort.

I hope you have found this program beneficial. Thank you so much for your participation!
I wish you every success in your functional fitness journey!

See below for additional exercise ideas and resources.

Participant Manual Screenshot



APPENDIX B: FUNCTIONAL FITNESS SCORESHEET

Default Question Block

Functional Fitness Score Sheet

Please enter your name

First Name

Last Name

Please enter today's date
(MM/DD/YYYY)

30 Second Chair Rise- Number of Stands

One Leg Balance- Number of Seconds for **Left** Leg

One Leg Balance- Number of Seconds for **Right** Leg

Standing Marching- Number of Steps

8 Foot Timed Up and Go- Number of Seconds

Use these descriptions to select your score on the traffic light for the next 2 questions.

Right Over the Head Shoulder Flexibility	Left Over the Head Shoulder Flexibility
☐ Can't get the hand to side of the head **(Position 1)**	☐ Can't get the hand to side of the head **(Position 1)**
☐ Hand can only get as far as back of neck **(Position 2)**	☐ Hand can only get as far as back of neck **(Position 2)**
☐ Hand can reach top of back or to shoulder blades **(Position 3)**	☐ Hand can reach top of back or to shoulder blades **(Position 3)**

Overhead Shoulder Flexibility- **Left** Shoulder. Slide the scale to select red, yellow, or green based on the position you can reach. (For all of these traffic lights, if yours is green, slide the bar up then back down to green.)

Overhead Shoulder Flexibility- **Right** Shoulder. Slide the scale to select

red, yellow, or green based on the position you can reach.

Use these descriptions to select your score on the traffic light for the next 2 questions.

Right Behind Back Shoulder Flexibility	Left Behind Back Shoulder Flexibility
☐ Can't reach buttock or above **(Position 1)**	☐ Can't reach buttock or above **(Position 1)**
☐ Lower back to shoulder blade **(Position 2)**	☐ Lower back to shoulder blade **(Position 2)**
☐ Touching shoulder blade & above **(Position 3)**	☐ Touching shoulder blade & above **(Position 3)**

Behind Back Shoulder Flexibility- **Left** Shoulder. Slide the scale to select red, yellow, or green based on the position you can reach.

Behind Back Shoulder Flexibility- **Right** Shoulder. Slide the scale to select

red, yellow, or green based on the position you can reach.

Use these descriptions to select your score on the traffic light for the next 2 questions.

Right Leg	Left Leg
☐ Can't straighten the extended leg or get hands beyond the knee **(Position 1)**	☐ Can't straighten the extended leg or get hands beyond the knee **(Position 1)**
☐ Hands reach between knee and toes **(Position 2)**	☐ Hands reach between knee and toes **(Position 2)**
☐ Hands can reach toe or beyond **(Position 3)**	☐ Hands can reach toe or beyond **(Position 3)**

Sit and Reach Flexibility- **Left** Leg. Slide the scale to select red, yellow, or green based on the position you can reach.

Sit and Reach Flexibility- **Right** Leg. Slide the scale to select red, yellow,

or green based on the position you can reach.

Use these descriptions to select your score on the traffic light for the next 2 questions

Handgrip Strength

- ☐ I need a gadget to open jars or bottles or get someone else to do it for me
- ☐ Sometimes need to use a gadget or ask someone but usually manage myself
- ☐ I am always able to open jars or bottles

Handgrip Strength- **Left** hand. Slide the scale to select red, yellow, or green.

Handgrip Strength- **Right** hand. Slide the scale to select red, yellow, or green.

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Default Question Block

Physical Activity Questionnaire

This form is to get an idea of your current level of physical activity.
Here are some descriptions that will help you answer the questions below.

- **Light activities** make your heart beat slightly faster than normal, but you can still talk or sing. This is walking at a leisurely pace.

- **Moderate activities** make your heart beat faster than normal. You can talk but not sing. This is brisk walking, biking, slow lap swimming, and doubles tennis.

- **Vigorous activities** make your heart beat much faster. You can't sing and can only speak a few words at a time before needing to take a breath. This is running, fast lap swimming, and singles tennis.

Please enter your name

First Name

Last Name

Please enter today's date

(MM/DD/YYYY)

I rarely or never do any physical activities.
Does this accurately describe you?

- Yes
- No

I do some light or moderate physical activities, but not every week.
Does this accurately describe you?

- Yes
- No

I do some light physical activities every week.
Does this accurately describe you?

- Yes
- No

I do moderate physical activities every week, but less than 30 minutes a day or 5 days a week.
Does this accurately describe you?

- Yes
- No

I do vigorous physical activities every week, but less than 20 minutes a day or 3 days a week.
Does this accurately describe you?

- Yes
- No

I do 30 minutes or more a day of moderate physical activities, 5 or more days a week.
Does this accurately describe you?

- Yes
- No

I do 25 minutes or more a day of vigorous physical activities, 3 or more days a week.
Does this accurately describe you?

- Yes
- No

I do activities to increase muscle strength, once a week or more.
Does this accurately describe you?

- Yes
- No

I do activities to improve flexibility, once a week or more.
Does this accurately describe you?

- Yes
- No

I do activities to improve balance, once a week or more.
Does this accurately describe you?

- Yes
- No

I sit for more than 2 hours AT A TIME during the day.
Does this accurately describe you?

- Yes
- No

About what percentage of your day do you spend sitting?
(Move the slider bar to answer.)

0 10 20 30 40 50 60 70 80 90 100

0

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APPENDIX D: EMAILS SENT TO PARTICIPANTS

Emails

Welcome

Welcome to the Functional Fitness at Home Program! I am so glad you decided to join our group. I think you'll find the program both beneficial and enjoyable.

I just sent you a program manual in the mail. While you're waiting for it, check out our program website. Please review the Introduction and complete the activities in that section.

Access the website by clicking here. *(Add link)*

Week 1

This week we will do the functional assessments and set goals. Please go to the program website Week 1 for all the details. *(Add link)* Let me know if you have any questions. I am happy to help!

Week 2

This week we will start our exercises. Please go to the program website Week 2 for all the information. *(Add link)* Please let me know if you have any questions.

Week 3

This week we will continue our exercises. Some things like repetitions may have changed so please refer to the program website Week 3 for details. *(Add link)*

Week 4

We're continuing the exercises and progressing some areas. Check out Week 4 on the program website. *(Add link)* Let me know if you have any questions. I am here to support you.

Week 5

This week, we will repeat the functional assessments. Please go to the program website Week 5 for details. *(Add link)* As always, let me know if you have any questions or concerns.

Week 6

This week, continue with the exercises. You are doing great! Please go to the program website Week 6 and note any changes in reps or hold times. *(Add link)*

Week 7

Stay strong! Continue with the exercises. Note the details as reps and intensity may have increased. Please go to the program website Week 7. *(Add link)*

Week 8

This is our last week. We'll be doing the functional assessments a final time. Please go to the program website Week 8. *(Add link)*

Final

Thank you so much for taking part in the Functional Fitness at Home Program. Your participation has made a valuable contribution toward helping older adults improve functional fitness. I hope you found it to be personally beneficial. I encourage you to continue your fitness journey. The benefits of functional fitness are tremendous. See Next Steps in the program website for additional resources for continuing your exercise program. *(Add link)*

APPENDIX E: VIRTUAL GROUP DISCUSSION

Meeting Structure

1. PC greets participants.

2. PC asks participants each week's discussion questions as listed below.

3. PC uses one or more strategies to enhance participants' self-efficacy (American College of Sports Medicine, 2022):

    Encourage participants to set realistic goals (mastery experiences).

    Provide additional instruction for exercises as needed (mastery experiences).

    Encourage use of activity logs to track progress (mastery experiences).

    Share an example of a functionally fit older adult (vicarious experiences).

    Encourage and verbalize confidence in participants' abilities (verbal persuasion).

    Provide tips on making exercise more enjoyable (physiological feedback).

4. PC informs participants of any changes in next week's exercises.

Discussion Questions

Week 1

How do you feel about your functional assessment scores and how you compare to the norms?

What gets in the way of you exercising consistently?

What helps you exercise?

Why do you want to be more active?

Why do you want to improve your functional fitness?

How can I help you during this program?

Weeks 2-4

Did you encounter any setbacks or problems exercising this past week?

What are some strategies to overcome these issues?

What successes (such as improvements and overcoming obstacles) did you have this past week?

Week 5

How do you feel about your functional assessment scores?

Did you encounter any setbacks or problems exercising this past week?

What are some strategies to overcome these issues?

What successes (such as improvements and overcoming obstacles) did you have this past week?

Week 6-7

Did you encounter any setbacks or problems exercising this past week?

What are some strategies to overcome these issues?

What successes (such as improvements and overcoming obstacles) did you have this past week?

Week 8

How do you feel about your functional assessment scores?

Did your physical activity increase compared to the beginning of the program?

Did you meet the long-term goals that you set at the beginning of the program?

How confident are you about continuing an exercise program?

Why should we keep working on our functional fitness?

.

APPENDIX F: ACTIVITY LOG

Default Question Block

Activity Log

Please enter your First and Last name

First Name

Last Name

Please enter today's date
(MM/DD/YYYY)

How many minutes did you walk (or do another aerobic activity)?

How many Squats (or similar exercise) did you do?

How many Single Leg Stance (or similar exercise) reps did you do on each leg?

How many Hamstring Stretches did you do on each leg?

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Default Question Block

Post Program Survey

(This 8 question survey is anonymous)

This program helped to increase my functional fitness.

Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
O	O	O	O	O

This program helped to increase my aerobic capacity.

Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
O	O	O	O	O

This program helped to increase my strength.

Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
O	O	O	O	O

This program helped to increase my balance.

	Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
	O	O	O	O	O

❄ [illegible]

	Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
	O	O	O	O	O

❄ [illegible]

	Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
	O	O	O	O	O

[illegible]

[illegible]

[illegible]

Powered by Qualtrics

APPENDIX H: POWERPOINT PRESENTATION

3/14/22

Effects of the Functional Fitness at Home Program on Physical Activity and Functional Fitness in Older Adults

Lisa Kokx PT, DPT, MA
Board Certified Geriatric Clinical Specialist
Certified Exercise Expert in Aging Adults

1

Program

- 8-week virtual program
- Functional Assessments
  - 30 Sec Chair Rise
  - One Leg Balance
  - Standing Marching
  - Timed Up & Go
  - Sit & Reach
  - Back Scratch- Overhead & Behind Back
  - Handgrip Strength
- Physical Activity Questionnaire
  - Rapid Assessment of Physical Activity

CDC, 2019

2

Program

- Exercise program (5 days/week) performed individually at home
  - Walking
  - Squat w/ chair touch
  - 360 degree turns
  - Lying hamstring stretch
  - Towel roll grips
  - SLS w/ counter support
  - Shoulder IR & ER towel stretches

National Institute on Aging

3

Program

- Weekly communication with participants
- Group Zoom meetings
- Behavior change strategies
  - Goals
  - Activity logs
  - Intrinsic motivation
  - Relapse prevention

National Institute on Aging

4

Website

- Progressive exercise program
- Education on exercise principles, functional fitness & behavior change strategies
- https://sites.google.com/uncg.edu/fah/home

National Institute on Aging

5

Results

- Significant improvements in functional fitness scores & physical activity participation
- Participants perceived program as beneficial

National Institute on Aging

6

Application

- Explain importance of functional fitness to patients
- Describe how FF is the ability to do everyday tasks they want & need to do
- Give examples
  - Walking up steps to enter their home
  - Caring for grandkids
  - Going out with friends
- Ask what type of activities are important to them

7

Application

- Explain link between functional fitness & physical activity
- Emphasize the functional purpose of exercises
- Examples:
  - Walking improves stamina for errands, housekeeping & recreation
  - Squats helps standing from low chairs, climbing stairs, getting off floor
  - Hand gripping ex improve opening jars & holding heavy items
  - Standing on one leg is beneficial for stepping up curbs

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Application

- Use more functional measures
- Explain relevance of functional measures to patients
  - Norms for age & gender
  - Cut points for fall risk & other outcomes

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Application

- Use behavior change strategies
  - Help patients set appropriate goals
    - Use SMART format
    - Write goal in the hospital notebook
  - Scale exercises so patients can be successful
  - Have them use an activity log
  - Point out patients who are successfully doing tasks they want to do
  - Give patients ideas to make exercise more enjoyable

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Application

- Make recommendations for after discharge
  - Educate on physical activity guidelines
    - See new International Exercise Recommendations for Older Adults
  - Teach pts to use assessments for goal setting & to monitor progress
  - Give patients info:
    - Free exercise videos
    - Tips to break up sitting time
    - Getting back on track after setbacks
  - Post-discharge website

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Comments or Other Ideas?

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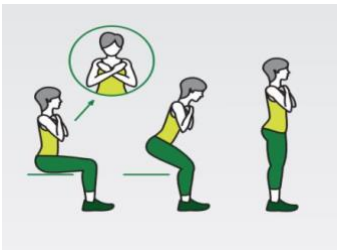
Takeaways Handout

Explain functional fitness to patients.
Functional fitness is the ability to do the everyday tasks with ease & confidence. This includes activities such as standing up from a low chair, stair climbing, housework, gardening, working, errands, going out with friends, caring for grandkids, & recreational activities.

Explain the connection between functional fitness & PA.
Walking improves stamina for *errands, housekeeping, working & recreation*
Squats improves strength for *getting out of low chairs, climbing stairs & getting up from floor*
Towel Roll Grips improves grip strength for *opening jars & holding heavy items*
Single leg stance is important for *correcting trips, walking on curbs & uneven ground*

Explain the relevance of functional measures to patients (norms & cut points).

Use behavior change strategies.
Create SMART goals & write in hospital notebook.
Scale exercises so patients can be successful.
Use an activity log.
Point out other patients who are successfully doing tasks.
Give tips to make exercise more enjoyable.



Make recommendations for post-discharge.
Educate on physical activity guidelines
Use functional assessments for goal setting & to monitor progress.
Give info on free exercise videos, ideas to break up sitting time & getting on track after illness.