Lee PG, et al., J Gerontol Geriatr Med 2019, 5: 036
DOI: 10.24966/GGM-8662/100036

HSOA Journal of Gerontology & Geriatric Medicine

Research Article

Lifestyle Intervention to Increase Physical Activity and Social Participation among Older Adults with Diabetes: Result of a Feasibility Study

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Abstract

Purpose: To assess the impact of lifestyle intervention on physical activity and participation in social roles and activities among sedentary older adults with Type 2 Diabetes (T2DM).

Materials and Methods: We conducted a pilot study involving an 18-week tailored lifestyle intervention, led by an Occupational Therapist (OT), among community-dwelling adults who were 65 years and older, sedentary, and had T2DM. The intervention included 6 sessions (2 in-person and 4 phone calls) of individually tailored consultation to modify lifestyle based on participants' baseline 1-week home accelerometry-derived PA and social participation.

Results: Twenty-three individuals completed baseline home monitoring activities, 87% completed the study. At the end of the study, participants reported significant improvements in the 4-week PA using the Community Healthy Activities Model Program for Seniors questionnaire: +1689 Kcal/week mean total PA and +1533 Kcal/week moderate-vigorous intensity PA. Participants also reported improvement in the Ability to Participate in Social Roles and Activities (+2.97, p=0.01) and Satisfaction with Participation in Discretionary Social Activities (+3.51, p=0.02).

Conclusion: Among sedentary older adults with T2DM, a brief OT-delivered lifestyle modification intervention improved self-reported PA and social participation, two important factors of disability, suggesting that such intervention may contribute to preventing disability in a high risk population.

Keywords: Aging; Diabetes; Participation; Physical activity

Introduction

Type 2 Diabetes Mellitus (T2DM) affects over 25% of older adults in the USA [1], and is associated with multiple co-morbidities with increased risk of disability [2]. Engaging in regular physical activity is a key part of the management of T2DM [3]; yet older adults are especially likely to be sedentary. Only 12% of adults aged 75 or older engage in 30 minutes of moderate PA for 5 or more days per week and 65% report no leisure PA. Current PA interventions have limited impact among older adults with T2DM because of modest short-term effects and high drop-out rates over time [4]. Potential barriers for older patients with T2DM to reach PA goals include co-existing geriatric syndromes and physical function impairments that can limit their participation in moderate-intensity PA [5], such as brisk walking for 150 minutes/week [3,6].

Participation or social participation, defined as an individual's involvement in daily activities in home, community, and societal environment, such as volunteering, caregiving and leisure activities [7,8], may be another important factor in promoting PA among older adults. A previous PA intervention aimed to delay mobility disability found that individuals with a higher level of participation were more successful in achieving the intervention goals [9]. Lower level of participation in daily life and social activities has been shown to be associated with higher risk for physical inactivity [10]. Therefore, we hypothesized that a PA intervention that also involves social participation may improve PA and mobility disability.

We present the results of a proof-of-concept study testing the feasibility of a lifestyle intervention among adults aged ≥65 years with T2DM based on their daily PA patterns at home. The intervention was based on social cognitive theory [11] and the World Health Organization's International Classification of Functioning, Disability and Health (ICF) model on health and disability [12], which links an individual's functioning at body function/structure, activity, and participation levels with personal and environmental factors. Lifestyle-based PA has been shown to improve physical functioning of older adults with T2DM [13], but has not been shown to also improve participation [14]. In this study, we hypothesized that a brief Occupational Therapist (OT) - led lifestyle-based PA intervention, tailored for the individual's functioning in the context of personal and environmental factors, is feasible to deliver and can result in improvement

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Citation: Lee PG, Connell CM, Alexander NB, Murphy SL (2019) Lifestyle Intervention to Increase Physical Activity and Social Participation among Older Adults with Diabetes: Result of a Feasibility Study. J Gerontol Geriatr Med 5: 036.

Received: August 10, 2019; **Accepted:** August 26, 2019; **Published:** September 02, 2019

in PA, participation and physical functioning among older adults with T2DM. OT are ideal choices for this intervention as they are trained to use strategies to promote participation of individuals with functional impairment in daily activities while adapting to their environment [15].

Methods

Study design

The study was a pre- and post- one-group intervention trial conducted at an academic medical center from March 2016 to February 2017. Figure 1 and appendix 1 represented the CONSORT diagram and study flowchart, respectively. The study was approved by the University of Michigan Institution Review Board and all participants signed the consent prior to study activities.

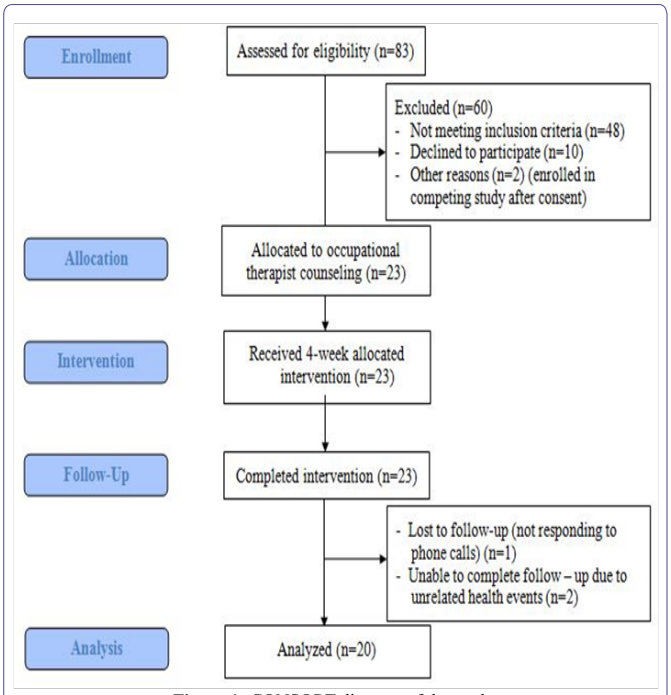

Figure 1: CONSORT diagram of the study.

Study participants

Community-dwelling adults aged ≥65 years with T2DM were recruited from a diabetes research registry maintained by the Michigan Diabetes Research Center, and through advertisement around the medical center campus. Phone and in-person screening were conducted with additional inclusion criteria: being sedentary (current performance of <150 minutes per week of moderate-intensity PA), ability to operate the study accelerometer, ambulatory (with or without a cane or walker), English-speaking and able to provide informed consent. Exclusion criteria included: possible cognitive impairment based on the Six-item Screener (missed ≥2/6 item-recall) [16], having a condition in which exercise would be contraindicated (e.g., medical instability) or difficulty to complete study procedures, dementia, Parkinson's disease, or current attendance in a PA intervention program.

Intervention

The research team, including a licensed OT, developed the intervention manual. The manual provides a guide for the OT to apply the three self-regulation components when counseling the participants [17]: self-observation, self-evaluation and self-reaction. The manual includes information on exercise safely with diabetes, description and examples of four types of exercises (i.e., aerobic, strength, balance and flexibility training) [18], and a variety of lifestyle-based PA categorized based on individual's social roles (i.e., participate in family activities such as shopping and fishing, or participate in community activities such as charity walks) [19]. As an incentive, all participants were offered to use a Fitbit Zip during the study period.

After obtaining consent, participants were asked to complete 7-day homework, recording detailed PA and participation activities, while wearing an accelerometer -ActiWatch [Respironics, Bend OR] on their non-dominant wrist. The homework and accelerometer were then mailed back to the study team in a pre-stamped envelope. Participants were excluded from the intervention if they did not adhere to the study procedures to a level that the team felt was appropriate to participate in the intervention (i.e., did not enter 75% of responses into the accelerometer, or did not wear the accelerometer for at least 5 out of 7 days with three consecutive days, or if the accelerometer was worn less than 70% of the wake time).

Using the participants' baseline home activities, an OT counseled them on how to improve physical and participation activities in 30-60-minute face-to-face sessions (Appendix 2 and 3). Using techniques grounded in social cognitive theory, the OT counseled the participants to set weekly physical and participation activity goals and strategies to achieve the goals, and utilizing the three steps of self-regulation to overcome barriers to reach their individual goals. Participants were encouraged to keep a weekly physical and participation activity log. Additional OT follow-ups included a phone call one week following the first face-to-face counseling session, a second face-to-face counseling session, followed by 2 weekly phone calls, and final call 2 weeks later. At the subsequent phone and face-to-face encounters, the OT worked with the participants to complete the activity logs, further encouraged them to work toward their individual goals, and helped them to problem solve any barriers.

Then a research assistant called the participants in a tapering fashion over the next 10 weeks, just asking if they have achieved their weekly PA and participation goals, no additional counseling was provided. At 18-weeks, all participants were assessed, then given the ActiWatch to wear for 7 days, and a stamped envelope to mail it back to the study team. After completion of the study, all participants were invited to attend a semi-structured interview session to share their experiences with the study team for the purpose of refining the intervention. Subsidiary prompts ensured that all relevant issues could be addressed. Interview questions explored the participants' opinion on specific components of the intervention, motivation and barriers to PA and participation. The interviews took up to 30 minutes and were audio recorded.

Feasibility measures

The feasibility measures included participant satisfaction with the intervention, intervention adherence and time to deliver the intervention. Satisfaction was measured by a brief survey of a series of Likert

scale items and semi-structured interviews. Throughout the study, participants were encouraged to contact the study team for any adverse events and research staff routinely inquired about their well-being during all interactions. Semi-structured interviews assessed participant's feedback in two broad areas: key components of the study, and potential motivators and barriers to PA and participation. Questions on the study were more targeted and specific, whereas questions on PA and participation were more general and broad. All questions were followed by the interviewer prompting the participant to provide more in-depth feedback.

Outcome measures

The primary outcomes were changes in PA and participation over 18-weeks. PA was measured by the Community Healthy Activities Model Program for Seniors (CHAMPS) surveys and ActiWatch counts. The CHAMPS survey is a commonly utilized and validated 41-item questionnaire to evaluate PA in community-dwelling older adults [20]. The CHAMPS assesses physical activities over the past 4 weeks, including the number of times and hours per week involved in each activity. Each of these activities is assigned a metabolic equivalence task value consistent with the intensity of effort usually associated with performing the activity, thus allowing calculation of caloric expenditure per week [21]. ActiWatch is a validated wrist-worn accelerometer that generates objectively measured PA counts [22]. Participants wore the accelerometer during the 2 weekly home-monitoring periods (at baseline and at final week). Two measures were used to examine activity level and sedentariness 1) average counts/minute; 2) percent immobility time, or the percentage of epochs in the given interval scored as immobile by the ActiWatch [23].

Participation was assessed by three validated questionnaires from the Patient-Reported Outcomes Measurement Information System (PROMIS) assessment center [24]. Each questionnaire was standardized with a U.S. adult population with mean of 50 and standard deviation 10. The Ability to Participate in Social Roles and Activities (APSRA, PROMIS Item Bank V2.0) assesses participation restriction, including problems experienced in social interaction, employment, transportation, community, social and civic life. The remaining two questionnaires were Satisfaction with Participation in Social Roles (SPSR, PROMIS Item Bank V1.0) (e.g., I am satisfied with my ability to do things for my family), and Satisfaction with Participation in Discretionary Social Activities (SPDSA, PROMIS Item Bank V1.0) (e.g., I am satisfied with my ability to do things for fun at home (like reading, listening to music, etc.)).

Secondary outcomes were changes in physical function as measured by Timed Up and Go (TUG; time to rise from a chair, walk 3 meters and return to the chair); Six Minute Walk (6MW); and Comfortable Gait Speed over a 10-meter walk. Blood samples were analyzed for glycosylated hemoglobin A1c (A1c) by the University of Michigan's Diabetes Research Center Chemistry Laboratory.

Data analysis

We did not power this proof-of-concept study as our aim was to test the feasibility of the intervention, and no previous studies have investigated the effect of PA intervention on participation changes. We also intentionally kept the overall sample size small (under 25) to allow more comprehensive evaluation and refinement of the intervention. The feedback from the interviews will be used to inform design of future larger randomized-controlled trial. Descriptive statistics (means and standard deviations) were used to estimate time spent in face-to-face counseling and phone calls by the OT. Mean satisfaction and percentage of sessions attended were also calculated. Percent intervention adherence was calculated based on the attendance at the 2 OT face-to-face visits and the completion of the 4 phone calls from the OT.

Data from the interviews were transcribed and read by two research team members. Initially the transcribed data were separated into participants who had improved PA (CHAMPS results and /or ActiWatch scores) versus those who did not improve. Data in each group were then examined for themes reported by previous studies [25-27], such as internal factors involved the individual's own decision-making, and external factors involved an individual's contextual environment, which are independent of an individual's decision-making [25-28,]. Data regarding participation were separately reviewed to identify for any common themes. Other co-authors read the relevant data to establish consensus on the interpretation.

For pre-post comparisons, we performed paired t tests comparing CHAMPS scores for all activities and for moderate-intensity activities, accelerometer mean daily activity counts and immobile time from baseline versus the final 7 days of the study. Similarly, paired t tests were used to test for statistically significant scores in participation surveys and physical function. Effect sizes for PA and participation changes were estimated using the ratio of the mean change to the standard deviation of that change [29]. All statistical analyses were performed using Stata14 (StataCorp. 2015. Stata Statistical Software: Release 14. College Station, TX: StataCorp LP).

Results

A total of 35 individuals consented for the study. Ten were excluded by the study team because they did not complete home monitoring activities. Two were excluded prior to the intervention because they also enrolled in another PA training program. The remaining 23 individuals all completed the intervention; 2 later had to withdraw for unrelated health events, and 1 was lost to follow-up, leading to a retention rate of 87% (n=20) among those who completed the baseline activities (Figure 1).

Among the 20 participants who completed the study, mean (± standard deviation) age was 73 ± 5.95 years, 50% were female, 85% White, 75% completed college, and had a mean of 2.9 ± 1.88 chronic diseases in addition to diabetes. The mean BMI was 31.7 ± 6.08 kg/m^2, A1c 7.2% ± 1.17%, diabetes duration 13.9 ± 7.57 years and 33% were on insulin. Half of the participants reported difficulty walking up several flights of stairs. With respect to baseline characteristics, there was no statistical difference between the individuals who completed the study and the 15 individuals who consented but did not complete the study (all $p>0.05$).

Feasibility results

Adherence to the intervention was good: 100% participants completed the 2 face-to-face counseling sessions and at least 1 of the 4 OT phone calls; 87% completed at least 2 OT phone calls. The total mean (± standard deviation) OT counseling time was 112 ± 24 min, including 92 ± 13.8 min face-to-face time, 21 ± 15 minutes for the 4 phone calls in total. Sixteen participants completed the feedback survey (Table 1). Overall they were satisfied with the intervention and

gained knowledge on how to improve PA. No adverse events related to the intervention were reported.

Satisfaction of the study	Participants responded "Yes"
Willing to volunteer for this study again	81%
Would recommend this study to a good friend	94%
Improved understanding of the current level of physical activity	88%
Improved understanding of ways to improve physical activity	75%
Satisfaction of the Intervention Components*	Participants "Satisfied / very satisfied"
Weekly activity logs	75%
Face-to-face counseling by the OT	88%
Phone calls from the OT	75%
Strategies recommended by the OT	81%

Table 1: Survey of 16 participants who completed the study.

*The answers in the survey on intervention components had 5 choices: very dissatisfied, dissatisfied, neither satisfied nor dissatisfied, satisfied, and very satisfied.

Intervention results

Based on the 4-week recalled CHAMPS activities, the participants had significant improvement in total PA (+1689 Kcal/week, $p<0.01$; effect size 0.71) and moderate-vigorous intensity PA (+1533 Kcal/week, $p<0.01$; effect size 0.78) (Table 2). The moderate-vigorous activity more than doubled from the baseline. Based on the accelerometer, the counts per minute and percentage of immobile time were unchanged ($p>0.05$). Two of the three measures of participation improved significantly: APSRA (+2.97, $p=0.01$; effect size 0.40) and SPDSA (+3.51, $p=0.02$; effect size 0.41); SPSR remained unchanged ($p=0.41$). Eighty percent of participant had improved or stable SPDSA score, 60% had improved APSRA and 62% had improved SPSR. There was substantial variability in individual participant's response to these three measures of participation: 1 participant had a decline in all three measures, 10 participants improved in all three measures, 6 participants declined in both APSRA and SPSR ($r=0.78$, $p=0.0001$). Finally, comfortable gait speed improved by 0.05 meters/second ($p=0.04$); results from TUG, 6MW test and A1c were unchanged ($p>0.05$).

Participant input from interviews

Several general themes on PA engagement emerged from the semi-structured interviews (n=10). The first one was that as a result of the study, the participants in general gained "more awareness" of the opportunities to be more physically active throughout the day, and became "more knowledgeable" about how to be physically active. Another theme was that the participants liked the intervention, particularly the goal setting portion of the study. While most individuals were motivated to be more active because they knew PA can improve their health, barriers to activities differed among the 5 individuals who improved their PA based on CHAMPS and accelerometer measures (i.e., responders) versus those who did not improve (i.e., non-responders). The responders reported barriers that are related to the environment and motivation, including bad weather, lack of time and lack of motivation. In addition to these barriers, the non-responders also reported barriers that are health related: knee pain, fatigue and exhaustion due to emphysema.

The motivators to participate socially included learning new knowledge, setting a goal and joy of spending time with family or neighbors:

- "[Motivation to be more interactive is] want to learn more about Alzheimer's"
- "I've not talked to neighbor for a long time and now I visit her frequently"
- "With this study, I am spending more time with the grandkids. I can move better, and not hurting"

Barriers for participation included distance from family/neighbors and physical health concerns:

- "Most of the people take off during the winter.... I don't have family in the area....no longer have a dog"
- "Colds (sickness)"

Discussion

This proof-of-concept study demonstrated feasibility and improvements in self-reported physical activity and participation among sedentary older adults with T2DM. Eighty-seven percent of the participants who completed the baseline home monitoring activities completed the study. For the participants who completed the intervention, our program was well accepted; over 90% of those surveyed were willing to recommend the study to a good friend. The intervention was successful in improving PA based on a validated self-report PA measure (CHAMPS), comfortable gait speed, and two of the three participation outcomes, but not the accelerometer counts. The brief counseling time, averaging less than 2 hours per person, strengthens the feasibility of the intervention and can be beneficial for wide dissemination if the results are further confirmed in larger randomized-controlled studies. The interview response suggested that PA interventions for older adults with diabetes may be more effective if they were implemented in conjunction with medical management of other symptoms.

While previous studies have shown that lifestyle - based PA can improve the management of T2DM and prevent physical function disability [13], our study is the first to find that such intervention also improves the measures of participation. In fact, an effect size of 0.40-0.41 is likely clinically meaningful as 0.30 is generally considered as a useful criterion for a minimally important difference in patient-reported outcome measures [29]. Our results contradict the findings from a systematic review of 18 randomized-controlled trials, which concluded that exercise interventions do not improve participation in life roles in older adults [14], perhaps because these exercise programs focused on functional improvement and did not consider environmental and personal factors. Our intervention, on the other hand, delivered by occupational therapist, focused on helping individuals to adapt to their environment based on their capacity [15]. Indeed, our positive results in participation may be in part be due to the tailored counseling based on each individual's environmental and personal factors, and helping the participants set their own participation goals. Consistent with previous literature, the interview responses suggested that educational activities, social network and physical health were all important factors in social participation [7]. The response from one interviewee suggested that social participation can be improved through self-observation and goal setting: "Actually seeing it in writing.

Participant characteristics (N=20)	Baseline (mean ± SD)	Outcome (mean ± SD)	Change from baseline (mean ± SD)	P value
A1c, %	7.20 ± 1.18	6.97 ± 0.76	-0.23 ± 0.88	0.25
BMI, kg/m^2	31.69 ± 6.08	31.76 ± 5.82	0.08 ± 0.99	0.73
TUG, sec (n=19)	10.06 ± 1.87	10.32 ± 2.32	0.26 ± 0.95	0.26
Gait speed, m/s (n=19)	1.17 ± 0.18	1.22 ± 0.19	0.05 ± 0.10	0.04
6MW, m (n=19)	347.70 ± 53.05	357.35 ± 60.32	9.66 ± 27.79	0.14
CHAMPS Total (Kcal/wk)	2433.85 ± 1605.19	4122.99 ± 2954.94	1689.14 ± 2333.16	0.004
CHAMPS: Any physical activities per week, times	13.30 ± 8.46	19.15 ± 11.85	5.85 ± 8.93	0.009
CHAMPS moderate activity (Kcal/wk)	1055.43 ± 1168.40	2588.57 ± 2526.40	1533.14 ± 1900.50	0.002
CHAMPS: Moderate-vigorous physical activities per week, times	3.70 ± 3.88	8.1 ± 6.58	4.4 ± 4.53	0.0004
ActiWatch Counts/min (n=18)	236.65 ± 90.48	242.18 ± 90.86	5.52 ± 42.90	0.59
ActiWatch immobile time per day; %	24.25 ± 9.57	24.63 ± 10.08	0.37 ± 6.96	0.82
*Ability to participate in social roles & activities	54.51 ± 7.37	57.48 ± 7.64	2.97 ± 4.90	0.01
*Satisfaction with participation in Social Roles	54.66 ± 7.50	55.90 ± 7.10	1.24 ± 6.64	0.41
*Satisfaction with participation in discretionary social activities	55.42 ± 8.16	58.43 ± 6.23	3.01 ± 5.43	0.02

Table 2: Intervention results on participants who completed the study.

P-value: Paired t-test comparing the means before and after intervention. A1c = Hemoglobin A1c; BMI = Body Mass Index; TUG= Timed Up and Go test; 6MW = 6-minute walk test; CHAMPS = Community Healthy Activities Model Program for Seniors.

*Patient-Reported Outcomes Measurement Information System (PROMIS) survey scores are ranged from 0-100, with population mean 50. Higher scores meant better ability to participate or more satisfaction with participation.

I've not talked to neighbor for a long time and now I visit her frequently." Results from our study need to be confirmed in larger studies and the roles of environment and personal factors in participation will need to be further assessed.

For older adults, maintaining social participation or reducing participation restriction are considered highly important [30], and participation is associated with good quality of life [31] and faster gait speed [32]. Maintaining participation is associated with lower levels of morbidity, physical disability and mortality [12,33-35]. Participation allows fulfilment of valued life activities, aspects of identity and social roles (e.g., being a worker, caregiver or community member) [12,30].

Diabetes was a leading driver of the population attributable risk for social participation restriction when compared with arthritis, ischemic heart disease and cognitive impairment among older Canadians [36]. Chronic diseases such as diabetes impact daily routines, as the individuals need to allocate time and effort to manage their medical conditions (i.e., more physician visits) which may lead to less time for participation [37]. More patients with diabetes reported at least one social participation restriction than those without diabetes (32% vs. 23%, p=0.003) [37]. As older age is associated with higher prevalence of multiple chronic conditions [38], future intervention studies involving older adults should consider including participation as an outcome because it transcends different chronic conditions; measurement of participation also captures the individual's capacity to fulfil basic tasks of life as well as the interaction between his/her capabilities, environment and needs [12,33,39,40].

Among the three objective physical function measures, gait speed showed statistically significant improvement, albeit not clinically significant [41]; improvement of gait speed by 0.1m/s is associated with improved survival [42] and reduced risk for disability [43]. Nevertheless, our finding is promising given the brief intervention, and that the natural course of the physical functioning is to decline over time, even with intense PA and weight loss [13]. Therefore, the fact that our intervention led to slightly improved or unchanged physical function over 18 weeks suggests that it may be beneficial for physical function.

Our study has several strengths. The intervention is innovative because it: 1) was tailored based on each individual's own baseline PA performed within his/her environment, consistent with the ICF model; 2) used an accelerometer-assisted, field-based method to address the individual's unique physical and social environment [44]; 3) was delivered by an OT to guide individuals with functional impairment to adapt to their environment [45]; and 4) incorporated both PA goals as well as participation goals. The study provided preliminary effect size estimation for future intervention and supports a run-in period in the future to improve participant retention from enrollment as 29% of the enrolled participants had difficulty fulfilling the protocol requirement [46].

This study has a number of limitations, including small sample size, short duration of the follow up and a lack of a control group. Despite these limitations, our study procedure was generally feasible and well-accepted and there were some preliminary effects of the intervention, including improvement in self-reported PA and stable physical functioning. The self-reported CHAMPS results were susceptible to recall bias and social desirability, thus the effectiveness of the intervention on PA should be interpreted with caution. However, CHAMPS is a well validated questionnaire with evidence of reliability [47], and provides an estimate of 4-weeks activity, whereas the accelerometer only recorded activities in 1 week. Participants enrolled in a clinical trial may have symptomatic improvement even before the intervention [48]. Some of our participants were likely to have started changing their behavior and became more active, which would be

captured by the accelerometer at baseline assessment. In fact, such behavior led to two individuals being excluded from the remaining of the study as they joined another PA program right after enrollment into the study. The CHAMPS results would more likely reflect true baseline activities prior to enrollment. Additionally, older adults with multiple chronic medical conditions are at risk to have an acute or unexpected health event that can interfere with their activity level. Therefore, one week's accelerometer measurement may not fully reflect the overall usual activity level of the individuals [49]. At least two of our participants reported having a "bad week" due to unrelated and unexpected health events during the week when they wore the accelerometers.

There is an urgent need for successful and sustainable interventions to improve PA among sedentary older adults with diabetes. Due to the heterogeneous health status of this population, interventions that are tailored based on the individual's functional status in the context of their environment may be effective in leading to long-term benefits [45]. This study provides preliminary support for a feasible, OT-facilitated lifestyle intervention to improve self-reported PA and participation in a sample of sedentary older adults with T2DM. Future randomized controlled trials will assess long-term outcomes of such a tailored-activity program in diverse populations.

Acknowledgement

Funding: This work was supported by VA Rehabilitation Research and Development Career Development Award (5-IK2-RX001190 to P.G.L.), the National Institute on Aging Claude Pepper Center (AG024824 to P.G.L.), and the National Institute of Diabetes and Digestive and Kidney Diseases (MDRC, P30DK020572). The sponsors had no role in the project beyond funding.

Trial Registration: ClinicalTrials.gov Identifier: NCT02699307; registered 2/10/2016.

Declaration of Interests

The authors declare that they have no competing interests. The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States government.

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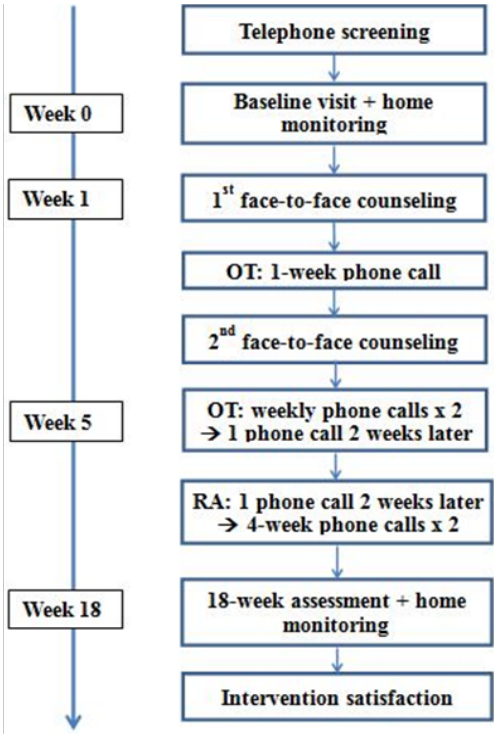
Appendix



Appendix 1: Flowchart of the intervention. OT = Occupational Therapist; RA = Research Assistant.

Physical activity goals

- Walking for 30 minutes every day
- Sitting exercises for 20 minutes three times a week
- Light weight lifting twice a week
- Less time in the recliner

Participation goals

- Go to movies with neighbor
- Visit grandkids
- Watch soccer games, with grandkids
- Go to a lecture sponsored by the Alzheimer's Association

Appendix 2: Examples of physical activity goals and participation goals.

Roles	Strategies
Self	Incorporate some extra walking into your daily routine Add a 10-15-minute walk after each meal, you can walk inside the house, around the house, around the block, or walk in the mall Walk to meetings with friends or family, when going to the letter box walk down to the end of the street and back Stand up while talking on the telephone
Family	Invite a friend or family to help you be more active join an exercise class together Watch a good TV show or movie with family or friend When watching TV at home, plan to get up and NOT sit during each commercial breaks
Community (Neighbors, Friends)	Tell friends and family about the study so they can remind you to get up and move or maybe motivate others to be more active as you are trying to Join local community walk / run events (Turkey Trout, 1K, 5K, etc.) Stand up after each hand of bridge, or playing Solitaire, or when cutting fabric for quilting, or standing at an easel to paint
Domestic activities	Do household chores with yours pouse/kids/grandkids Do some exercises (e.g., walk around the kitchen) while waiting for meal to cook When lifting the milk or something heavier, lift it 5 times or more up and down, before setting it down.

Appendix 3: Examples of physical activities recommended by occupational therapist based on social roles.

Journal of Anesthesia & Clinical Care

Journal of Addiction & Addictive Disorders

Advances in Microbiology Research

Advances in Industrial Biotechnology

Journal of Agronomy & Agricultural Science

Journal of AIDS Clinical Research & STDs

Journal of Alcoholism, Drug Abuse & Substance Dependence

Journal of Allergy Disorders & Therapy

Journal of Alternative, Complementary & Integrative Medicine

Journal of Alzheimer's & Neurodegenerative Diseases

Journal of Angiology & Vascular Surgery

Journal of Animal Research & Veterinary Science

Archives of Zoological Studies

Archives of Urology

Journal of Atmospheric & Earth-Sciences

Journal of Aquaculture & Fisheries

Journal of Biotech Research & Biochemistry

Journal of Brain & Neuroscience Research

Journal of Cancer Biology & Treatment

Journal of Cardiology: Study & Research

Journal of Cell Biology & Cell Metabolism

Journal of Clinical Dermatology & Therapy

Journal of Clinical Immunology & Immunotherapy

Journal of Clinical Studies & Medical Case Reports

Journal of Community Medicine & Public Health Care

Current Trends: Medical & Biological Engineering

Journal of Cytology & Tissue Biology

Journal of Dentistry: Oral Health & Cosmesis

Journal of Diabetes & Metabolic Disorders

Journal of Dairy Research & Technology

Journal of Emergency Medicine Trauma & Surgical Care

Journal of Environmental Science: Current Research

Journal of Food Science & Nutrition

Journal of Forensic, Legal & Investigative Sciences

Journal of Gastroenterology & Hepatology Research

Journal of Gerontology & Geriatric Medicine

Journal of Genetics & Genomic Sciences

Journal of Hematology, Blood Transfusion & Disorders

Journal of Human Endocrinology

Journal of Hospice & Palliative Medical Care

Journal of Internal Medicine & Primary Healthcare

Journal of Infectious & Non Infectious Diseases

Journal of Light & Laser: Current Trends

Journal of Modern Chemical Sciences

Journal of Medicine: Study & Research

Journal of Nanotechnology: Nanomedicine & Nanobiotechnology

Journal of Neonatology & Clinical Pediatrics

Journal of Nephrology & Renal Therapy

Journal of Non Invasive Vascular Investigation

Journal of Nuclear Medicine, Radiology & Radiation Therapy

Journal of Obesity & Weight Loss

Journal of Orthopedic Research & Physiotherapy

Journal of Otolaryngology, Head & Neck Surgery

Journal of Protein Research & Bioinformatics

Journal of Pathology Clinical & Medical Research

Journal of Pharmacology, Pharmaceutics & Pharmacovigilance

Journal of Physical Medicine, Rehabilitation & Disabilities

Journal of Plant Science: Current Research

Journal of Psychiatry, Depression & Anxiety

Journal of Pulmonary Medicine & Respiratory Research

Journal of Practical & Professional Nursing

Journal of Reproductive Medicine, Gynaecology & Obstetrics

Journal of Stem Cells Research, Development & Therapy

Journal of Surgery: Current Trends & Innovations

Journal of Toxicology: Current Research

Journal of Translational Science and Research

Trends in Anatomy & Physiology

Journal of Vaccines Research & Vaccination

Journal of Virology & Antivirals

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