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Research paper

Building community-clinical linkages to increase older adult physical activity: The PT-REFER trial protocol and participant baseline characteristics

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ABSTRACT

Background: Physical activity is important for maintaining older adult health, but a majority of older adults are not meeting recommended physical activity levels. This paper describes the protocol and participant baseline characteristics for a trial (named "PT-REFER") to test an intervention focused on developing community-clinical linkages to increase older adult referrals from physical therapy clinics to an evidence-based group exercise program (Enhance®Fitness) (EF) offered by YMCA associations.

Methods: We designed a two-arm cluster-randomized controlled trial with YMCA associations. We conducted formative research with YMCA staff and physical therapists to inform intervention format and content. The primary outcome is the number of new participants enrolled in EF over the course of 30 months. We also collect process information on cost and implementation though structured surveys and semi-structured qualitative interviews.

Results: The PT-REFER intervention creates a learning collaborative for YMCA associations, which are tasked with implementing a number of capacity- and partnership-building activities over the course of seven months, and participating in monthly group technical assistance calls. We recruited 20 YMCA associations from 13 states. At baseline, the average number of EF sites per association was 3.9 and the monthly average number of new EF participants was 3.7.

Conclusions: This study will test an approach to increasing the capacity of YMCAs for conducting outreach to physical therapy clinics, and evaluate the factors that may influence its implementation. As a result, it has the potential to contribute to our understanding of how to develop viable and sustainable community-clinical linkages for older adult health.

1. Introduction

Physical activity has many benefits for older adults, including the prevention and management of chronic diseases and improved strength and balance [1]. Older adults who are more physically active are able to maintain activities of daily living, live independently, have reduced major mobility disability, and are less socially isolated compared to physically inactive older adults [2,3]. However, 51% of older adults aged 65–74 and 65% of older adults aged 75 and over do not meet the recommended guidelines for either aerobic or muscle-strengthening physical activity [4], due to barriers such as pain, cost, lack of transportation, lack of interest [5], and lack of awareness of available and suitable programs [6,7].

Clinical providers play an important role in getting patients to be more physically active. For example, older adults who receive brief counseling for physical activity from their provider are more likely to exercise [8]. Among clinical providers, physical therapists (PTs) often provide physical activity counseling to their patients. During the course of treatment, PTs form a strong therapeutic alliance with their patients and understand patients' physical abilities and limitations. However,

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while PTs would welcome continuity of care for their patients to maintain gains after physical therapy ends, they often lack knowledge about physical activity resources in the community and have limited infrastructure for communicating with potential partners [9].

One community-based program with demonstrated success in maintaining and improving older adult physical function [10] and quality of life [11,12] is Enhance®Fitness (EF). EF is an evidence-based group physical activity program designed for older adults [13]. The Arthritis Program at the Centers for Disease Control and Prevention recommends EF for people with arthritis, and the Administration on Community Living recognizes it as both a falls prevention program and chronic disease self-management support program [14,15]. EF is offered in a variety of community settings nationwide, including senior centers, YMCA associations, residential senior housing, and faith-based organizations [16].

Clinical-community linkages (CCLs) are formal partnerships between clinical healthcare providers and community-based programs (e.g., PT referrals to physical activity programs), and serve as a promising avenue to increasing older adult participation in physical activity [17,18]. Clinical settings often cannot provide physical activity or health promotion programming for their patients in the office. As mentioned above, many community organizations such as the YMCA deliver evidence-based programs for older adult physical activity, but clinical providers are not always informed about these programs [19]. At the same time, community organizations may have limited skills for approaching healthcare providers and limited knowledge about the kinds of information relevant to providers and their older adult patients [19].

We designed the Physical Therapists – Recommending Enhance®Fitness to Expand Reach (PT-REFER) trial to test an intervention focused on building internal capacity at YMCA associations for conducting outreach to physical therapy clinics, and for developing and maintaining partnerships with such clinics in order to increase older adult participation in EF. We describe PT-REFER intervention development, study design, and the baseline characteristics of enrolled YMCA associations.

2. Intervention development

The YMCA is a national network of mission-driven, community-based nonprofit organizations dedicated to strengthening communities and supporting healthy living; it serves more than 22 million people every year. The YMCA is a nationally-networked organization that consists of 900 associations operating 2700 local YMCA branches, which serve more than 10,000 communities nationwide [20]. YMCA of the USA (Y-USA) is the national resource office for the YMCA associations operating in all 50 states, Washington, D.C., and Puerto Rico. In 2012, Sound Generations, the owner and licensing authority for EF, entered into an expanded licensing agreement with Y-USA. Under the agreement, any YMCA association or branch can implement EF.

We planned the PT-REFER intervention as a change agent intervention, in which a trained Y-USA staff person actively disseminates effective practices to YMCA associations. Use of change agents has been shown to be an effective means of disseminating evidence-based practices [21,22]. Since Y-USA has used learning collaboratives [23] as the dissemination approach in previous initiatives to promote organizational capacity-building (e.g., for cancer survivorship programs) [24], the PT-REFER intervention creates a learning collaborative for YMCA associations, which are tasked with implementing a number of capacity- and partnership-building activities over the course of seven months (Table 1). To support the implementation of these activities, each YMCA association designates an outreach team that receives an intervention package and participates in group technical assistance telephone calls with the Y-USA change agent (also called "interventionist"). These calls focus on reviewing tasks, sharing experiences, and quality improvement.

Three sources guided intervention package development: a) previous Y-USA learning collaborative toolkits, which employ monthly charts of work and establish a clear order and pace of activities that encourages gradual mastery of skills; b) a literature review on best practices for outreach, partnership development, and adult learning; and c) findings from formative research with PTs and YMCA associations. The remainder of this section describes the formative research, our assessment of intervention package feasibility, and revisions made to the package. The University of Washington Institutional Review Board approved all study protocols.

2.1. Formative research with PTs and YMCA associations

We first conducted direct observations in PT clinics in order to familiarize ourselves with the types of interactions that take place during PT appointments. We used information collected through observations to inform the development of the interview guide for interviews with practicing PTs. Lastly, we interviewed staff from YMCA Associations enrolled in the study to further inform intervention development.

2.1.1. PT observations

We conducted direct observations in five physical therapy outpatient clinics in the Seattle area to collect information about patient-provider interactions regarding physical activity. We observed clinic waiting areas and 39 patient-provider interactions in exam rooms during scheduled appointments using observation methods adapted from the Communication Observation Method manual [26] and Davis Observation Code [27,28]. These observations revealed that during physical therapy sessions, PTs and patients discussed physical activity options outside the clinic. As a result, these sessions could offer an opportunity for PTs to refer patients to a program like EF [9].

2.1.2. PT interviews

We conducted 30 semi-structured qualitative interviews with practicing PTs from around the country. These interviews focused on current physical activity recommendation practices, general perceptions about EF, thoughts about referring patients to EF, and perceptions about how YMCAs can best work with PTs to disseminate information about EF and promote participation. Interviews lasted approximately 1 h. Analysis employed the same general approach as the YMCA staff interviews. Detailed findings from these interviews are published elsewhere [9]. PTs suggested that, when presenting EF to PTs in clinics, EF program staff should emphasize safety, program effectiveness, and the opportunity to retain therapy gains [9]. In addition, PTs advised that EF staff should describe program structure (e.g., specific exercises), appropriateness for older adults, instructor credentialing, and the decision-making process for modifying exercises based on participant ability. Most expressed a preference for face-to-face presentations during staff meetings to enable meeting YMCA staff and EF instructors in person, and to facilitate conversations about program specifics.

2.1.3. YMCA staff interviews

We conducted 20 semi-structured telephone interviews with staff from YMCA associations enrolled in the trial. The interview guide included questions about current YMCA outreach practices, level of experience with evidence-based programming, and ability to implement a referral system. Interviews lasted about an hour, were audio-recorded, and transcribed verbatim by a professional transcriptionist. We performed a thematic analysis in Atlas.ti version 7 [25] using deductive codes derived from the interview guide. The results from this analysis show an interest from YMCA staff to build or strengthen partnerships with healthcare providers. In particular, they noted that partnering with PTs would connect them with older adults looking for physical activity options in their community as they complete physical therapy and strive to maintain any gains or benefits from their therapy.

At the same time, YMCA staff reported juggling many

Table 1
Monthly tasks and supporting tools in the PT-REFER intervention package.

Month	Tasks	Supporting tools
Month 1 (Pre-Work)	Convene toolkit team	Team-building worksheet
	Understand the background and purpose of this work	YMCA online courses on community-clinical partnerships
	Engage senior leaders	White paper describing study rationale and PT-YMCA partnership benefits
		Senior leader and project manager roles and expectations worksheet
Month 2	Strategize partnerships to help create referral relationships with PTs	Partnership inventory worksheet
	Planning for future influx of new participants.	Partnership development plan worksheet
		Program operations and capacity review worksheet
Month 3	Prepare data collection and management processes for feedback loop with PTs	HIPAA Privacy and Security Training
		Overview of key messages for PTs and physical therapy patients
	Understand how to frame EF for PTs and older adult patients	Provider feedback overview
Month 4	Plan for outreach	Outreach logistics worksheet and best practices (Who and How)
	Prepare elevator speech, pitch and presentations to physical therapy clinics	Review white paper
		How to create an elevator speech
Month 5	Contact physical therapy clinics and prepare for next steps	First contact sample scripts
	Review capacity to accommodate additional EF participants	In-service presentation PowerPoint template
		Best practices for developing and maintaining partnerships
Month 6	Present to physical therapy clinics	Best practices for presenting to physical therapy clinics
	Update YMCA senior leaders on project progress.	Senior leader and project manager roles and expectations update worksheet
Month 7	Reflect on toolkit implementation experience	Process debrief worksheet
	Celebrate success and identify areas for quality improvement	Plan-Do-Study-Act worksheet

Notes: EF = Enhance®Fitness; YMCA = Young Men's Christian Associations; PT = Physical therapist; HIPAA = Health Insurance Portability and Accountability Act.

responsibilities and having little time to spend on additional outreach activities. They also reported that previous outreach efforts to healthcare providers often did not lead to establishing partnerships. Consequently, they desired specific tools to facilitate and maximize the effects of outreach efforts, such as explicit information about how to frame EF for clinical audiences, methods for approaching potential PT partners, and information about identifying gatekeepers that could facilitate access to clinics or individual providers.

2.1.4. Formative research summary

The formative research described above provided a better understanding of what PTs and YMCA staff need to partner to promote older adult physical activity. PTs needed clear information about the benefits and structure of specific physical activity programs, and about the competency of the instructors. Based on this information, we incorporated into the toolkit: a white paper describing the rationale for PT-REFER and the benefits of PT-YMCA partnerships (e.g., helping older adults stay active), and brochures on the EF program that included information helpful to PTs before making an EF referral. YMCA staff needed clear guidance about what information PTs want and how to approach them. Based on this information, we incorporated some of the following components into the toolkit: example scripts for initiating first contact with PTs, a PowerPoint template for presenting information on EF to PTs, and online courses on how to build community-clinical partnerships.

2.2. Assessing feasibility and revising the intervention package

We assessed intervention package feasibility through in-person meetings with the five physical therapy clinics that participated in observational data collection (described above), and through conference phone calls with staff from four YMCA associations that offered EF but not enrolled in the PT-REFER trial. We gathered feedback using a semi-structured interview guide on the following topics: adequacy of the package for YMCA associations to work with PTs; feasibility and acceptability of referrals; creating feedback loops between EF programs and referring physical therapy clinics; best practices for presenting EF research; framing the YMCA and physical therapy clinic partnership; and intervention package flow and content.

We took extensive interview notes and analyzed them using thematic content analysis. YMCA and physical therapy clinic staff reported the intervention package to be user-friendly, and anticipated that the tools and guidance would help build capacity for partnership development between YMCA associations and physical therapy clinics. Since the package format was modeled after similar documents used by Y-USA technical advisors, YMCA staff were comfortable navigating its components. However, they also felt some of the components were too detailed and that there was some redundancy in content. As a result, we included a bulleted executive summary in the more detailed components of the package and highlighted essential information in bold font, so that staff could quickly understand content and navigate to relevant sections. An overview of the final version of the intervention package, including tasks and supporting tools for each of the seven months, is presented in Table 1.

3. Methods

3.1. Study design and sample-size calculations

Our study is a two-arm, cluster-randomized controlled trial. We chose YMCA associations as the unit of randomization because they operate at the metropolitan or small-city level, where provider professional networks and catchment areas for health care organizations tend to coincide. YMCA associations operate EF mostly in their local branches, but in order to maximize their reach to underserved populations, some YMCA associations offer EF in community sites, such as faith-based organizations, community centers, and minority-serving service organizations.

The primary outcome variable is the total number of new EF enrollees for each association in a 30-month period from the start of the intervention. The unit of analysis is the YMCA association; this negates the need to account for intra-cluster correlation between sites within associations in the power calculation, which would be required if the unit of analysis was the site. Enrollment data from the baseline period April 2015 to March 2016 were used to estimate a mean monthly enrollment for the control condition of 3.7 per association. With 10 YMCA associations per arm, the power is estimated to be 91% to detect a relative difference in enrollment of 50% for intervention compared with control; this translates into an average 30-month enrollment per association equal to 111 in the control arm versus 166.5 in the intervention arm. Hence, the hypothesized effect size is moderately large in relative terms (50%) but quite modest in terms of enrollees (55.5 over a 30-month period). The power was calculated using the formula for comparison of means [29], with means equal to 111 and 166.5 and standard

Table 2
Outcome and process measures in the PT-REFER trial.

Evaluation type	Measure	Data collection method	Reported by	Description	Data collection schedule
Trial outcome evaluation	Primary outcome	ODES	YMCA associations	Number of new participants enrolled in EF	Monthly (April 2016–September 2018)
	Secondary outcome	ODES	YMCA associations	Number of new EF enrollees referred by a PT	Monthly (April 2016–September 2018)
Quantitative process evaluation	Provider outreach practices	Online survey	YMCA associations	Current outreach practices to healthcare providers; leadership support for outreach; resources used for outreach; primary barriers to conducting outreach	Baseline (April 2016) 12 months (April 2017) 24 months (April 2018)
	Staff time	Online survey	YMCA associations	Job title; time allocation (%) across job duties, including outreach	Baseline (April 2016) Quarterly (June 2016–June 2018)
	Detailed outreach activities	Online survey	YMCA associations	Information on outreach activities, including number of emails; phone calls; in-person meetings; feedback to providers; resources provided (e.g., posters); cost of resources	Monthly (May 2016–June 2018)
Qualitative process evaluation	Toolkit implementation	Structured interview	YMCA associations (intervention group only)	Completion of toolkit activities; use of toolkit resources; time spent on each activity; usefulness of toolkit activities for building referral linkages to PTs	After months 3 and 7 of intervention (July and November 2016)
	Year 1 interviews	Telephone interview	YMCA associations	Outreach efforts; barriers and facilitators to outreach; senior leadership support for outreach; resources used during outreach; toolkit implementation (intervention group only)	May 2017
	Year 1 interviews	Telephone interview	PTs	Perceptions of YMCA outreach efforts; communication with YMCA partner; referrals to EF; reasons for non-referral; barriers and facilitators to referral	May 2017
	Year 2 interviews	Telephone interview	YMCA associations	Outreach efforts; barriers and facilitators to outreach; senior leadership support for outreach; resources used during outreach; toolkit use and dissemination; interest in receiving toolkit (control group only)	May 2018
Cost evaluation	Interventionist time	Invoice	Y-USA	Time spent on intervention-specific activities	Quarterly (April 2016–September 2018)
	Research team time	Budget	Research team members	Time spent on intervention-specific activities, separate from research-specific activities (e.g., participation in technical assistance calls)	Quarterly (April 2016–September 2018)
	Staff time*	Survey	YMCA associations	Job title; time allocation across job duties, including outreach	Quarterly (April 2016–June 2018)

Notes: ODES = Online Entry Data System; YMCA = Young Men's Christian Associations; EF = Enhance®Fitness; PT = Physical therapist; Y-USA = YMCA of the USA *This measure is the same measure used for the quantitative process evaluation.

deviations estimated to be 33.32 and 40.80 based on an estimated overdispersion parameter (ratio of variance to mean) equal to 10. Note that power was estimated using conservative assumptions on variances and ignored a potential gain in precision due to stratification that is difficult to quantify a priori; hence, a smaller effect size (e.g., 40%) may be detectable.

3.2. Eligibility criteria and recruitment

We worked with Y-USA to recruit YMCA associations into the study. Using Y-USA's existing process for announcing and soliciting applications for internal grants, we developed an application specific to research participation. To be eligible to apply to the Request for Research Participation (RRP), YMCA associations had to meet the following criteria: be in compliance with the National Council of YMCAs Constitution (Qualifications of Membership), be a current EF provider in compliance with Y-USA's national EF program license requirements as of November 2014, and submit an online application via Y-USA's Easygrants online system. One application per chartered YMCA association was allowed; single branches within associations were not eligible to apply separate from their association.

The RRP included the following components: a description of the proposed research study, eligibility criteria, application instructions, and the application itself. The application included eight questions designed to assess a YMCA association's experience, structure and capacity to participate in research. Questions covered the following topics: relationships with community healthcare partners (2 questions); leadership support (1 question); plan for sustainability and growth (2 questions); data collection (2 questions); and adherence to protocol (1 question). Each question had two parts: a self-rated scale [1–5] and a narrative response. To enable YMCA associations to rate themselves against an established standard, each scale included descriptions aligning with scores one, three and five. Narrative responses included specific evidence and examples that clearly supported the YMCA association's choice of scale score. The RRP was open in the Easygrants system from November 11, 2014 to December 5, 2014.

After the application period closed, Y-USA and the research team reviewed and scored the applications. All reviewers were provided with scoring guidelines and reviewer instructions as part of Y-USA's standard application review process. Each application was independently reviewed and scored by two reviewers, one from Y-USA and one from the research team. Reviewers entered scores in to the Easygrants system. Applications where the difference in reviewers' scores was large were reviewed again by the research team and Y-USA together to resolve the scoring discrepancy.

Our target was to recruit 20 YMCA associations into the study. Eighteen YMCA associations responded to the RRP in the Easygrants system. After review of scores and narrative responses, one YMCA association was deemed unprepared to meet the requirements of research study participation. In order to meet our goal of 20, Y-USA reached out to three additional YMCA associations who had not completed the RRP but met the eligibility criteria, and invited them to complete the RRP. All three completed the RRP. Their applications were reviewed and scored in the same way as the original applicants. All three were selected for the study.

3.3. Randomization

We created predicted enrollment estimates for each participating YMCA association based on the number of branches (with and without active EF programs), the number of licensed EF sites, and the number of enrollees during the baseline period of April 2015–March 2016. The 20 associations were then ordered by predicted enrollment and arranged into pairs of consecutive associations (i.e., strata). Within each stratum, the pair of associations were randomly assigned to intervention or control (one association per arm) using the random number generator in the R statistical software [30].

3.4. Data collection and measures

Data collection in the PT-REFER trial employs a mixed methods approach and uses existing administrative EF data, web-based surveys, and semi-structured telephone interviews. We briefly describe these measures below. For a detailed description of evaluation measures, including timing of data collection, refer to Table 2.

3.4.1. Outcome measures

The primary outcome variable is the total number of new enrollees in EF in a 30-month period from the start of the intervention. The source for this data is the EF Online Data Entry System (ODES), in which EF programs are required to record participant data as part of the licensing agreement with Sound Generations. ODES includes participant demographics, health history, fitness check results, and attendance. Data can be grouped by YMCA association or branch, EF site, EF class, and individual participant. New participants are identified based on the date their participant record was created in ODES. We chose as a secondary outcome the total number of PT-referred new EF enrollees for the same time period; this was not chosen as the primary outcome because participants may not recall or report that they were referred by a provider. If reported, referral source data is also recorded in the participant registration entry in ODES.

3.4.2. Process measures

In order to understand the context in which the intervention operated, we designed three quantitative process measures: a) *provider outreach practices*, collected at baseline and yearly afterwards, which provides information about current outreach activities to healthcare providers, leadership support, available resources, and primary barriers to conducting outreach; b) *staff time*, collected at baseline and quarterly afterwards, which provides information about how staff allocate their time across job duties, including outreach; and c) *detailed outreach activities,* collected monthly starting in month 1 of the trial, which tracks specific outreach activities such as phone calls, emails, and in-person meetings. We are collecting all three process measures via online surveys administered in REDCap [31], to be completed by the primary study contact at each enrolled YMCA association. To better understand the toolkit implementation and outreach process, we are conducting a process evaluation consisting of structured toolkit implementation interviews with the intervention YMCA associations, semi-structured trial midpoint and endpoint interviews with all YMCA associations, and semi-structured trial midpoint interviews with PTs. To evaluate the cost of the intervention, we are collecting information on interventionist time, research team time, and YMCA association staff time.

3.5. Statistical analyses

The primary analysis will be conducted using the intent-to-treat principle, with the YMCA association as the unit of analysis. The primary analysis will use Poisson regression to provide a test of the null hypothesis (i.e., no difference in new EF enrollees between intervention vs. control group), as well as an estimate and 95% confidence interval for the intervention effect. The regression model will contain a variable for treatment assignment (intervention vs. control) as well as the stratum used for randomization. Stratum will be included in the model as a fixed effect (a random effects model was considered but rejected due to the small sample size). Sensitivity analyses will also be conducted with adjustment for the following covariates: number of EF sites at baseline; number of YMCA branches at baseline; and number of new enrollees during the baseline period.

The treatment effect estimate will be the covariate-adjusted percentage difference in mean number of new enrollees in the intervention group relative to the control group. Hypothesis testing and creation of a

Table 3
Summary of baseline characteristics (N = 20).

	All (N = 20)		Intervention (n = 10)		Control (n = 10)	
	Mean (SD) or n (%)	*Range*	*Mean (SD) or n (%)*	*Range*	*Mean (SD) or n (%)*	*Range*
General characteristics						
Number of branches	6.35 (5.92)	1–24	7.30 (7.53)	1–24	5.40 (3.92)	1–14
Number of licensed EF sites	3.90 (4.66)	1–22	3.0 (2.31)	1–8	4.8 (6.21)	1–22
Monthly enrollment rate	3.67 (3.01)	0.2–12.4	4.00 (3.77)	0.2–12.4	3.33 (2.17)	1.2–8.5
Provider outreach practices						
Total number of healthcare partners	21.35 (37.19)	1–140	15.00 (30.22)	1–100	27.70 (43.77)	2–140
Total number of PT partners	1.80 (2.09)	0–8	1.50 (1.65)	0–5	2.10 (2.51)	0–8
Contact with healthcare partners						
Monthly or more	13 (65%)	–	6 (60%)	–	7 (70%)	–
Less than once a month	6 (30%)	–	4 (40%)	–	2 (20%)	–
N/A (no current partners)	1 (5%)	–	0 (0%)	–	1 (10%)	–
Contact with PT partners						
Monthly or more	8 (40%)	–	4 (40%)	–	4 (40%)	–
Less than once a month	6 (30%)	–	2 (20%)	–	4 (20%)	–
N/A (no current partners)	6 (30%)	–	4 (40%)	–	2 (20%)	–
Major barriers to outreach						
Staff turnover	6 (30%)	–	4 (40%)	–	2 (40%)	–
Limited time	19 (95%)	–	9 (90%)	–	10 (100%)	–
Competing demands	12 (60%)	–	9 (90%)	–	3 (30%)	–
Poor provider response	5 (25%)	–	3 (30%)	–	2 (20%)	–
Limited materials	3 (15%)	–	3 (30%)	–	0 (0%)	–
Other	2 (10%)	–	1 (10%)	–	1 (10%)	–
Staff time						
Total hours per week worked	39.99 (15.82)	2–60	37.58 (15.35)	10–55	42.40 (16.72)	2–60
Hours spent on tasks						
Outreach to PTs	1.29 (3.53)	0–16	1.98 (4.95)	0–16	0.60 (0.84)	0–2
Outreach to other providers	2.35 (2.66)	0–10	2.60 (2.41)	0–7	2.10 (3.00)	0–10
Member recruitment	3.15 (4.34)	0–15	1.15 (1.63)	0–5	5.15 (5.31)	0–15
Personnel/administration	18.20 (12.29)	1–42	18.40 (15.44)	2–42	18.00 (8.97)	1–34
Program duties	9.08 (8.33)	1–22.5	5.75 (8.02)	1–22.5	12.40 (7.59)	1–22
Have an outreach team	10 (50%)	–	6 (60%)	–	4 (40%)	–
Number of people on outreach team	2.40 (2.07)	–	2.83 (2.64)	–	1.75 (0.50)	–
"I have sufficient time to adequately conduct outreach to generate referrals and enrollment to EnhanceFitness."						
Agree or strongly agree	5 (25%)	–	4 (40%)	–	1 (10%)	–
Neutral, disagree, or strongly disagree	15 (75%)	–	6 (60%)	–	9 (90%)	–

Notes: EF = Enhance®Fitness; PT = Physical therapist.

95% confidence interval will be based on a permutation procedure to account for small sample size and for the fact that the outcome will not have a Poisson distribution (in particular, we expect the variance to be larger than the mean, as observed in the baseline data). We will perform sensitivity analyses to examine influence on the results of the unit of analysis (association versus branch), missing data, differential compliance, and external factors such as outside funding. We will also conduct sub-group analyses to assess differential intervention effects based on factors that are potential effect moderators (e.g., season, region).

4. Results

4.1. Baseline characteristics of enrolled YMCA associations

Baseline characteristics of the YMCA associations enrolled in the study are presented in Table 3. The geographic locations of the associations are shown in Fig. 1. Overall, the randomization worked well to produce two groups that were balanced on most covariates, although some differences between groups occurred by chance despite the randomization (for example, number of healthcare partners and time spent on program duties). At baseline, YMCA associations enrolled in the study had an average of 6 branches and operated 4 EF sites, with an average number of 4 new enrollees per month. They reported 21 healthcare partners on average, out of which 2 were PTs. A majority of associations reported being in contact with these partners at least once a month. Almost all enrolled YMCA associations reported limited time as a major barrier to outreach, and that they spent an average of 2 h per week conducting outreach to all types of healthcare providers. Half of the associations had an outreach team in place at baseline, with an average size of 2 members.

Fig. 1. Geographic location of YMCA associations enrolled in the PT-REFER study.

5. Discussion

In this paper we describe PT-REFER, a two-arm cluster-randomized

controlled trial focused on building community-clinical linkages between physical therapy clinics and YMCA associations to increase older adult participation in an evidence-based physical activity program (EF). We conducted qualitative formative research with both YMCA associations and PTs to gain a better understanding of how to facilitate connections between these community and clinical partners and to inform the development of the intervention. The intervention tested in this trial involves a change agent who establishes a learning collaborative for YMCA associations tasked with implementing a number of capacity- and partnership-building activities over the course of seven months.

The study has a number of limitations. Although the formative research included PTs and YMCA staff from across the country, findings may not be generalizable outside of the study population. Moreover, the effectiveness of the learning collaborative model to increase older adult participation in evidence-based programs may be limited due to a number of intervening environmental, organizational, and individual factors: organizations may not be able to engage in the activities prescribed through the collaborative due to funding limitations, competing priorities, lack of adequate support from leadership, and lack of infrastructure for successful partnerships. At the same time, older adults may not be able to participate in evidence-based physical activity programs in the community even after receiving a referral due to barriers such as transportation and cost.

Despite these limitations, this study has the potential to make a significant contribution to the field in three important ways. First, we focus on PTs. Most community-clinical linkage interventions tend to engage primary care providers and a variety of community programs [18]. In contrast, our intervention builds on the shared mission of PTs and community physical activity programs - increasing the number of older adults that meet recommendations for physical activity engagement - and on the unique ability of PTs to assess the suitability of such programs for their patients. If this specific and aligned linkage approach is successful, researchers and practitioners may want to explore developing other community-clinical linkages that involve specialized care and relevant community programs, such as cardiac rehabilitation and physical activity.

Additionally, the development of such physical activity community-clinical linkages may help increase the small number of older adults who engage in recommended levels of physical activity. Because participation in physical activity helps older Americans manage their chronic conditions and prevent unnecessary disease, disability, and injury [3,32,33] physical activity based linkages have the potential to alleviate the health and economic impact of chronic disease in our aging society, and improve community capacity to make positive changes in population health.

Second, we propose a pragmatic, community-engaged approach to intervention development [34] that addresses the specific needs of partners, and focuses on the usefulness of the intervention and its fit with the real-world context in which it will be implemented. We engaged YMCA and clinical stakeholders early in the research process, and developed the intervention package based on learnings from formative research with these stakeholders. This type of deep research dive into the two organizational and practice “worlds” promotes the development of tools that are needed, relevant, and can be easily integrated into the organizational workflow. The results of our feasibility assessments with both partners support this characterization. Such methods allow the creation of interventions that are designed for dissemination [35,36], and promote faster and wider adoption outside of the research context.

Finally, our study contributes to the burgeoning literature on the effectiveness of learning collaboratives, which are increasingly used as a model for accelerating the dissemination and implementation of innovative models of care [37]. While the learning collaborative model has been used in other initiatives [38,39], the factors contributing to collaborative success or failure are not well understood. The process evaluation planned as part of our study, which includes both qualitative and quantitative components, will provide an in-depth examination of facilitators and barriers to implementation of the model, and may enable the development of resources for improving outcomes.

6. Conclusion

Community-clinical linkages are promising avenues for increasing older adult participation in physical activity in the community. However, organizations that may be well suited to partner, such as YMCAs and physical therapy clinics, may not have the knowledge, capacity, and resources to develop and maintain successful partnerships. This study will test an approach to increasing the capacity of YMCAs for conducting outreach to physical therapy clinics, and evaluate the factors that may influence its implementation. As a result, it has the potential to contribute to our understanding of how to develop viable and sustainable community-clinical linkages to improve older adult health.

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Conflicts of interest

The authors declare that they have no competing interests.

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