



Extension Educators and Volunteer Leaders: Evaluation of Fitness Outcomes Among Participants in Community Strength Training Classes

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Volunteer-led strength training classes can expand access, improve exercise adherence, and enhance intervention sustainability for older adults. This study compared participant functional fitness outcomes between volunteer-led and Extension educator-led StrongWomen strength training groups in community settings. Change scores for participants ($n = 317$) were calculated for six Senior Fitness Test (SFT) measures. A non-parametric analysis of independent samples to determine SFT score differences between participant groups (educator-led and volunteer-led) showed no significant differences. Volunteers and professionals, like Extension educators, may be similarly effective in conducting community-based strength training classes resulting in improved functional fitness outcomes. We offer recommendations for organizations seeking to adopt similar approaches.

Keywords: strength training, community-based, Cooperative Extension, volunteer leaders, older adults, rural outreach, fitness outcomes, lay leaders

INTRODUCTION

As Americans age, their participation in muscle strengthening exercise declines. According to one recent study, strength training participation begins to fall around midlife. Prevalence is lowest among those age 75 and older, when only 21% meet recommendations of twice weekly participation (1). Another study comparing the proportion of older adults meeting strength training recommendations across three large, national studies reported prevalence ranging from 16.7 to 21.6% (2).

Regular strength training is associated with reduced fall risk, reduced disability, and improved chronic disease management, all conditions disproportionately affecting older adults (3–7). Given the well-established and wide ranging benefits of strength training, low prevalence among older adults is a valid concern.

Older adult's exercise barriers include time commitments, geographic proximity to exercise facilities, transportation, and lack of social support (8–11). Older adults in rural areas face additional barriers related to geographic isolation and limited financial resources for fee-based strength training classes or facilities (12, 13). New approaches are needed to reduce barriers and

increase the proportion of older adults regularly engaging in strengthening activities. Peer or lay leadership of community-based programs is one approach with promise for increasing strength training and improving functional fitness outcomes among older adults (14).

Peer and lay leaders have become common elements of community-based intervention efforts, but no generally agreed upon definition for these terms exists (15, 16). The terms “peer,” “volunteer,” and “lay” are often used interchangeably in the literature, although important differences may exist depending on intervention type and implementation setting. Lay leaders, who may or may not be peers, have been referred to as lay health advisors, community health workers, community health aides, and community health advisors in health promotion literature (17). These leaders may be similar to the target audience in age, income level, racial or ethnic group, or residential geography. Lay leaders are typically nonprofessional community members trained to deliver specific interventions (18, 19).

LITERATURE REVIEW

Strategies to increase older adults’ physical activity levels have been the focus of numerous studies (20–22). Benefits of strength training for older adults are well-established (23). Structured community-based programs are an effective strategy (6, 7, 24–26). For example, study of fitness outcomes in the StrongWomen Program (SWP), a nationally-disseminated and community-based strength training program, showed older adult women significantly improved functional fitness in six domains assessed by the Senior Fitness Test (SFT) (27–29). The SFT is a criterion-referenced test based on scores for thousands of older adults. Other programs using selected domains of the SFT to evaluate participant outcomes in community-based settings, such as EnhanceFitness and Stay Strong, Stay Healthy (SSSH), found improved functional fitness (30, 31). Fitness improvements in SWP, EnhanceFitness, and SSSH were attained by instructors with and without specialized exercise backgrounds. The SWP and SSSH programs are typically led by non-exercise professionals trained to instruct the structured classes. EnhanceFitness was originally instructed by certified fitness trainers after receiving additional, program-specific training (30).

Published studies exploring use of volunteers or lay leaders in health outreach programs, including group exercise and strength training classes, have increased in the last decade (24, 32–37). A recent review of peer-led healthy aging programs implemented in practical settings found only 12 published studies suitable for inclusion. Of six peer-led programs included, three involved peer leaders in strength training instruction (14). While more practice-based evidence is needed supporting adoption of peer-led strategies to increase older adult strength training, including lay persons in program delivery clearly offers benefits for program participants (19, 38). Additionally, increased access afforded through peer-led programs has potential to positively impact public health (38, 39).

At the individual level, similar participant outcomes have been found in volunteer-led and professionally-led programs

addressing a range of health conditions. Outcomes for volunteer-led groups were found comparable for arthritis self-management, falls prevention, chronic disease self-management, and physical activity (33, 40, 41). From a relational perspective, volunteer leaders may be more effective than professionals and can serve as powerful role models (42). Advice and new knowledge may be more readily accepted and digested in an atmosphere of shared common experiences (43). Volunteer-led approaches also promote self-efficacy, a major determinant of physical activity maintenance (44). Volunteer leaders can advise participants of potential challenges in being physically active, communicate strategies to deal with them, and increase participant self-efficacy in dealing with difficulties (45). Self-efficacy is important in exercise adoption and can decrease attrition from exercise programs (46, 47). Additionally, volunteer-led group strength training classes can improve exercise adherence and maintenance (19, 48).

Improving access to strength and balance programming is an important public health strategy; however, access is limited when programs rely on professionals for instruction (e.g., physical therapists, nurses), particularly when teaching exercise classes draws professionals away from clinical activities (37, 49). A recent systematic review found that availability of organized exercise opportunities was the most common environmental factor motivating older adults’ strength training engagement. Access to facilities was a commonly cited motivator (11); lack of access has been cited as a barrier (12). A majority of community-based group fitness classes are led by health or fitness professionals, or others with certifications or degrees in Kinesiology and related fields (6, 19). One exception is the open-access community-based physical activity programs offered by Extension educators operating through the Land-Grant University Cooperative Extension System (21). Extension educators, who typically have bachelor’s or master’s degrees in areas unrelated to exercise science, offer programs through a network of county Extension offices in each state and are supported by campus-based faculty in their respective states.

Program models including volunteer leaders is one strategy to address access barriers of cost and transportation, particularly for rural older adults who typically have limited access to evidence-based programs (39). Capacity for implementation limits program dissemination to high-need areas and access by populations who stand to benefit most. Lay volunteers, as nonprofessional community members, are an important complement to professional healthcare providers given the shortage of people currently qualified to address physical activity needs of the growing older adult population (15, 16, 18, 37, 50).

Volunteer leadership of programs may enhance sustainability and reach (24, 39, 51, 52). Community-based program sustainability is important to make long-term differences in health behaviors, which is vital for rural older adults who are less healthy and more sedentary than their urban counterparts (53, 54). One study found counties using volunteer leaders to instruct strength training groups were 8.3 times more likely to have continuing groups compared with counties not using volunteer leaders (51).

Some studies have compared volunteer-led groups and a control group, but few reported functional fitness outcomes and drew comparisons between volunteer-led and professionally-led approaches in real-world, community-based settings (26, 33, 35, 52). The study described here examined fitness improvements among participants of two types: those in counties adopting a volunteer-led program model, and those relying solely on an educator-led model for StrongWomen Program (SWP) delivery. This article provides a brief description of the SWP and the implementation approach involving Extension educators and volunteers in one state. Then, findings from analysis of functional fitness outcomes among participants, and comparison of participant improvements in counties adopting the volunteer-led or educator-led model, are described.

Here, “volunteer leader” is used in reference to unpaid laypersons trained to teach structured community-based strength training classes. In this context, volunteer leaders usually do not have specialized fitness certifications but have received training to lead a specific sequence of exercises under supervision of a community education professional employed by an organization. For clarity, the terms “lay” and “peer” are used when referring to studies using this terminology when volunteer status was not reported.

PROGRAM APPROACH

The SWP is an evidence-based strength training program for mid-life and older women. The SWP was designed to be community-based and implemented through non-profit organizations and settings by trained SWP leaders (55). The program consists of hour-long strength training sessions held twice weekly over 12 weeks. Individual sessions include a warm-up, 8–10 strengthening exercises using dumbbells and ankle weights, and a cool-down and stretch. Classes met in various sites, most commonly community centers, churches, and meeting rooms located in county Extension offices.

Nationally, the SWP is most widely implemented through the Cooperative Extension Service (Extension). Extension programs are delivered by professional Extension educators housed in county-based offices. Extension educators are paid employees, typically non-exercise professionals, hold a bachelor’s or master’s degree, and conduct programming in a variety of areas. Extension educators implementing the SWP in Arkansas had a range of educational backgrounds, including family and consumer sciences, nutrition, and health education. Extension educators implement programs based on local needs, which usually includes some aspect of health and wellness.

Extension educators leading the SWP completed the StrongWomen Program Leader Workshop, where they received the StrongWomen Toolkit developed by the Tufts University StrongWomen team to guide implementation (56). Workshops in Arkansas were conducted by a StrongWomen Ambassador team comprised of Extension educators in the state who were long-term program leaders with extensive training and SWP mentorship. The strength training program, including training for Program Leaders (those trained to lead local

classes, regardless of volunteer or professional status) and the StrongWomen Tool Kit, have been described elsewhere (27, 55).

The SWP in Arkansas evolved to include instruction by volunteers recruited from an initial SWP class led by the county Extension educator (51), but this did not occur in every county. In counties where volunteer instructors were not recruited, classes were solely led by the Extension educator. Consistent with SWP protocols, both Extension educators and volunteer leaders were trained by StrongWomen Ambassadors using a standardized format and materials (55).

In counties utilizing the volunteer delivery model, the Extension educator remained responsible for program oversight, including evaluation, maintaining paperwork, and conducting site visits to monitor progress and ensure program fidelity. In both class formats—educator-led or volunteer-led—the Extension educator conducted the SFT to evaluate participant functional fitness improvements (28).

METHODS

Participants

The initial sample consisted of 658 SWP participants in volunteer- and educator-led classes who had completed a baseline SFT at or near the beginning of the program. Of these, 317 participants completed a subsequent SFT at or near 12 weeks after program start and were included in the analysis. Participants were categorized as volunteer-led or educator-led based on county of SWP class attendance. Counties designated educator-led did not have one or more trained SWP leaders aside from the Extension agent. The presence of one or more volunteers trained as SWP leaders determined county classification as volunteer-led. Participants represented 22 counties with ages ranging from 27 to 95 years old ($M = 66.51$; $SD = 12.00$) and BMIs ranging from 18 to 51 ($M = 29.00$; $SD = 6.49$). Almost all participants were White women living in a rural areas. Nearly three-quarters of participants ($n = 234$) were in volunteer-led counties. The Institutional Review Board of the affiliated university approved the procedures used in this study.

Setting

The SWP targets mid-life and older women, but was open to adults of all ages; a majority of participants were female older adults. SWP participants included in the sample attended strength training classes led by the county Extension educator (educator-led), or were in counties utilizing volunteer leaders to instruct programs (volunteer-led). Participants in counties classified as volunteer-led were instructed by volunteers all or some of the SWP sessions. The program delivery model used in this state recommended new SWP classes be initiated and led by the Extension agent for the first 12 weeks, but classes frequently transitioned to volunteer leadership before the initial 12 week period concluded. Volunteer leaders enabled ongoing classes which continued indefinitely and beyond the initial 12 weeks. New participants could join existing SWP classes at any time. Participants attending classes in educator-led counties were led by the county Extension educator. Participants in volunteer-led counties may have attended classes taught solely by volunteers or

taught by both the educator and volunteer leaders. Regardless of leader type, all sessions were conducted by instructors completing the standardized SWP Leader Workshop and complied with program protocols.

Data Collection

Extension educators were trained and conducted participant SFT using standardized protocols. Data were reported to a web-based data management system and exported for purposes of the analysis described here. The SFT is criterion-referenced by age and gender and was selected as most appropriate for the project given participants' age range, the need for measure consistency across participant groups, and ease of administration. The SFT consists of six functional fitness measures, plus height and weight to determine body mass index (BMI). Focus area and aligning measures include: upper body flexibility: back-scratch test; lower body flexibility: sit-and-reach test; agility and dynamic balance: 8-foot up-and-go test; upper body strength: arm curl test; lower body strength: chair stand test; aerobic endurance: 3-min step test (28).

Data Analysis

Baseline SFT data and 12-week follow-up data were matched for participants ($n = 317$). To account for differences in individuals, six change scores, one for each SFT measure excluding BMI, were calculated by subtracting the post-scores from the initial scores. Following frequency analysis and a determination that not all variables were normally distributed, a non-parametric analysis of independent samples with a Mann-Whitney U -test statistic was performed to determine any statistically significant differences on the SFT change scores between group types. Data were analyzed using SPSS version 26 (IBM, Chicago).

RESULTS

Regardless of county classification by leader type (educator- or volunteer-led), a majority of participants improved on all measures of functional fitness, except agility and dynamic balance. Sixty-six percent of participants ($n = 209$) improved lower body strength as indicated by improved chair stand test scores; 64% ($n = 204$) improved upper body strength measured by the arm curl test. Improvements in aerobic endurance were observed among 66% of participants ($n = 209$). Lower body flexibility, measured by the chair sit-and-reach test, was improved by 57% of participants ($n = 180$). A slight majority of participants, 51% ($n = 161$), improved upper body flexibility. Agility and dynamic balance, measured by the 8-foot up-and-go test, were improved by 42% ($n = 133$) of participants.

Table 1 lists change score means and standard deviation by county leader type, U -scores, and significance level for each functional fitness variable. There were no statistically significant differences between the educator-led and volunteer-led participant groups. Community-based strength training classes led by volunteer leaders and Extension educators may obtain similar improvements in functional fitness outcomes.

TABLE 1 | Comparison of change scores for six functional fitness measures by leader type.

Measure	<i>n</i>	Volunteer-led		Educator-led		<i>U</i>	<i>p</i>
		Mean	SD	Mean	SD		
Lower Body Strength	308	1.79	4.17	1.94	4.40	9,446	0.794
Upper Body Strength	314	2.18	6.04	1.98	5.81	9,559	0.887
Endurance	311	10.90	29.66	7.60	25.54	-8,689	0.316
Lower Body Flexibility	309	0.69	3.51	0.99	3.30	9,391	0.903
Upper Body Flexibility	312	0.09	5.13	-0.99	3.56	8,459	0.137
Agility and Dynamic Balance	314	0.38	1.41	0.60	1.80	9,832	0.79

DISCUSSION

Findings of no significant difference in fitness outcomes among participants in volunteer-led and Extension educator-led counties lends support to the value of volunteer approaches in community-based programs. Concerns about volunteer leader effectiveness and program quality have been voiced as rationale for not adopting this approach. These findings help address such concerns and support adoption and implementation of outreach strategies with intentional involvement of volunteer leaders. Implications for program design, implementation, and sustainability extend beyond the niche of group exercise classes. Designing programs with intent for delivery by volunteer leaders, given that similar participant outcomes are expected as with professional leaders, can help ensure program continuance and expansion following the initial implementation period. Based on findings, we can now offer more definitively recommended strategies for organizations aiming to develop or adapt volunteer-led health programs.

Program Planning

Health outreach programs planned with intent to engage volunteers from the outset will be more easily implemented (57). Program structure, as key to successful volunteer leader engagement, should explicitly identify volunteer leader roles. Volunteer leaders may offer high value and return on investment for organizations and should be engaged in stimulating roles providing opportunities to practice new skills or build on existing personal strengths (58, 59).

Volunteer Leader Recruitment

Active volunteer leader recruitment strategies, including personal invitations to potential volunteers, are recommended over passive methods (e.g., newspaper articles/ads, fliers, brochures), which require interested individuals to initiate action (60, 61). However, program implementers should be careful to avoid over-recruiting from the same pool of volunteers from convenience or familiarity. Research in other volunteer-led programs found

reframing ideas about who volunteers and where volunteers can be found is essential for program growth (62).

Volunteer Leader Training

Proper training is imperative to ensure program fidelity and volunteer leader success (16). In the program described here, volunteer leaders and Extension educators received standardized face-to-face training on the evidence-based program protocol (56). Volunteers' effectiveness in achieving similar participant fitness outcomes as professionals suggests volunteer leaders should be trained using the same methods and level of rigor often reserved for professionals. Face-to-face training was necessary to adhere to the SWP Leader Training protocol and allowed trainers to evaluate both volunteer leaders and Extension educators form and technique in teaching strengthening exercises. The initial time and monetary investment in training was intensive and may have been reduced by utilizing other methods, such as web-based training. However, this training modality may be inappropriate for initial training of group exercise leaders, even when local classes are supervised by the Extension educator to ensure program adherence. The trend toward offering more web-based training may be suitable for some community-based programs, but effectiveness for exercise classes needs further evaluation. Program planners should carefully weigh costs and benefits of face-to-face vs. indirect training methods to determine the best strategy (63).

Volunteer Leader Engagement and Motivation

Understanding factors motivating volunteer engagement and continued involvement is key. Motivational factors include achievement, affiliation, and power and can be extrinsic or intrinsic. Motivators for initiating service may differ from motivators for continuing service (64). Learning new things, helping others, and a sense of obligation to the community are intrinsic motivators for volunteers. Motivational strategies for organizations include continued training, which provides opportunities for growth and development; creating opportunities for volunteer leaders to give and receive social support; and formal and informal recognition (37).

Recommendations for future studies include replicating this study to demonstrate volunteer leader efficacy as well as consideration of leader and program participant demographic characteristics. Additionally, future studies should explicitly investigate effectiveness of leader training format—face-to-face, web-based, or a hybrid approach combining both. Lastly, future studies should examine adoption of similar volunteer-led approaches for programs originally developed for professional delivery.

Limitations

Personal and professional backgrounds of the volunteer leaders in this study, including educational status, is unknown. Prior research on perceived factors supporting volunteer leader model adoption among implementing Extension educators found volunteer leaders' education level to be an influential

factor (65). A multi-state study found trained leaders with a bachelor's degree or higher were more likely to implement the SWP than those with lower education levels (66). In this single state study, volunteer leaders with professional work experience, such as retired teachers, or past athletic participation, may have been more likely to volunteer than others which could influence their success in this type of role. However, the influence of such factors cannot be accounted for here.

The absence of participant characteristics from our analyses, such as education, age, race and ethnicity, professional background, and economic status is an additional limitation potentially impacting participant outcomes. Aside from age and gender, these data were not collected as part of the SFT or SWP evaluation protocol. A further limitation is the proportion of the initial sample included in data analyses. Of 658 participants completing baseline SFT at or near the start of the SWP, 48% ($n = 317$) were eligible for inclusion. Participants with subsequent SFT delayed beyond 12 weeks were excluded to ensure consistency in comparisons.

This analysis utilized secondary data from a community-based program in 22 counties. Baseline and follow-up assessments were matched at the participant level with county of class attendance identified. However, leader type was not built into program reporting protocols and direct comparisons between classes led by volunteers and those led by Extension educators are not possible. Further, some instructor crossover is likely, as groups could have been led by both Extension educators and volunteers during the 12-week period. The aim of this study was not to establish volunteer or educator-led classes as "better," but to explore whether fitness outcomes were comparable between participants in counties using either delivery models. Future study exploring differences in participant fitness outcomes by class delivery method and leader characteristics would further contribute to the literature.

Although the SWP targets mid-life and older women, programs offered by Extension are open access and cannot be limited, by law, to specific gender and age groups. Program protocols include use of the SFT as a functional fitness measure, although established ranges of functional ability are not available for those younger than 60 years of age. Use of the SFT is a potential limitation, given the age range of participants in the sample, but is addressed by data analysis methods. Change scores were calculated by comparing individual participants' 12-week follow-up assessment to baseline assessment data and was unrelated to the age and gender ranges established in the SFT.

Several issues made use of a control or comparison group unfeasible. Secondary data produced from real-world implementation of a community-based program were analyzed, which did not allow for experimental or quasi-experimental design. Despite this limitation, the analysis presented is among the first to explore differences in participant fitness outcomes in counties with volunteer leadership and counties with Extension

educator leadership, contributing to a gap in the literature regarding effectiveness of volunteer-delivered strength training programs.

CONCLUSION

Demand for community-based fitness programs will remain unmet without adoption of new approaches to expand reach (16, 24). The shortage of programs, combined with limited time available for professionals to offer such programs, points to the promise and importance of using volunteer leaders to bridge the gap. Adaptation of evidence-based programs for instruction by volunteer leaders offers an alternative to professional instruction and a feasible approach to increase reach.

The volunteer leaders and Extension educators in this study were equally effective in teaching the exercise program, as evidenced by improved functional fitness among participants. The finding of no significance between group functional fitness outcomes is likely due to use of a standardized protocol for training and adaptation of a research-based strength training program for implementation in community settings. Organizations seeking to implement similar programs should be mindful of training needs and capacity of lay leaders or volunteers. Training and support provided should be high-quality and equally as rigorous as training provided to professionals delivering the same program.

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DATA AVAILABILITY STATEMENT

Requests to access these datasets should be directed to M.E. Betsy Garrison, megarris@uark.edu.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by University of Arkansas Institutional Review Board. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

All authors jointly developed study design. LW and LT coordinated data collection. LW led manuscript preparation. MG conducted data analysis and interpretation. All authors read, contributed to, and approved the final manuscript.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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